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XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations

Final Report

Draft Report Published as NUREG-0324

Prepared by J. F. Sagendorf, J. T. Goll, W. F. Sandusky

Pacific Northwest Laboratory
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ABSTRACT

Provided is a user's guide for the U. S. Nuclear Regulatory Commission's (NRC) computer program XOQDOQ which implements Regulatory Guide 1.111. This NUREG supercedes NUREG-0324 which was published as a draft in September 1977. This program is used by the NRC meteorology staff in their independent meteorological evaluation of routine or anticipated intermittent releases at nuclear power stations. It operates in a batch input mode and has various options a user may select. Relati atmospheric dispersion and deposition factors are computed for 22 specific distances out to 50 miles from the site for each directional sector. From these results, values for 10 distance segments are computed. The user may also select other locations for which atmospheric dispersion deposition factors are computed. Program features, including required input data and output results, are described. A program listing and test case data input and resulting output are provided.

SUMMARY

A user's guide for the U.S. Nuclear Regulatory Commission computer program XOQDOQ is presented. This program is used by the staff in their independent meteorological evaluation of routine or anticipated, intermittent releases of radionuclides at commercial nuclear power stations. The program is not intended to evaluate the meteorological aspects of the consequences of accidental releases.

The present version of the program operates in a batch-input mode with various options that are user selectable. Relative atmospheric dispersion factors, X/Q values, and deposition factors, D/Q values, are computed for 22 specific distances out to 50 miles from the site. From these values, X/Q and D/Q values for 10 distance segments are computed. Both X/Q and D/Q values are computed for user-inputted specific points of interest.

The program is based on a straight-line trajectory Gaussian plume model. At the user's option, the plume concentration can be depleted by dry deposition and radioactive decay. The computed ground-level concentration can be modified to account for plume recirculation or stagnation. The program computes an effective plume height that accounts for physical release height, aerodynamic downwash, plume rise, and terrain features.

This version of the program was developed on a CDC 7600 computer in Fortran IV language. The structure of the program is such that it should be easily converted to other computer systems.

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The enthusiastic support and assistant of Tom Bander of the Pacific Northwest Laboratory in preparing this document is greatly appreciated. Mr. William G. Snell was the NRC Technical Monitor and Mr. Earl H. Markee, Jr., the NRC Project Manager.

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USER GUIDE FOR XOQDOQ: EVALUATING ROUTINE EFFLUENT RELEASES AT COMMERCIAL NUCLEAR POWER STATIONS

1.0 INTRODUCTION

This document provides a user's guide for the computer program XOQDOQ which is used by the Nuclear Regulatory Commission (NRC) in its independent meteorological evaluation of continuous and anticipated intermittent releases from commercial nuclear power reactors. This program has evolved form an earlier program developed by Sangendorf (1974) for NRC's predecessor, the Atomic Energy Commission (AEC). The program described in this document is a revised version of an earlier program (Sagendorf and Goll, 1976) and was developed on a CDC 7600 computer in Fortran IV language. Its structure is such that it could be easily converted to other computer systems. The earlier version of the program was also used by the NRC staff in its evaluations connected with Appendix I to 10 CFR, Part 50.

The program is based on the theory that material released to the atmosphere will be normally distributed (Gaussian) about the plume centerline. In predicting concentrations for longer time periods, the Gaussian distribution is assumed to be evenly distributed within the directional sector. A straight-line trajectory is assumed between the point of release and all receptors.

The program implements the assumptions outlined in Section C (excluding C1a and C1b) of NRC Regulatory Guide 1.111 (USNRC, 1977). In evaluating routine releases from nuclear power plants, it primarily is designed to calculate annual relative effluent concentrations, X/Q values, and annual average relative deposition, D/Q values, at locations specified by the user, and at various standard radial distances and segments for downwind sectors. Evaluations of anticipated intermittent (e.g. containment or purge) releases which occur during routine operation may also be evaluated using the program. Evaluation of intermittent releases provides both X/Q and D/Q values at various standard locations, as well as user-inputted specific points of interest.

It operates in a batch-input mode and has various options that a user may select. They can account for variation in the location of release points, additional plume dispersion due to building wakes, plume depletion via dry deposition and radioactive decay, and adjustments to consider non-straight trajectories. It computes an effective plume height that accounts for physical release height, aerodynamic downwash, plume rise, and terrain features. It cannot handle multiple emission sources, plume depletion via wet deposition, or evaluate the meteorological aspects of the consequences of accidental releases.

Provided in various sections of this user's guide is information on basic program features, format of the required data, a description of the program

and subroutines, and a description of the expected program output. Appendices to this guide include a listing of the program, sample data inputs and the resulting data output.

The program described in this guide is compatible with a CDC 7600 computer system under the NOS 1.0 operating system. Any questions regarding the program or problems encountered should be directed or reported to the Meteorology Staff, U.S. Nuclear Regulatory Commission, Washington, D.C.

2.0 INPUT CARD FORMAT

The required input data for program execution are listed in Table 2.1. The input data are categorized by card types, ranging from 1 to 17. For some card types, more than one physical card will be inputted.

Card Type 1 initializes options, known as KOPT's, for each release point to be evaluated. If multiple sites are to be evaluated with the program, then additional data sets, starting with Card Type 1, are required.

3.0 PROGRAM FEATURES

The program is based on the principle that diffusion of material released to the atmosphere can be described by a Gaussian distribution within the plume with transport described by a straight-line trajectory. A discussion of a Gaussian plume model is provided elsewhere (e.g. Slade, 1968). This model, though, only approximates the actual atmospheric transport and diffusion of effluents. Various terms used in it, namely, the horizontal and vertical dispersion coefficients, are empirically determined, largely from observations at or near ground level. Predicting plume concentrations at locations other than ground level will introduce additional errors into the calculation. Nevertheless, this modelling approach is especially useful for evaluating routine releases of material to the atmosphere and predicting resulting normalized concentrations and deposition amounts over long time periods.

The program has the following options:

1. The release may be

    a. always elevated
    b. always ground level, or
    c. a mixed mode, which is primarily used in the analysis of vent release points at or above the height of adjacent structures.

TABLE 2.1. List of Input Data

Card Type 1 is an array (KOPT) of options, such that 1 = do, 0 = bypass. These options remain in effect for all release points run. Thus, all release points must have the same assumptions.

Card Type	Columns	Variable Name	Format	Description
1	1	KOPT(1)	I1	Option to distribute calms as the first wind-speed class (if calms are already distributed by direction in Card Type 6, KOPT(1) = 0, and Card Type 5 is blank). If KOPT(1) = 1, the calm values of Card Type 5 are distributed by direction in the same proportion as the direction frequency of wind-speed class two.
1	2	KOPT(2)	I1	Option to input joint frequency distribution data as percent frequency.
1	3	KOPT(3)	I1	Option to compute a sector spread for comparison with centerline value in purge calculation (Normally = 1).
1	4	KOPT(4)	I1	Option to plot short-term X/Q values versus probability of occurrence (Normally = 0).
1	5	KOPT(5)	I1	Option to use cubic spline in lieu of least square function for fitting intermittent release distribution (Normally = 1).
1	6	KOPT(6)	I1	Option to punch radial segment X/Q and D/Q values (Normally = 1).
1	7	KOPT(7)	I1	Option to punch output of X/Q and D/Q values of the points of interest (Normally = 1).
1	8	KOPT(8)	I1	Option to correct X/Q and D/Q values for open terrain recirculation.
1	9	KOPT(9)	I1	Option to correct X/Q and D/Q values using site specific terrain recirculation data.

TABLE 2.1. List of Input Data

Card Type	Columns	Variable Name	Format	Description
1	10	KOPT(10)	I1	Option to use desert sigma curves (Normally = 0).
1	11	KOPT(11)	I1	Option to calculate annual X/Q averages with 30 degree sectors for north, east, south and west and 20 degree sectors for all others (Normally = 0, and the code will use 22-1/2 degree sectors).
2	1-80	TITLM	20A4	The main title printed at the beginning of the output.
3	1-5	NVEL	I5	The number of velocity categories (maximum of 14).
3	6-10	NSTA	I5	The number of stability categories (maximum of 7) (1 always equals Pasquill stability class A, 2 = B, ..., 7 = G).
3	11-15	NDIS	I5	The number of distances with terrain data for each sector. The number of distances must be the same for each sector (Card Type 10)(maximum of 10).
3	16-20	INC	I5	The increment in percent for which plotted results are printed out (Normally = 15).
3	21-25	NPTYPE	I5	The number of titles of receptor types (cow, garden, etc.) (Card Type 13)(maximum of eight)
3	26-30	NEXIT	I5	The number of release exit points (maximum of five).
3	31-35	NCOR	I5	The number of distances of site specific correction factors for recirculation (maximum of 10).
4	1-5	PLEV	F5.0	The height (in meters, above ground level) of the measured wind presented in the joint frequency data (Card Type 7). (For elevated/ground-level mixed release, use the 10-meter level winds).

TABLE 2.1. List of Input Data

Card Type	Columns	Variable Name	Format	Description
4	6-20	DECAYS(I) I=1, 3	3F5.0	For each I: The half-life (days) used in the X/Q calculations: if DECAYS > 100, no decay will occur; if DECAYS < 0, depletion factor will be used in the X/Q calculations; if DECAYS = 0, X/Q will not be calculated. (Normally, DECAYS(1) = 101, (2) = 2.26, (3) = -8.00.)
4	21-25	PLGRAD	F5.0	Plant grade elevation (feet above sea level). If PLGRAD = 0.0, DIST and HT data Card Type 10 and 11 must be in meters. If PLGRAD < 0.0, DIST in miles and HT data in feet above plant grade. If PLGRAD > 0.0 above DIST in miles and HT data in feet above sea level.
5	1-35	CALM(I) I=1, NSTA	7F5.0	The number of hours, or percent, of calm for each stability category; if KOPT(1) = 0, insert blank card. (Note: I=1 is stability class A, 2=B, ..., 7=G).
6	1-80	FREQ(K,I,J) K=1, 16 I=1, NVEL (if KOPT(1) = 0) I=2, NVEL (if KOPT(1) = 1) J=1, NSTA		The joint frequency distribution in hours (or percent). The values for 16 (K) sectors are read on each card for each combination of wind-speed class (I) and stability class (J). The loop to read these value cycles first on direction continuing in a clockwise fashion), then on wind class and finally on stability class.
7	1-5	UCOR	F5.0	A correction factor applied to wind-speed classes. If UCOR < 0: no corrections will be made. If UCOR > 100: the wind-speed classes will be converted from miles/hour to meters/second.

TABLE 2.1. List of Input Data

Card Type	Columns	Variable Name	Format	Description
7	6-75	UMAX(I)	14F5.0	The maximum wind speed in each wind-speed class, in either miles/hour or meters/second. (If given in miles/hour, set UCOR > 100.)
Card Types 8 and 9 are read in for each correction factor and distance given, I = 1,NCOR				
8	1-80	VRDIST(K,I) K=1,16	16F5.0	The distance in meters at which correction factors are given. These values are read in beginning with south and proceeding in a clockwise direction (maximum of 10).
9	1-80	VRCR(K,I) K=1,16	16F5.0	Correction factor to be applied to X/Q and D/Q values corresponds to distances specified in VRDIST.
Card Types 8 and 9 are repeated for the remaining distances and correction factors. Card Types 10 and 11 are read in for each terrain distance and height given, I = 1,NDIS.				
10	1-80	DIST(K,I) K=1,16	16F5.0	The distance in meters at which terrain heights are given. These values are read in beginning with south and proceeding in a clockwise direction (maximum of ten distances).
11	1-80	HT(K,I) K=1,16	16F5.0	The terrain heights (in meters, above plant grade level) corresponding to the distances specified in the DIST array (Card Type 10). These values are read in the same order as the DIST array. For a given direction and distance, the terrain height should be the highest elevation between the source and that distance anywhere within the direction sector.
Card Types 10 and 11 are repeated for the remaining distances and heights.				

TABLE 2.1. List of Input Data

Card Type	Columns	Variable Name	Format	Description
12	1-25	NPOINT(I) I=1, NPTYPE	515	The number (maximum of 30) of receptor locations for a particular receptor type (such as the number of cows, gardens, or site boundaries).
Card Types 13 and 14 are read in for each receptor type, thus I=1, NPTYPE				
13	1-16	TITLPT(I,J)	4A4	The title (cows, gardens, etc.) of the receptor type for the receptor locations (Card Type 14) (a maximum of 16 spaces).
14	1-80	KDIR(I,N) PTDIST(I,N) N=1,NPOINT(I)	8(I5, F5.0)	The receptor direction and distance. KDIR is the direction of interest, such that - 1 = South, 2 = SSW,..., 16 = SSE, PTDIST is the distance, in meters, to the receptor location.
Card Types 13 and 14 are repeated for the remaining receptor types. Card Types 15, 16, and 17 read in for each plant release point, thus I = 1, NEXIT				
15	1-80	TITLE(I,J)	20A4	The title for the release point whose characteristics are described on Card Types 16 and 17.
16	1-5	EXIT(I)	F5.0	The vent average velocity (meters/second). (Note: if a 100% ground-level release is assumed, set EXIT = 0, DIAMTR = 0, and SLEV = 10 meters).
16	6-10	DIAMTR	F5.0	The vent inside diameter (meters).
16	11-15	HSTACK(I)	F5.0	The height of the vent release point (meters, plant grade level). If release is 100% elevated, input negative of height.
16	16-20	HBLDG(I)	F5.0	The height of the vent's building (meters, above plant grade level).

TABLE 2.1. List of Input Data

Card Type	Columns	Variable Name	Format	Description
16	21-25	CRSEC(I)	F5.0	The minimum cross-sectional area for the vent's building (square meters).
16	26-30	SLEV(I)	F5.0	The wind height used for the vent elevated release (meters, above plant grade level).
16	31-35	HEATR(I)	F5.0	The vent heat emission rate (cal/sec) (Normally = 0).
17	1	RLSID(I)	A1	A one letter identification for the release point.
17	2-5	IPURGE(I)	I4	IPURGE = 1, 2 or 3 if the vent has intermittant releases. The 1, 2 or 3 corresponds to DECAYS(1), DECAYS(2), or DECAYS(3) (Card Type 4), respectively, whichever is used as the base for intermittent release calculations (normally no decay/no deplete X/Q, such that IPURGE(I) = 1); if a vent has no intermittent releases, IPURGE = 0.
17	6-10	NPURGE(I)	I5	The number of intermittent releases per year for this release point.
17	11-15	NPRGHR(I)	I5	The average number of hours per intermittent release.

Card Types 15, 16 and 17 are repeated for the remaining release points.
Card Types 1-17 may be repeated for the next case.

2. The effluent plume for elevated releases can undergo plume rise due to momentum and/or buoyancy.

3. Ground-level releases can be affected by additional dispersion due to nearby building wakes.

4. Wind speeds measured at one level may be extrapolated to other elevations for release point evaluation.

5. Plume growth parameters (σ_y and σ_z) can be described by
   a. Pasquill-Gifford curves (Slade, 1968)
   b. desert curves by Markee (Yanskey et al, 1966).

6. For elevated releases, topography can be inputted for use in calculation of the effective plume height.

7. The plume may undergo radioactive decay for varied half-lives.

8. The plume may be depleted via dry deposition.

9. X/Q and D/Q values may be modified by standard or inputted values to account for local air recirculation or air stagnation.

10. X/Q and D/Q values can be punched for predetermined distance segments and for specific points of interest.

11. The joint frequency data may be inputted as a percent frequency of occurrence or as total frequency of occurrence.

Specific information on program capabilities are given in Section 4.0.

Meteorological data is input into the program as a joint frequency table, which is a table of the fractional occurrence during a given time period of a particular combination of stability class type, wind direction, and wind speed class. The wind direction has been broken into sixteen sectors proceeding clockwise from N through NNW. The wind speeds are grouped into classes, with the program allowing up to 14 separate classes, which includes a class for calm wind speeds. Atmospheric stability is grouped according to seven categories from extremely unstable to extremely stable.

3.1 MULTIPLE SITE ANALYSIS

The present version of the program can handle multiple site analysis by simply adding additional data sets. Each data set would begin with the Card Type 1 (KOPT DATA) and include the same type of information as the previous data set. The program terminates by reading an end of file (EOF) card, so within the normal run-time limit of the operating system, an unlimited number of sites can be analyzed. Presently, the program is limited to five separate release points. If more release points for a specific site exist, multiple data sets differing only in release point characteristics could be used.

The advantage of running multiple data sets is to reduce compilation time of the program. However, in most computers which swap jobs in the central processing units (CPU), the job turn-around time will probably increase.

3.2 CONTINUOUS RELEASE ANALYSIS

As noted in Section 4.1, continuous releases are analyzed according to a sector spread version of the Gaussian plume equation. The program also has the ability to compute a centerline concentration value for comparison with the sector spread concentration, with the most conservative value retained. If this comparison is desired appropriate lines commented in Subroutine ANNUAL should be changed to active statements. (See listing in Appendix A.)

For a special case of a continuous ground level release in a desert-type environment, the building wake term will only apply under certain conditions. For unstable and neutral atmospheric conditions, normal building wake calculations prevail. For stable atmospheric conditions, the building wake calculation will be set to zero. This condition applies for both sector spread and centerline calculations at specific points of interest and at set distances. The rationale for this feature is the desert sigmas include the effect of plume meander. During stable atmospheric conditions the effect of plume meander dominates the effects of building wake. These conditions, however, are not used for intermittent releases because these releases may be for short time intervals during which plume meander is not considered to have occurred.

3.3 INTERMITTENT RELEASE ANALYSIS

If a intermittent release point is to be evaluated, the user should set IPURGE = 1 on Card Type 17. The number of intermittent releases per year and average number of hours per release are inputted on Card Type 17 as NPURGE and NPRGHR, respectively. Since the program evaluates intermittent releases in terms of total hours of release, the computed results for two intermittent releases of 10 hours will be the same as 1 intermittent release of 20 hours, if emission height and rate are the same.

A discussion of how X/Q values for intermittent releases are calculated is given in Section 4.6.

3.4 PUNCHED DATA OUTPUT

The user can specify various data to be punched out by the program. If KOPT(6) = 1 on Card Type 1, the segment X/Q and D/Q values will be punched. If KOPT(7) = 1 on Card Type 1, the X/Q and D/Q values for the user-inputted points of interest will be punched.

If a user is evaluating both a continuous and purge release in the same data set, and both KOPT(6) and KOPT(7) = 1, the segment X/Q and D/Q values will only be punched once. If the user desires punched segment X/Q and D/Q values for a purge release calculation, that release point should be evaluated as a separate data set.

3.5 EFFECTIVE STACK HEIGHT

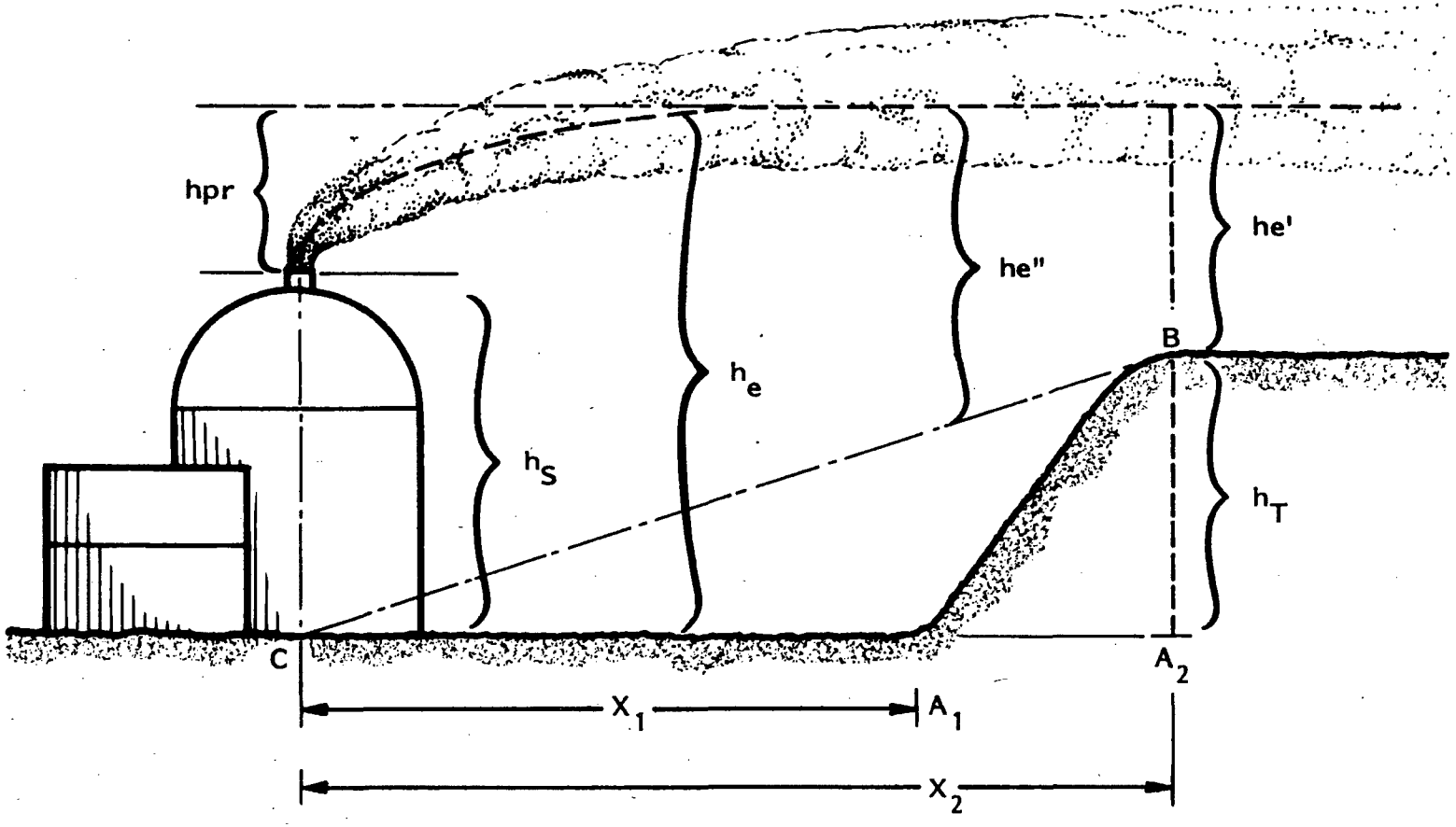
For both an elevated and mixed-mode release an effective stack height is computed. This value, which will vary according to direction and distance from the site, incorporates initial plume rise above the release point, any effects of aerodynamic downwash, and reduced height due to user inputted terrain features. For a particular inputted terrain feature the program linearly interpolates a terrain height from plant grade to the height of the terrain feature. This feature is illustrated in Figure 3.1.

In Figure 3.1 the terrain feature starts at point A_1 at distance X_1 from the site and reaches it's maximum elevation at point A_2 at distance X_2 from the site. The plume centerline is represented by a dashed line and reaches a height that is the sum of the plume rise, h_{pr}, and height of the vent, or stack, h_s. At distances less than x_1 the effective plume height, h_e, is not reduced by terrain features. If the user inputs distance, x_1, with a terrain height equal to plant grade and inputs distance, x_2, with terrain height, h_T, the program will linearly interpolate a terrain height between point x_1 and B with the effective terrain height becoming h_e' at distance x_2. If the user inputs x_2 as the distance for the first terrain height of h_t, the program will interpolate a terrain height as shown by line CB so that the effective terrain height at point A_1 would be h_e'', not h_e. The user will, therefore, have a lower than desired effective plume height and compute conservative X/Q and D/Q values at distance x_1. Once an effective plume height, such as h_e', has been established in the program only an inputted terrain feature higher than h_T will produce an effective plume height less than h_e'.

3.6 STANDARD AND SITE-SPECIFIC CORRECTION FACTORS

Adjustments to represent non-straight line trajectories (recirculation or stagnation) may be accomplished in two ways. First, standard default correction factors for each directional sector can be implemented by setting KOPT(8) = 1 on Card Type 1. If that option is chosen, all values of X/Q and D/Q will be multiplied by a specific factor as a function of the distance that is given in Figure 3.2. This correction is applied uniformly to all directional sectors.

Second, specific adjustments may be known for a site as a result of field diffusion experiments or comparison of results from a variable trajectory model. If such data does exist, the user should set KOPT(9) = 1 on Card Type 1 and input those factors via Card Types 8 and 9. The number of data sets to be entered is set by parameter NCOR on Card Type 3. Specific correction factors to be entered do not have to be at the same distance for each directional sector. The user may enter specific factors in the north sector for, e.g., 1000, 2000, 3000 meters, and specific factors in the south sector at distances of, e.g., 5000, 6000 and 7000 meters. The only restriction is the same number of correction factors must be inputted for each directional sector.



h_S = HEIGHT OF STACK (RELEASE Pt)

hpr = HEIGHT DUE TO PLUME RISE

he = EFFECTIVE STACK HEIGHT

he', he" = EFFECTIVE STACK HEIGHT WITH TERRAIN CORRECTION

h_T = TERRAIN HEIGHT ABOVE PLANT GRADE

X_1, X_2 = DISTANCE TO TERRAIN FEATURES

FIGURE 3.1. Calculation of Effective Stack Height

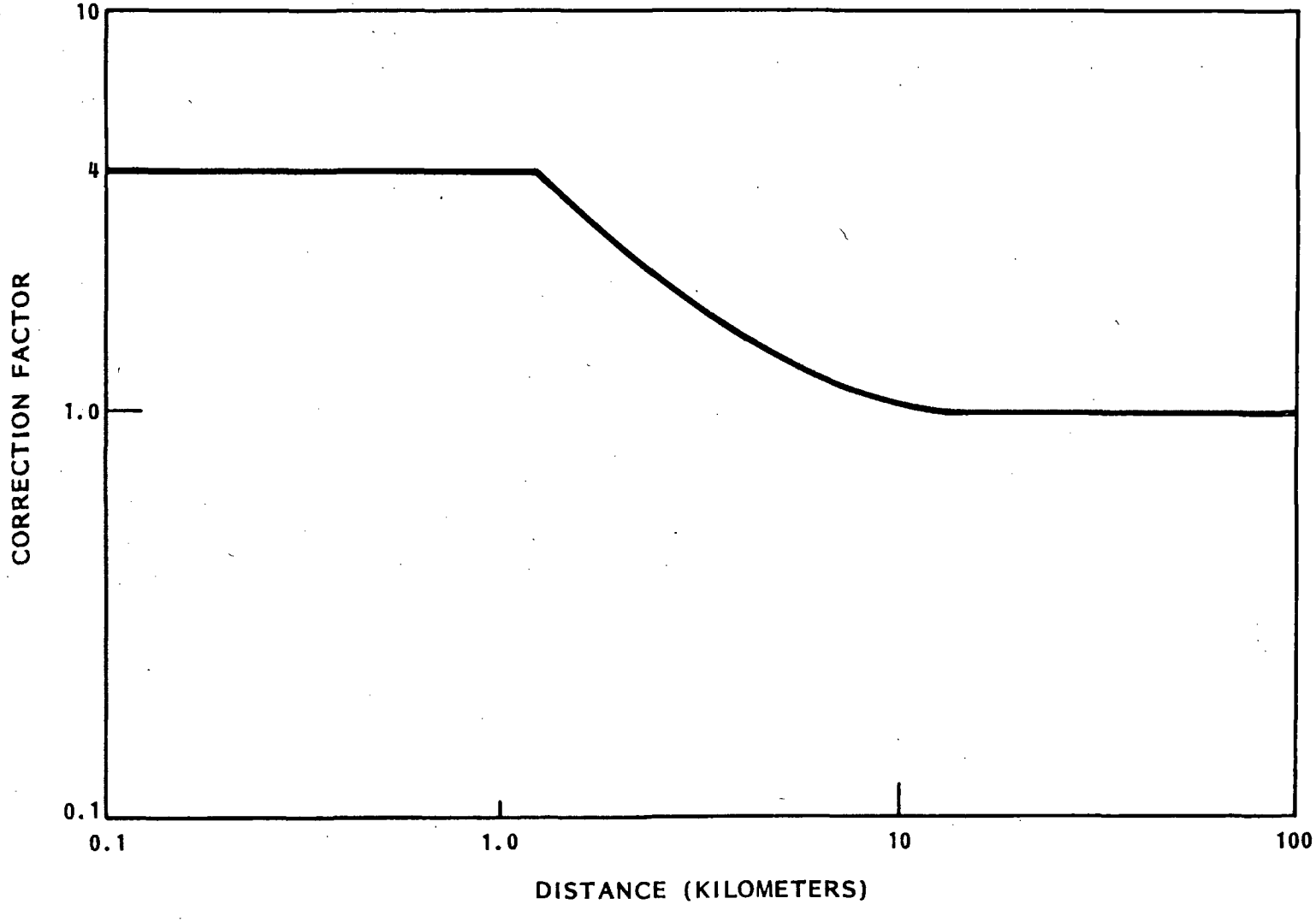


FIGURE 3.2. Open Terrain Correction Factor

If specific correction factors are to be used, the program will use the first correction factor for each directional sector for all computed X/Q and D/Q values to the distance of the first specific correction factor. The program linearly interpolates between correction factors to apply appropriate corrections to those X/Q and D/Q values lying between distances of the correction factors. The X/Q and D/Q values at distances greater than the greatest distance from the site with a correction factor will be adjusted by that correction factor.

3.7 WIND SPEED CLASSES

The maximum value for each wind-speed class is entered via input variable UMAX on Card Type 7. If these values are in miles per hour, the parameter UCOR on Card Type 7 must be set to some value greater than 100. If the values are in meters per second, UCOR should be set to some value less than 0; e.g., -100. The number of maximum wind-speed class values entered must correspond to the number entered for NVEL on Card Type 3.

If the number or frequency of calms occurring for each stability class is being inputted, and KOPT(1) = 1 on Card Type 1, the first value for UMAX on Card Type 7 should represent the starting threshold of the wind speed sensor. If KOPT(1) = 0 on Card Type 1, the first UMAX value is the maximum value of the first non-calm wind speed category.

If the last wind-speed class is of the format, wind speeds > than some value, the user must establish a maximum wind speed for that class. Generally, a value of 5 units greater than the largest wind speed noted is acceptable.

3.8 CALMS

Data on the number or frequency of calms by stability class is inputted to the program via Card Type 5. If calms are included in the first wind-speed class, a blank card should input for Card Type 5. If calm data does exist, the user has two options: (1) to create a separate wind-speed class for the calm data, or (2) to distribute the calms according to the directional distribution of the first non-calm wind-speed class.

If KOPT(1) = 1 on Card Type 1 a separate wind-speed class for the the calm data will be established. The user should remember to add 1 to the value of NVEL that normally exist.

4.0 DESCRIPTION OF PROGRAM XOQDOQ, INCLUDING SUBROUTINES

This program reads in and prints out the inputted data selected by the user. It also calls the subroutines required to evaluate both continuous or purge releases. The main program structure is given in Figure 4.1 in which the basic subroutine calling sequence to evaluate each release point is noted.

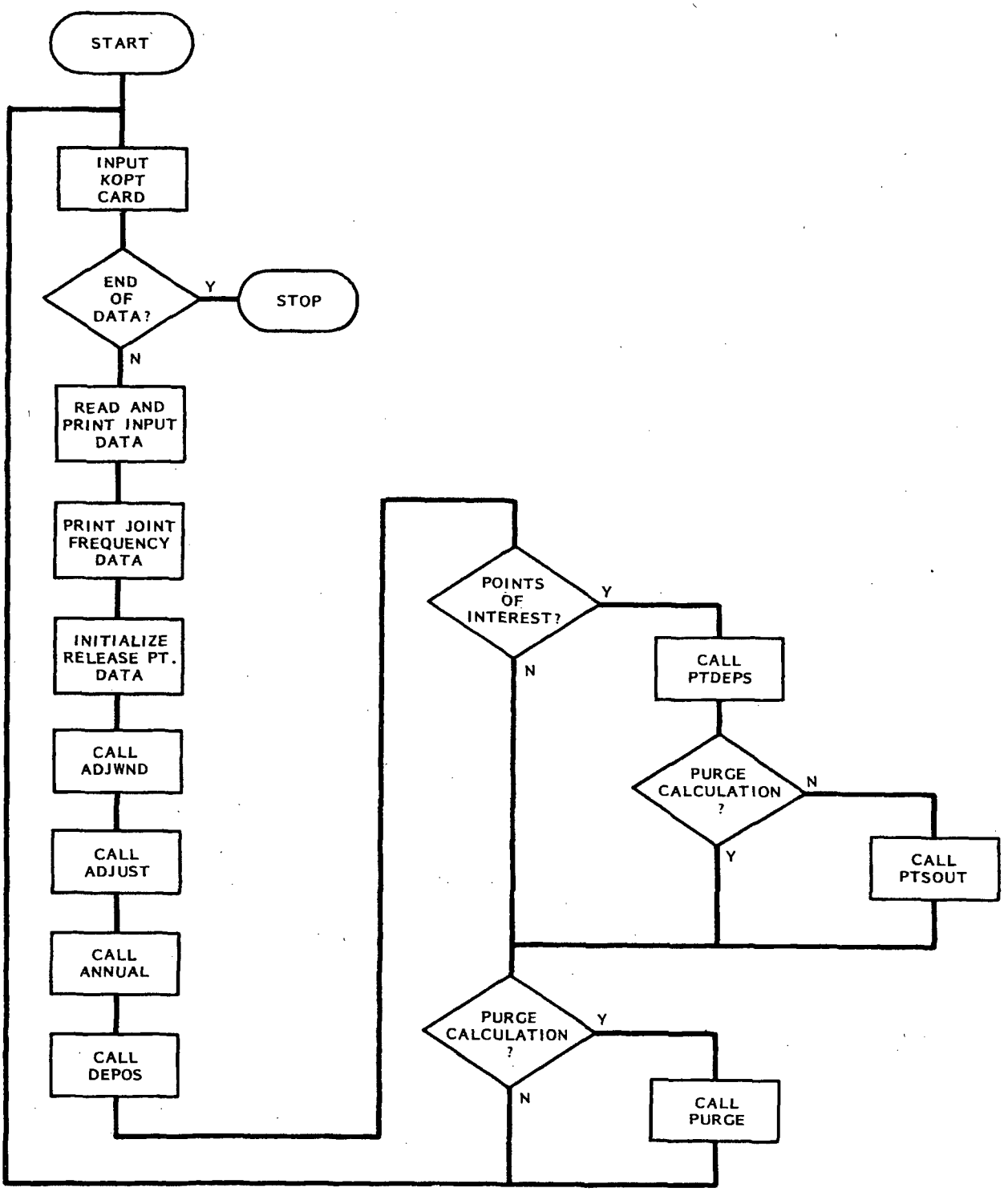


FIGURE 4.1. Flow Chart for XOQDOQ

The program can distribute inputted calms according to the options selected, either as a separate wind-speed class or into the first wind-speed class. A more detailed discussion of the capability is given in Section 3.8.

The program is structured so multiple sites can be evaluated by a single execution of the program. If the program is used in this mode, multiple data sets, including inputted joint frequency distribution data, are required. With a single meteorological data set, a maximum of five release points can be evaluated.

A description of all subroutines is given below. In the descriptions, references are made to the input cards described in Section 2.0. Flow diagrams for each of the major subroutines in the XOQDOQ program are given in Figures 4.2 through 4.5. Flow diagrams for the subroutines MIXD15 and CALC, which are called by PURGE, are given in Figures 4.6 and 4.7.

4.1 SUBROUTINE ANNUAL

This routine calculates long-term or annual average values of X/Q. It assumes a continuous release and that resulting effluent concentrations will be distributed evenly across a 22-1/2 degree direction sector. This subroutine calculates concentrations for ground-level and elevated releases only. If the release is in a mixed mode, concentrations for both elevated and ground-level releases are calculated, and the resultant concentration value is based on the percentage of time each type of release would occur.

For elevated releases, concentrations are predicted using the modified equation from Slade (1968) given below:

$$\frac{\bar{X}}{Q}(x, K) = \frac{2.032}{x} \cdot RF(x, K) \sum_{i,j}^{N,7} \frac{DEPL_{ij}(x, K)\ DEC_i(x)\ f_{ij}(K)}{\bar{U}_i(x)\ \sigma_{zj}(x)} \cdot \exp -0.5\left(\frac{h_e^2}{\sigma_{zj}(x)^2}\right) \quad (1)$$

where:

$X_{(x,K)}$ = average effluent concentration normalized by source strength at distance x in directional sector K (second/cubic meter)

x = the downwind distance (meters)

i = the ith wind-speed class

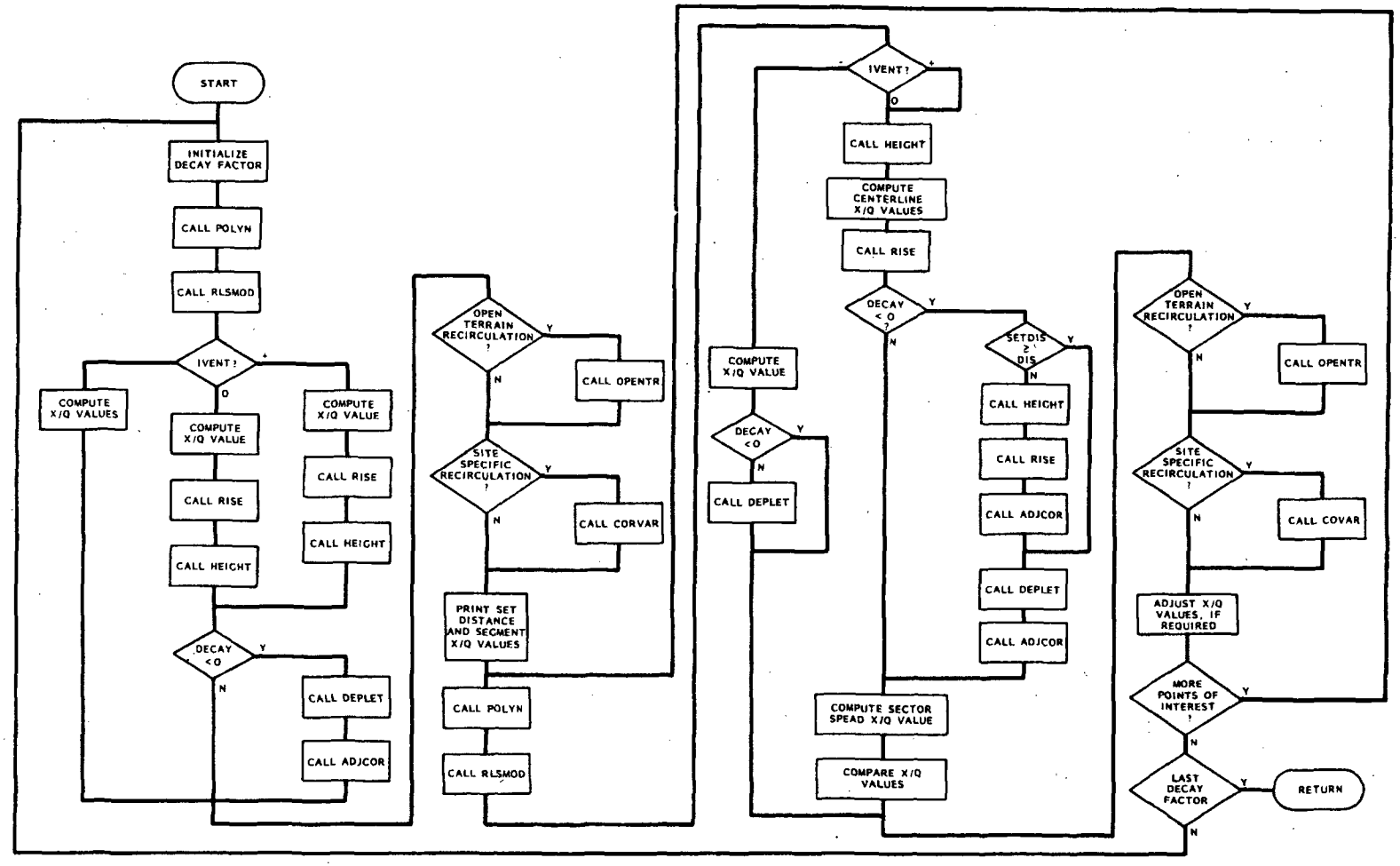


FIGURE 4.2. Flow Chart for ANNUAL

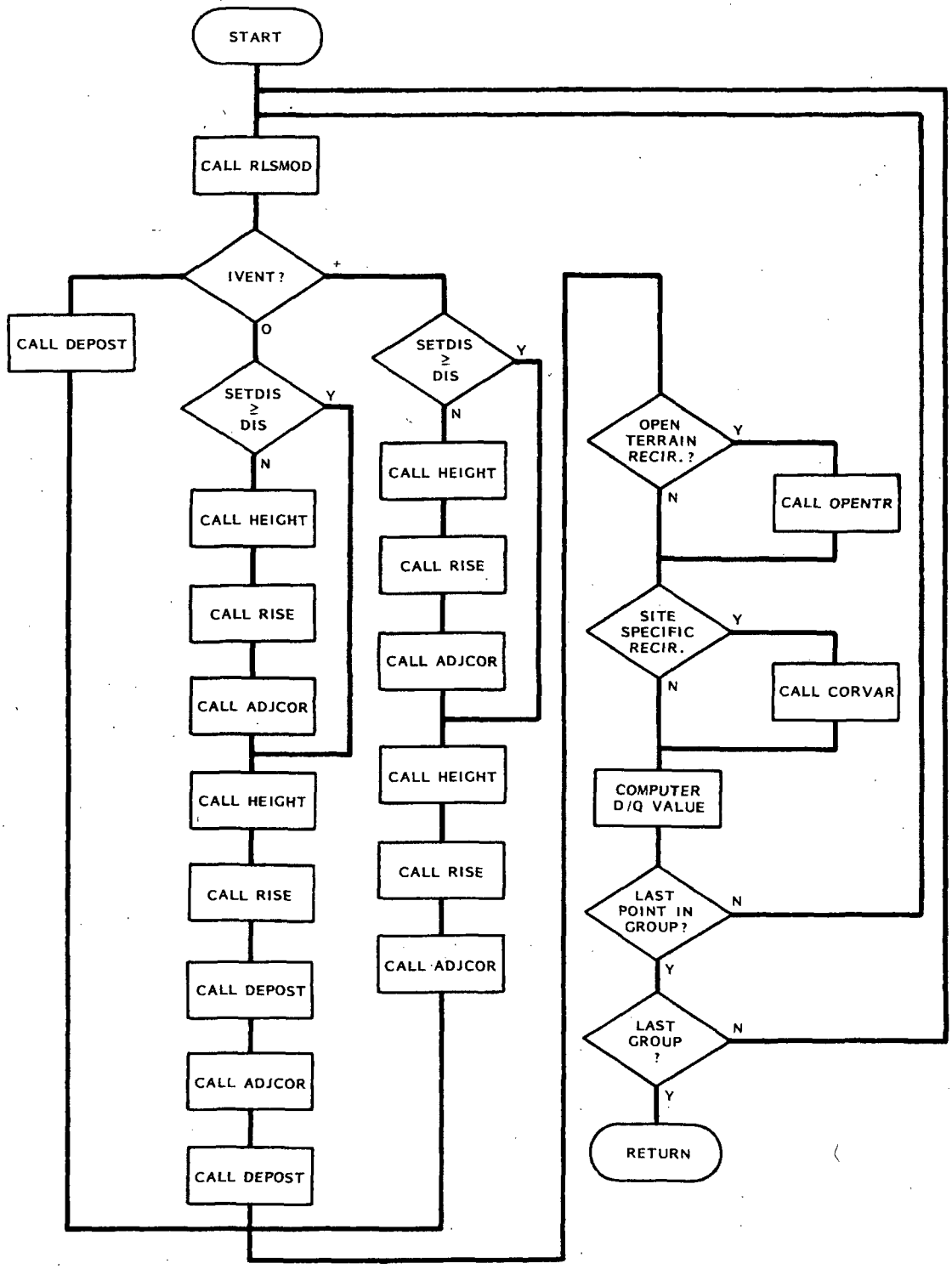


FIGURE 4.3. Flow Chart for PTDEPS

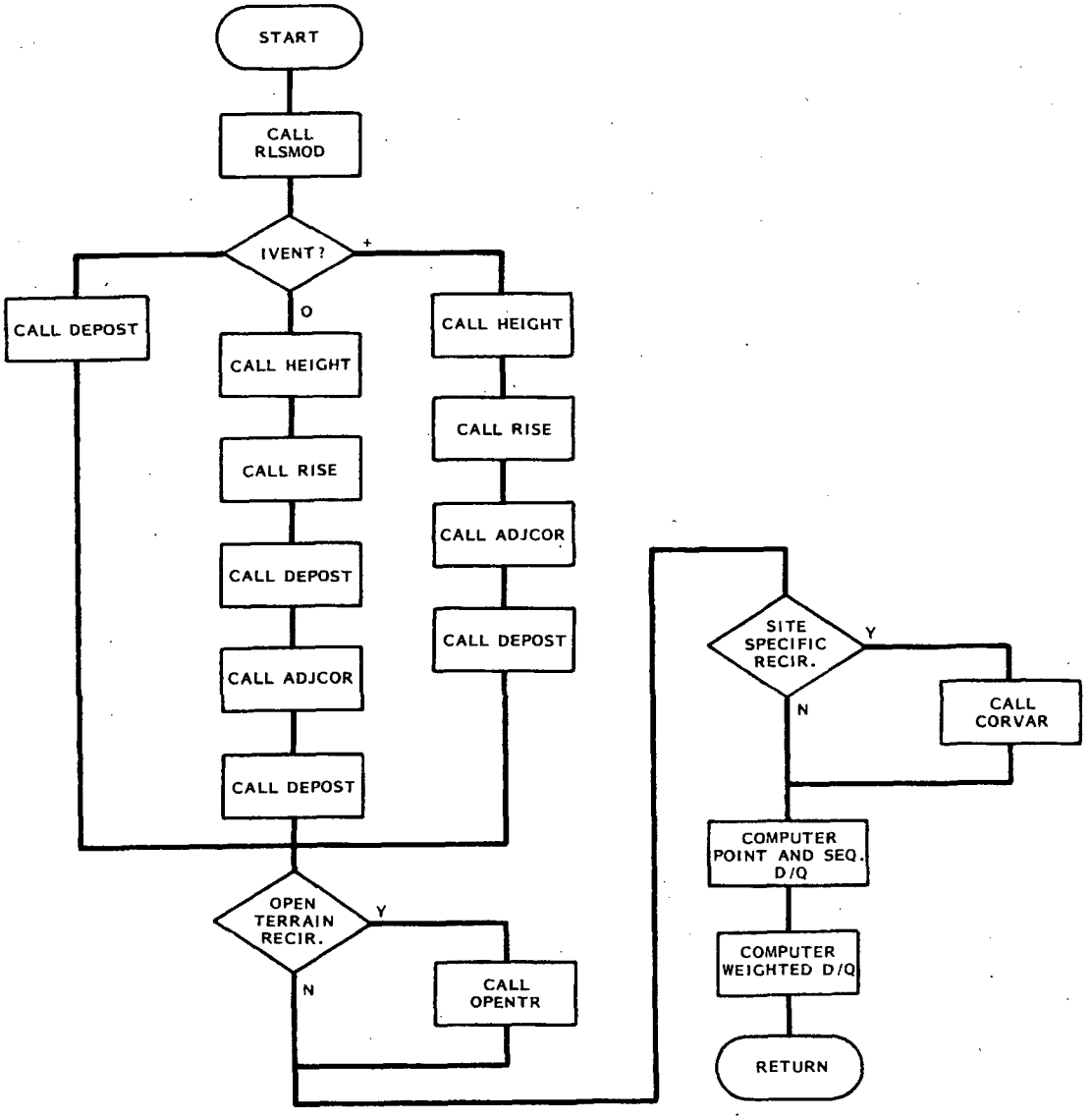


FIGURE 4.4. Flow Chart for DEPOS

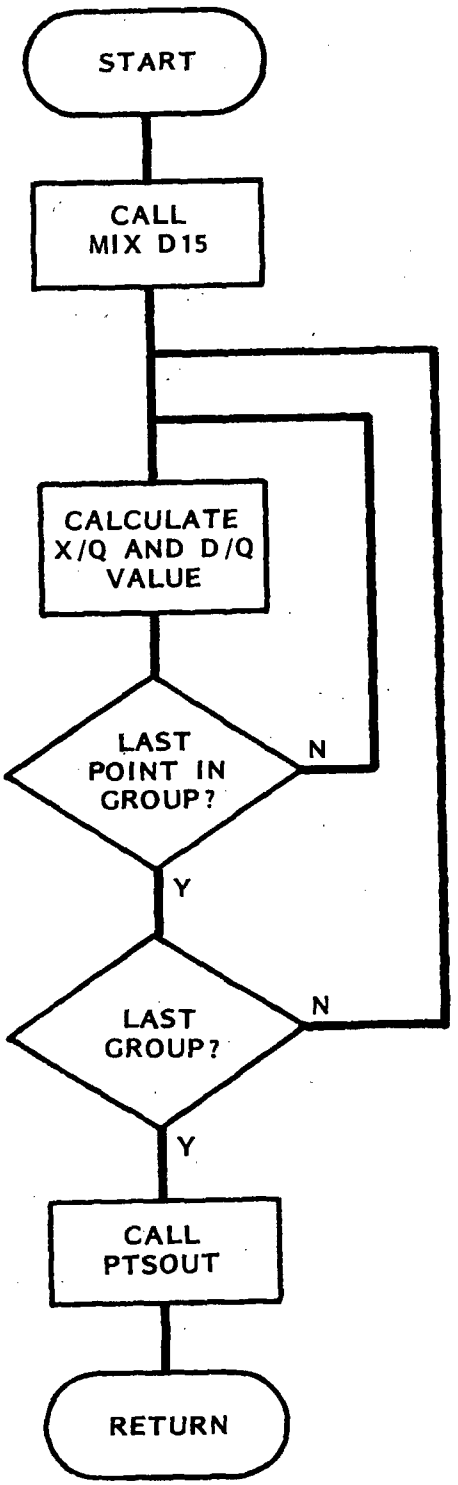


FIGURE 4.5. Flow Chart for PURGE

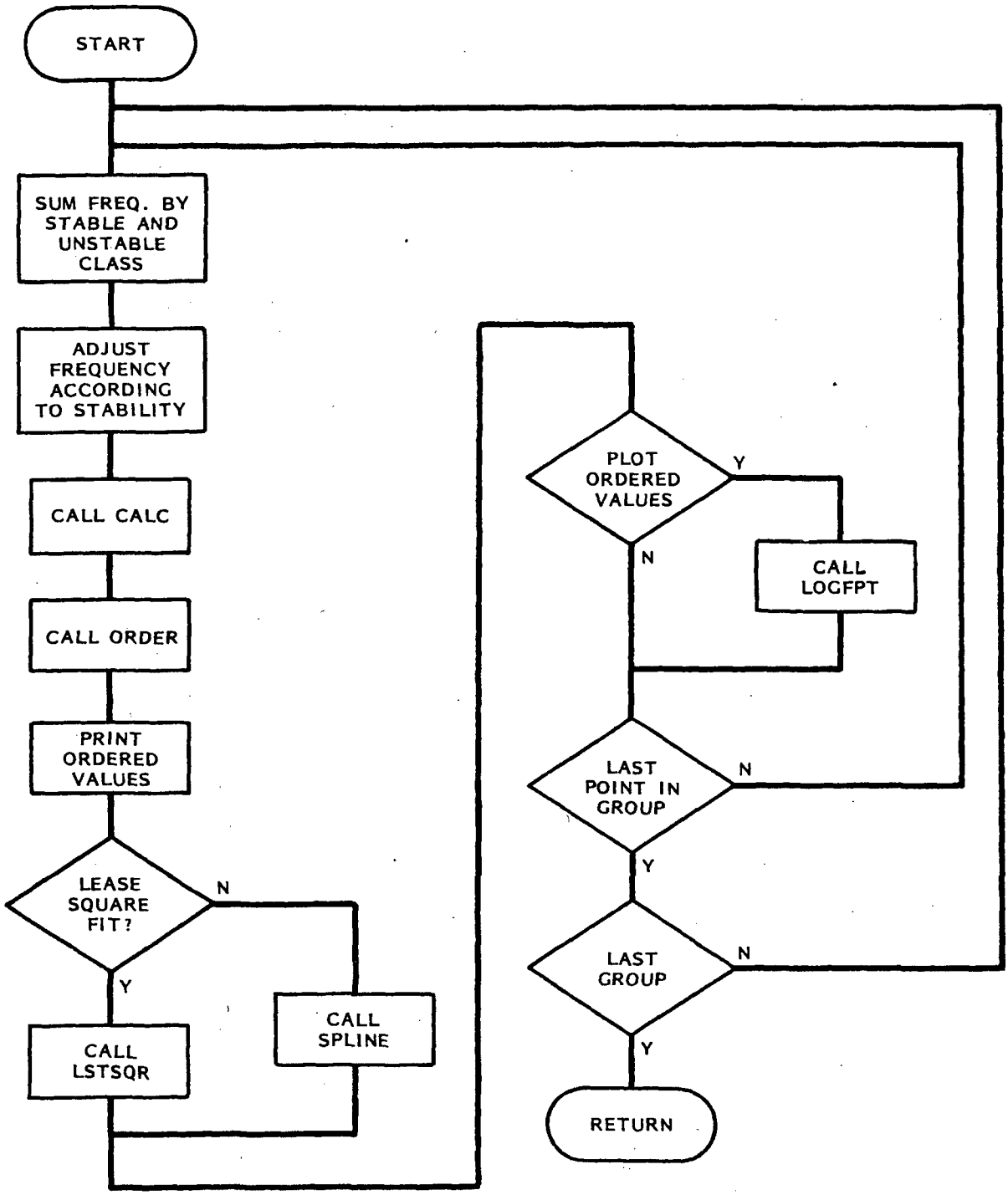


FIGURE 4.6. Flow Chart for MIXD15

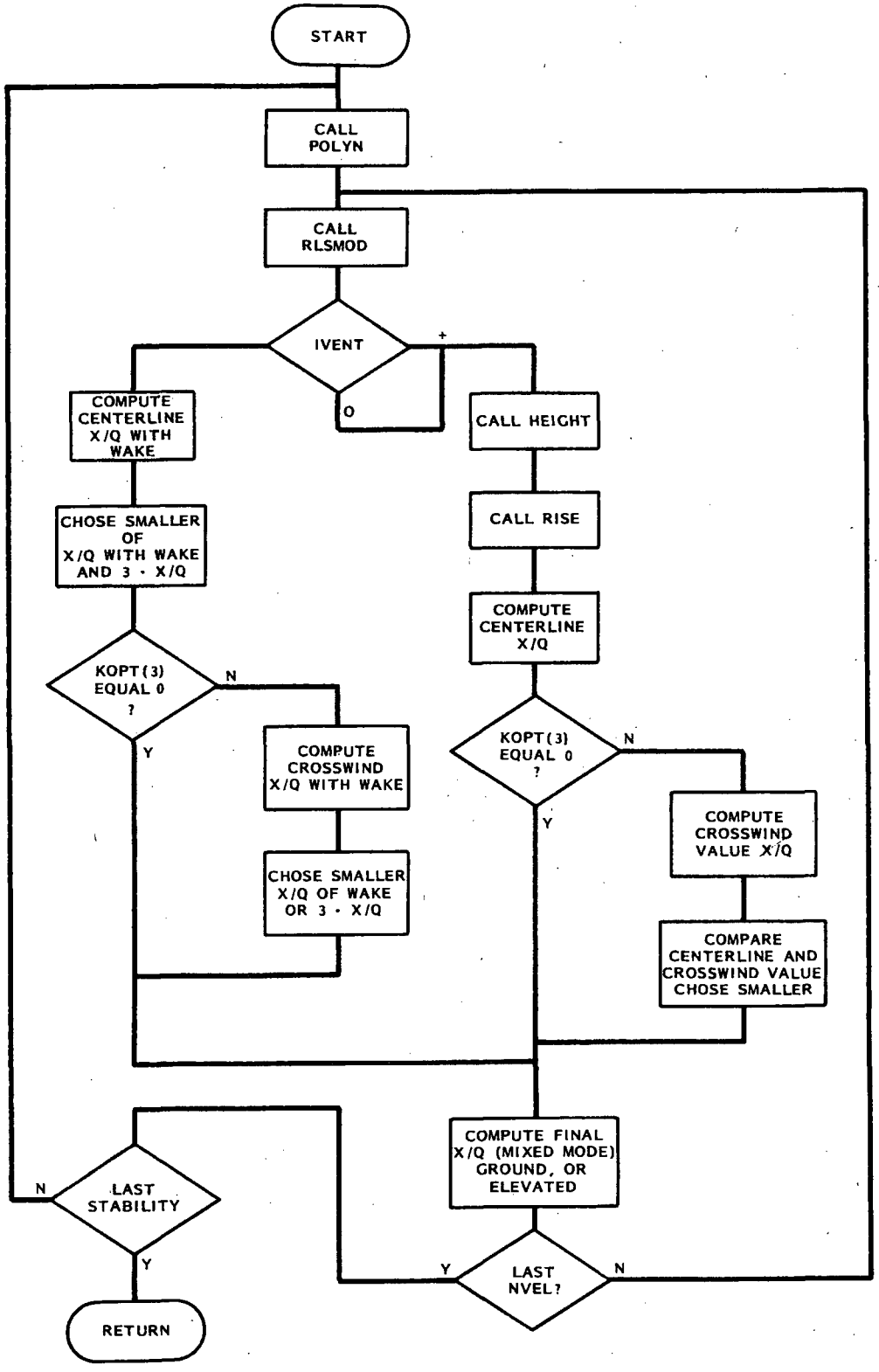


FIGURE 4.7. Flow Chart for CALC

j = the jth atmospheric stability class, grouped into seven classes according to Regulatory Guide 1.23

K = kth wind-direction class

U_i = mid-point value of the ith wind-speed class

$\sigma_{z_j}(x)$ = the vertical plume spread for stability class j at distance x, determined from subroutine POLYN (meters)

$f_{ij}(k)$ = joint probability of occurrence of the ith wind-speed class, jth stability class, and kth wind-direction sector.

h_e = effective plume height, determined from Subroutine RISE (meters)

$DEC_i(x)$ = reduction factor due to radioactive decay at distance x for the ith wind-speed class

$DEPL_{ij}(x,K)$ = reduction factor due to plume depletion at distance x for the ith wind-speed class, jth stability class, and Kth wind-direction class

$RF(x,K)$ = correction factor for recirculation and stagnation at downwind distance x and Kth wind-direction class; standard values can be used [KOPT(8)], inputted by the user [KOPT(9) and Card Type 8 and 9], or not used [KOPT(8) and KOPT(9) = 0].

For elevated release, a plume rise is determined and the effective plume height is calculated for each wind-direction sector, K, as a function of distance, x, from the site. If topography data is inputted, the effective plume height is reduced. A more complete discussion of effective plume height is given in Section 3.5

Ground-level release concentrations are calculated using the following two equations modified from Slade (1968):

$$\frac{\chi}{Q}(x,K) = \frac{2.032}{x} RF(x,K) \sum_{i,j}^{N7} DEPL_{ij}(x,K)\, DEC_i(x)\, f_{ij}(K)\, [\bar{U}_i(\sigma_{z_j}^2(x) + CD_z^2/\pi)^{1/2}]^{-1} \qquad (2)$$

and

$$\frac{\overline{X}}{Q}(x,K) = \frac{2.032}{x} RF(x,K) \sum_{i,j}^{N7} DEPL_{ij}(x,K)\, DEC_i(x)\, f_{ij}(K)\, [\sqrt{3}\overline{U}_i \sigma_{zj}(x)]^{-1} \qquad (3)$$

where X/Q(x,K), i,j,K, U_j, $\sigma_{zj}(x)$ $f_{ij}(K)$, $DEC_i(x)$,$DEPL_{ij}(x,K)$, and RF (x,K) have been defined previously; and

D_z = building height used to compute additional atmospheric dispersion due to the building wake, based on Yanskey et al. (1966).

Equation 3 represents the maximum additional dispersion due to the building wake. The program compares the results from Equation 2 and 3 and retains the higher (most conservative) X/Q value.

The values obtained from Equation 1 and/or Equations 2 and 3 are a function of downwind distance (x) and wind-direction sector (K). The program is designed to compute concentrations for 22 downwind distances (x) between 0.25 and 50 miles for each of the 16 directional sectors. Therefore, normalized effluent concentrations are predicted at 352 downwind locations.

This subroutine, using the predicted downwind concentrations, computes concentrations for 10 downwind segments for each of the 16 directional sectors. The computed value represents an average concentration for the downwind directional sector bounded by the range of the segment. For example, a $\overline{X}/Q$ value for the segment 40-50 miles in the North sector represents an average $\overline{X}/Q$ value for any point north of the site and between 40 and 50 miles north of the site.

The technique for computing the $\overline{X}/Q$ segment values is given by the following relationship:

$$\overline{X}/Q_{seg}(K) = \frac{R_1\ X/Q(R_1,K) + r_1 \cdot X/Q(r_1,K) + \ldots + r_n \cdot X/Q(r_n,K) + R_2 \cdot X/Q(R_n,\ K)}{R_1 + r_1 \ldots + r_n + R_2} \qquad (4)$$

where

$X/Q_{seg}(K)$ = average value of X/Q for the segment for the directional sector K

$X/Q(R_1, K)$ = X/Q value at downwind distance R_1 for the directional sector K

R_1, R_2 = downwind distance of the segment boundaries

$r_1 \ldots r_n$ = selected radii between R_1 and R_2.

In addition to calculating concentrations for the 22 downwind distances for each directional sector, this subroutine will calculate normalized concentrations, X/Q values, at up to 150 individual receptor locations specified by the user. The same techniques described by Equations 1, 2, and 3 are used to calculate concentrations at receptor points.

Equations 1, 2 and 3 require information on a reduction factor due to radioactive decay. That term, $DEC_i(x)$, is calculated by the following relationship as given by Slade (1968):

$$DEC_i(x) = EXP\ (-0.693\ t_i/T) \qquad (5)$$

where

$t_i = x/(86400 \cdot U_i)$
T = half-life, in days, of the radioactive material
t_i = travel time, in days
x = downwind or travel distance, in meters
U_i = Midpoint of the ith wind-speed class in meters/second.

The value for T, half-life in days, is inputted via Card Type 4. Up to three separate decay half-life values can be inputted into the program, with the maximum allowable half-life being 100 days.

Calculated concentrations can include the effect of plume depletion due to dry deposition, using data given in Figures 3 through 6 of Regulatory Guide 1.111 (USNRC, 1977). The depletion factor is adjusted for changes in topography. The technique used in that adjustment is given in Section 4.15. The correction factor to account for non-straight line trajectories can be based on a standard correction factor for open terrain correction (Card Type 1, KOPT(8) = 1) or based on user inputted data (Card Type 1, KOPT(8) = 1, and Card Type 8 and 9). If both KOPT(8) and KOPT(9) = 0, no correction factor will be applied.

4.2 SUBROUTINE DEPOS

This subroutine calculates the relative deposition per unit area, D/Q, by directional sector for 22 downwind specific distances and 10 downwind segments between 0.25 and 50 miles. The specific and segment distances used are the same as those used in ANNUAL to produce X/Q values. Deposition amounts computed assumed the effluent release to be elevated only, ground level only, or a mixed elevated/ground-level release that is determined by computing the ratio of the effluent exit velocity to the exit level wind speed. Information on resultant plume rise, topography, and deposition adjustment factors calculated in subroutine ADJCOR are included in the computational scheme. The resultant deposition amounts can be modified according to standard recirculation factors as produced in subroutine OPENTR or specific correction factors inputted by the user (see discussion for CORVAR).

For each directional sector, relative deposition is computed by the following relationship for a specific downwind distance:

$$\frac{\overline{D}}{Q}(x, K) = \frac{RF(x, K) \sum_{ij}^{N7} D_{ij} f_{ij}(K)}{(2\pi/16)\, x} \qquad (6)$$

where

$D/Q(x,K)$ = average relative deposition per unit area at a downwind distance x and direction K, in meters^{-2}

D_{ij} = the relative deposition rate from Figures 7 through 10 of Regulatory guide 1.111 (USNRC, 1977) for the ith wind-speed class (since plume height is dependent on wind speed) and the jth stability class, in meters.

$f_{ij}(K)$ = joint probability of the ith wind-speed class, jth stability class, and kth wind-direction sector

x = downwind distance, in meters

π = 3.14159265

$RF(x,K)$ = correction factor for air recirculation and stagnation at distance x and Kth wind direction.

D/Q segment values are computed by technique given in Equation 4 except the term X/Q is replaced by D/Q.

4.3 SUBROUTINE PTDEPS

This subroutine computed relative deposition values, D/Q, for inputted receptor locations. This subroutine is basically identical to subroutine DEPOS (Section 4.2).

4.4 SUBROUTINE PURGE

Using the short-term X/Q values calculated in Subroutine MIXD15, and the annual average X/Q values calculated in Subroutine ANNUAL, this subroutine calculates X/Q and D/Q values for intermittent releases for each of the user-specified receptor locations. The user specifies what level short-term percentile values is to be used (Card Type 3, INC, usually 15) and if a decayed and/or depleted annual X/Q values is to be used in the computation (Card Type 17, IPURGE). Normally the user should set IPURGE = 1 so that the undecayed, undepleted annual X/Q value is used. The short term X/Q value that is computed in Subroutine CALC is an undecayed, undepleted value.

A graphic representation of how computational procedure works is illustrated in Figure 4.8. In that figure the abscissa is the time that increases as you move to the right. The ordinate is X/Q values increasing as you go up. The 15 percentile X/Q value, which is larger than the annual X/Q value, is plotted according to 1 hour of time. The annual average value occurs for a standard time period of a year (8,760 hours). The straight line connecting these points represents X/Q values for intermittent, or purge releases, ranging in duration from 1 hour to 8,760 hours. The duration time for each release is the number of times the purge release occurs times the length of the release. In Figure 4.8 a duration time of 80 hours is illustrated which could present 4 purge releases at 20 hours, 2 purge releases at 40 hours or other combinations. The ratio of the X/Q values for intermittent, or purge release, and the annual average X/Q value is used to determine the appropriate X/Q values for the other decay, depletion combinations as well as a value for D/Q. As indicated above IPURGE is normally set to 1, so the ratio is based on undecayed, undepleted X/Q values.

If the 15 percentile X/Q value is less than the annual average X/Q value, or less conservative, the 15 percentile X/Q value will be set to the annual average value X/Q; the slope of the connecting line will be zero, and the X/Q values for purge releases of any duration will be equal to annual average X/Q values. This condition normally could only occur with unique combination of joint frequency of wind speed, wind direction, and atmospheric stability data.

This calculation is repeated for each individual receptor location inputted by the user.

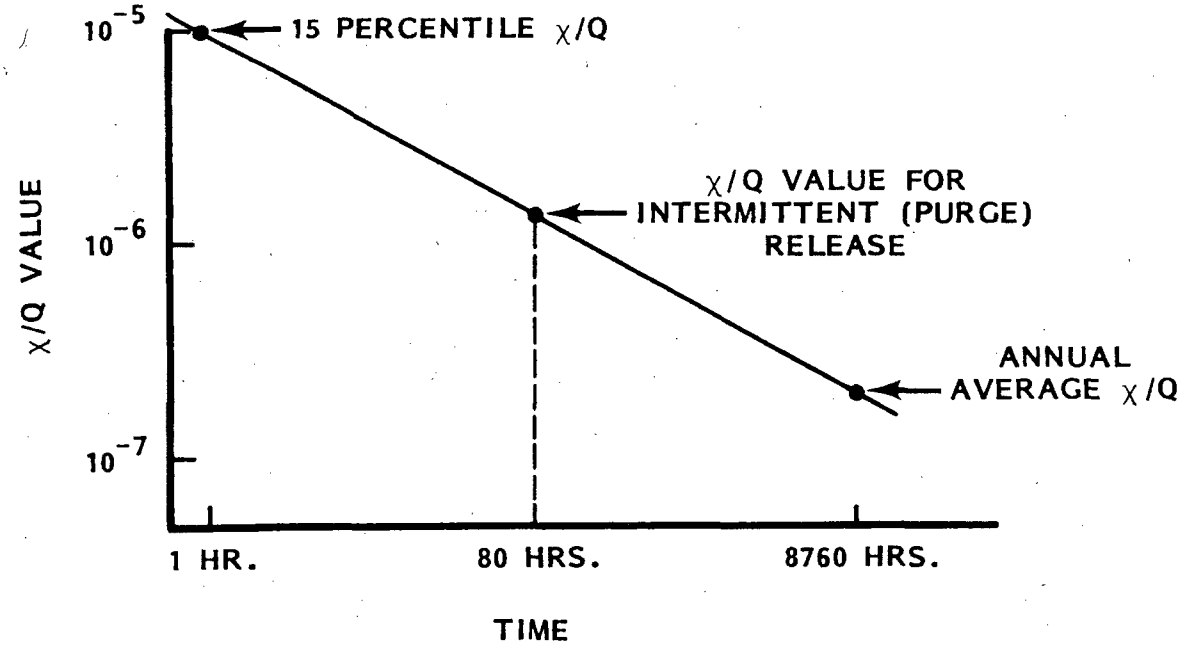


FIGURE 4.8. Subroutine PURGE Calculations

4.5 SUBROUTINE MIXD15

This subroutine coordinates the calculations of the short-term X/Q values used in the intermittent release calculations of subroutine PURGE. Subroutine CALC, which is called by MIXD15, calculates specific short-term X/Q values from all combinations of wind-speed class and stability categories in the inputted joint frequency distribution. The values are then ordered by Subroutine ORDER, from high to low values, and their cumulative frequencies are summed. Subroutine CONV, which is called by MIXD15, then transforms the frequency array onto a probability axis and, either subroutine LSTSQR or SPLINE, depending on the choice of the user, fits a curve to the log (X/Q) values versus transformed frequency data points. This curve is shifted up by two standard deviations to approximate the upper envelope of the X/Q values. The upper envelope X/Q values at five percent frequency increments are printed and can be plotted if desired by the user (Card Type 1, KOPT(4) = 1). The desired percentile value that was requested by the user is then passed to Subroutine PURGE to be used in computing X/Q values for the purge release.

4.6 SUBROUTINE CALC

This subroutine calculates short-term centerline X/Q values at the given individual receptor locations specified by the user. X/Q values are calculated for each combination of wind-speed class and atmospheric stability category. The calculations use the following equations:

$$X/Q = [U_i(\pi\sigma_{y_i}(x)\sigma_{z_j}(x) + CA)]^{-1} \quad (7)$$

and

$$X/Q = [3U_i\pi\sigma_{y_i}(x)\sigma_{z_j}(x)]^{-1} \quad (8)$$

and

$$X/Q = [U_i\pi\sigma_{y_i}(x)\sigma_{z_j}(x)]^{-1} \exp[-1/2(h_e/\sigma_{z_j}(x))^2] \quad (9)$$

where

X/Q = effluent concentration normalized by source strength (sec/cubic meter)

U_i = upper limit of the ith wind-speed class, inputted by user as Card Type 7 ($m\ sec^{-1}$)

$\sigma_{y_j}(x)$ = horizontal standard deviation of material in the plume for stability category j at distance x, value computed in Subroutine POLYN (m)

$\sigma_{z_j}(x)$ = vertical standard deviation of material in the plume for stability category j at distance x, value computed in Subroutine POLYN (m)

h_e = effective plume height, value computed in Subroutine RISE (m)

C = building-wake constant, value set in program to 0.5

A = minimum cross-section area of the reactor building (m^2)

x = downwind distance (m)

The user also has the option, via Card Type 1, to assume the plume is uniformly distributed in the horizontal within a 22-1/2 degree directional sector. This option is appropriate for intermittent releases greater than eight

hours duration or for a large number of shorter period releases. Thus in addition to the computations of Equations 7, 8, and 9, the following computations are completed if the option is selected:

$$X/Q = 2.032\ [xU_i(\sigma_{z_j}{}^2(x) + CD_z{}^2/\pi)^{1/2}] \tag{10}$$

$$X/Q = 2.032\ [\ 3U_i\sigma_{z_j}\ (x)\cdot x]^{-1} \tag{11}$$

$$X/Q = \frac{2.032}{\sigma_z\ (x)U_i\cdot x}\ [\exp(-1/2[h_e/\sigma_{z_j}\ ]^2)] \tag{12}$$

where X/Q, U_i, $\sigma_{z_j}(x)$, h_e, C, x, are given above, and

D_z = height of the building (m),

x = the downwind distance (m).

Equations 9 and 12 are used for elevated releases. The results from these equations are compared and the largest X/Q value is retained. For ground level releases and KOPT(3) = 1, the values from Equations 7, 8, 10, and 11 are compared and the larger value retained. The terms CA in Equation 7 and $CD_z{}^2$ in Equation 12 are the building-wake contributions to dilution (Yanskey et al, 1966). Equations 8 and 11 represent X/Q values considering the maximum allowable building-wake dilution.

4.7 SUBROUTINE ORDER

This subroutine uses the shell method to order the array of X/Q values calculated in Subroutine CALC from the greatest to least value. Associated frequencies are also summed.

4.8 SUBROUTINE CONV

This subroutine transforms the cumulative frequency array generated in Subroutine ORDER onto a probability axis. This subroutine calls a function, GAUSS, that uses a Gauss-Legendre integration technique to integrate the normal function.

4.9 SUBROUTINE LSTSQR

This subroutine is used to perform the least square fit on log (X/Q) values versus frequency data transformed in Subroutine CONV. This routine is considered the standard for fitting log (X/Q) values.

4.10 SUBROUTINE INVERS

This subroutine, which is called by Subroutine LSTSQR, is used to perform a matrix inversion.

4.11 SURROUTINES LOGFPT, PPLT, DEVATE, AREA

These subroutines, which are called in Subroutine MIXD15, are used to plot, on logarithmic versus probability axes, the following data:

1. the X/Q values calculated by subroutine CALC versus probability
2. the X/Q values determined from the upper envelope of X/Q values calculated in Subroutine MIXD15 versus probability.

The plots are not produced unless desired by the user; see Card Type 1, KOPT(4).

4.12 SUBROUTINE SPLINE

As an option to the user, a cubic spline curve fitting technique can be used instead of a least square fitting technique. To use this technique KOPT(5) is set to 1 on Card Type 1.

4.13 SUBROUTINE DEPLET

This subroutine solves polynomial regression equations for the depletion curves of Figures 3 through 6 of Regulatory Guide 1.111 (USNRC, 1977).

4.14 SUBROUTINE DEPOST

This subroutine solves polynomial regression equations for the deposition curves of Figures 7 through 10 of Regulatory Guide 1.111 (USNRC, 1977).

4.15 SUBROUTINE ADJUST

Figures 3 through 10 of Regulatory Guide 1.111 (USNRC, 1977) contain curves for deposition and depletion for plumes 100, 60, 30 and 0 meters above the ground. For plumes between 0 and 15 meters above the ground, the program uses the ground-level release graphs; for those between 15 and 45 meters, it uses the 30 meter curves; between 45 and 80 meters, the 60 meter curves; and for those plumes greater than 80 meters above the ground, it uses the 100 meter curves. The program assumes that, after full plume rise is achieved, the plume cannot get higher from the ground. The derivation of these curves assumed no change in terrain height with downwind distance. But because topography does change with distance, and likewise the vertical distance between the plume

centerline and the ground will change, it is usually necessary to read from more than one depletion or deposition curve of Regulatory Guide 1.111 (USNRC, 1977) as the plume travels with distance.

The actual depletion to a point depends on the depletion rate which the plume has experienced prior to reaching that point. Thus when the plume changes elevation due to topography (i.e., it is necessary to shift from one curve to the next), an adjustment of depletion and deposition estimates must be made to account for the plume's prior history. To approximate the adjustment for deposition in changing terrain, the program assumes that at the point where a new curve is read (i.e., crossover point, the point where the plume is 80, 45, or 15 meters above ground level) the adjustment factor is the ratio of the fraction remaining of the plume from the upper height depletion curve to the fraction remaining in the plume as read on the lower height depleting curve. The deposition values beyond this point are multiplied by this ratio. For depletion, the curve adds the difference in the value of the depletion curves (higher curve minus lower curve) at the crossover point to the values of the lower height curve at distances beyond the crossover distance.

For each combination of wind speed, stability category, and downwind sector, this subroutine determines the downwind distance at which the plume will be 80, 45, and 15 meters above the ground, and determines the respective depletion and deposition adjustment factors.

4.16 SUBROUTINE ADJCOR

This subroutine keeps track of the crossover heights which each plume passes for each direction, wind-speed class, and stability category. It determines which depletion and deposition adjustment factors derived in subroutine ADJUST are needed.

4.17 SUBROUTINE ADJWND

Elevated releases should use winds measured at the release height, and ground-level releases should use 10-meter winds. If the winds were not measured at the proper height, or a mixed elevated-ground level release is being evaluated, the program corrects the wind speeds to reflect the proper elevation. It uses the following relationship from Smith (1968):

$$COR = \left(\frac{SL}{PL}\right)^{EX} \qquad (13)$$

COR = the correction factor applied to the measured wind speeds

PL = the measured wind height

SL = the desired wind height

EX = 0.25, for unstable or neutral atmospheric conditions and

0.50, for stable conditions.

4.18 SUBROUTINE RLSMOD

This subroutine computes the ratio of the plume exit velocity to the wind speed and determines whether the release will be elevated, ground level or a mixture of the two. If a mixture is indicated, the proportion of the plume considered to be elevated and the proportion considered to be ground-level are determined by the following relationships:

$$E_t = 1.0 \qquad \text{for } W_o/\bar{u} \leq 1.0$$

$$E_t = 2.58(W_o/\bar{u}) - 1.58\ (W_o/\bar{u}) \qquad \text{for } 1.0 < W_o/\bar{u} \leq 1.5$$

$$E_t = 0.3 - 0.06\ (W_o/\bar{u}) \qquad \text{for } 1.5 < W_o/\bar{u} \leq 5.0 \qquad (14)$$

$$E_t = 0.0 \qquad \text{for } W_o/\bar{u} > 5.0$$

where

E_t = fraction of the time when the release is ground level

W_o = the plume exit velocity

$\bar{u}$ = average wind speed at the vent height.

4.19 SUBROUTINE HEIGHT

This subroutine linearly interpolates a terrain height for a specific location. For a given direction and distance, the inputted terrain heights should be the highest terrain elevation between the source and the given distance anywhere in the direction sector (Card Type 10 and 11).

4.20 SUBROUTINE RISE

For elevated releases, the program determines the effective stack height from

$$h_e = h_s + h_{pr} - h_t \quad (h_e \geq 0) \tag{15}$$

where

h_e = effective plume height (meters)

h_s = physical stack height (meters)(Card Type 16, HSTACK)

h_{pr} = plume rise (meters)(subroutine RISE)

h_t = terrain height (meters)(subroutine Height).

This routine, using formulae from Briggs (1969), calculates plume rise caused by either momentum or buoyancy.

Nuclear power stations generally have ambient temperature plumes, so the heat emission rate, HEATR (Card Type 16) is read in as zero; and the plume rise is calculated from the momentum equations. Thus for neutral or unstable conditions, plume rise is calculated by the following relationship:

$$h_{pr} = 1.44\left(\frac{W_o}{u}\right)^{2/3} \cdot \left(\frac{x}{D}\right)^{1/3} \cdot D \tag{16}$$

where

h_{pr} = plume rise (meters)

W_o = stack or vent exit velocity (meters/second)(Card Type 16)

x = downwind distance (meters)

U = wind-speed at release height (meters/second)(Card Type 16) and

D = internal stack diameter (meters)(Card Type 16).

When the exit velocity is less than 1.5 times the wind speed, a correction (Gifford, 1972) for downwash is subtracted from Equation 16:

$$C = 3\left(1.5 - \frac{W_o}{u}\right)D \tag{17}$$

where C is the value to be subtracted, and the other terms are defined as in Equation 16. The result from Equation 16, corrected by Equation 17 if necessary, is compared with

$$h_{pr} = 3\left(\frac{W_o}{u}\right) D \tag{18}$$

and the smaller value of h_{pr} is used.

For stable conditions, the results from Equations 16 and 18 are compared with results from the following two equations:

$$h_{pr} = 4\left(\frac{F_m}{S}\right)^{1/4} \tag{19}$$

and

$$h_{pr} = 1.5\left(\frac{F_m}{u}\right)^{1/3} \cdot S^{-1/6} \tag{20}$$

where

$$F_m = (W_o D/2)^2 \tag{21}$$

and

$$S = \frac{g}{T}\frac{\partial\theta}{\partial z} \tag{22}$$

and

F_m = the momentum flux parameter (meters^4/second^2)

S = restoring acceleration per unit vertical displacement for adiabatic motion in the atmosphere (seconds^{-2})

g = acceleration of gravity (meters/second^2)

T = ambient air temperature (degrees Kelvin)

$\partial\theta/\partial z$ = vertical potential temperature gradient (degrees Kelvin/meter).

For the purposes of this routine, S is defined as 8.7×10^{-4} for E stability, 1.75×10^{-3} for F stability, and 2.45×10^{-3} for G stability. The smallest value of h_{pr}, calculated from Equations 16, 18, 19, and 20, is used.

If a value for heat emission rate is inputted, then an additional downwind distance, x*, is computed. For neutral and unstable conditions,

$$x^* = 0.5\, F^{2/5}\, h_s^{3/5} \left[\frac{\text{seconds}^{6/5}}{\text{feet}^{6/5}}\right] \quad \text{when } (h_s < 1{,}000 \text{ ft}) \tag{23}$$

$$x^* = 33\, F^{2/5} \left[\frac{\text{seconds}^{6/5}}{\text{feet}^{3/5}}\right] \quad \text{when } (h_s \geq 1{,}000 \text{ ft}) \tag{24}$$

where

$$F = \text{buoyancy flux parameter} = 4.3 \times 10^{-3}\, Q_h \frac{\text{ft}^4/\text{sec}^3}{\text{cal/sec}} \tag{25}$$

h_s = physical stack height (feet).

For stable conditions,

$$X^* = 2.4\, US^{-1/2} \tag{26}$$

Then for buoyant plume rise, the following equations are used:

1) for $x < x^*$,

$$h_{pr} = 1.6\, F^{1/3}\, u^{-1} x^{2/3} \tag{27}$$

2) for $x \geq x^*$ for unstable and neutral conditions,

$$h_{pr} = \frac{1.6\, F^{1/3}\, x^{*2/3}\left[\frac{2}{5} + \frac{16}{25}\,\frac{x}{x^*} + \frac{11}{5}\left(\frac{x}{x^*}\right)^2\right]}{u\left(1 + \frac{4x}{5x^*}\right)^2} \tag{28}$$

At $x = 5x^*$, the plume is assumed to reach its maximum height; for stable conditions,

$$h_{pr} = 2.4\,(F/uS)^{1/3} \tag{29}$$

with S as defined for Equation 22.

4.21 SUBROUTINE POLYN

This subroutine calculates values of σ_y and σ_z versus downwind distance, using equations of the form

$$\sigma_z = ax^b + C \tag{30}$$

$$\sigma_y = ax^b \tag{31}$$

where

$\sigma_{y,\,z}$ = horizontal crosswind (σ_y) or vertical (σ_z) standard deviation of material in the plume due to ambient free-stream turbulence

σ_x = downwind distance

a,b,c = coefficients, derived by Eimutis and Konicek (1972), as functions of stability class and distances.

Both σ_y and σ_z are limited to 1000 meters.

By setting KOPT(10) to 1 on Card Type 1, the σ_y and σ_z values computed will be representative of desert conditions. Information on how these values were determined is given in Yanskey, et al. 1966.

4.22 SUBROUTINE OPENTR

This subroutine solves a set of polynomial regression equations that describe the curve given in Figure 3.2. The value returned is recirculation correction factor for open terrain. This option is selectable by the user by setting KOPT(8) = 1 on Card Type 1. This feature should be used for all sites unless specific diffusion test, or other data, indicate other factors are more appropriate. In that case the user would input site specific correction factors via Card Types 8 and 9 and set KOPT(9) = 1 on Card Type 1.

4.23 SUBROUTINE CORVAR

If recirculation factors have been determined (e.g. by field experiments) for a specific site, they may be applied to computed X/Q and D/Q values. This option is implemented by setting KOPT(9) equal to 1 on Card Type 1 and inputting correction factors according to card Types 8 and 9. The factors entered are linearly interpolated by this subroutine and applied to computed X/Q and D/Q values.

4.24 SUBROUTINE PTSOUT

This subroutine prints the outputted X/Q and D/Q values obtained in subroutines ANNUAL, PTDEPS, and PURGE, for the input-specified receptor locations.

4.25 SUBROUTINE PRNTIN

This subroutine prints the building, vent, and release-type characteristics after all outputted X/Q and D/Q values.

4.26 SUBROUTINE INTCOM

This subroutine is a DATA statement to label the 16 directional sectors.

5.0 DESCRIPTION OF PROGRAM OUTPUT

The output from the program was designed to present the maximum amount of information on each release point for the user. Each output page is identified as to the version of program, run date, and run time. The sequence of outputted information is as follows.

1. inputted data cards
2. summarized joint frequency data of wind speed and wind direction by stability class

3. for each decay value

   - X/Q values at 22 specific distances ranging from 0.50 to 50 miles from the site
   - X/Q values for 10 distance segments
   - If depletion occurs, D/Q values at 22 specific distances ranging from 0.50 to 50 miles from the site
   - If depletion occurs, D/Q values for 10 distance segments
   - Data on emission, release, height, and physical building dimensions. If a mixed mode release, data on velocities levels producing elevated, ground level, and mixed-mode conditions

4. for purge releases with specific points of interest, ordered short-term X/Q values, a probability distribution of X/Q values, a probability distribution of X/Q values, and percentile value selected by the user to be used in computing X/Q and D/Q values for the release

5. for specific points of interest, X/Q values for specific decays inputted by the user, and a D/Q value if depletion occurs

6. for multiple releases, up to five, Steps 3 through 5 are repeated.

If KOPT(4) = 1 on Card Type 1, then program generated plots of short-term X/Q values versus probability distribution are produced. These plots will only be generated if a purge release is to be evaluated, and specific points of interest have been inputted by the user.

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APPENDIX A

LISTING OF PROGRAM AND SUBROUTINES

```
      PROGRAM XOQDOQ(INPUT,OUTPUT,PUNCH,                                XOQDOQ
     1               TAPE5=INPUT,TAPE6=OUTPUT,TAPE7=PUNCH)              XOQDOQ
C*****************************************************************     XOQDOQ
C*****************************************************************     XOQDOQ
C*****************************************************************     XOQDOQ
C******                                                                XOQDOQ
C*****                              XOQDOQ                            XOQDOQ
C*****          PROGRAM FOR THE METEOROLOGICAL EVALUATION             XOQDOQ
C*****               OF ROUTINE EFFLUENT RELEASES AT                  XOQDOQ
C*****                    NUCLEAR POWER STATIONS                      XOQDOQ
C*****                              - J. SAGENDORF   NOAA             XOQDOQ
C*****                                J. GOLL        USNRC            XOQDOQ
C*****                                JUNE 1976 - ORIGINAL            XOQDOQ
C*****                                AUGUST 1977 - REVISION          XOQDOQ
C *****                               APRIL 1982 - REVISION 2          VERS2
C******                                                               XOQDOQ
C*****************************************************************     XOQDOQ
C*****************************************************************     XOQDOQ
C*****************************************************************     XOQDOQ
      COMMON /TITLE/ TITLM                                              VERS2
       COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                     BLANK
     1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                  BLANK
     2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)              BLANK
     3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                  BLANK
     4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)             BLANK
     5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)            BLANK
     6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)        BLANK
     7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                     BLANK
     8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL        BLANK
     9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)       BLANK
     1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                     BLANK
       DIMENSION TITLM(20),UMIN(14)                                     VERS2
     1          ,TOT(7), CALM(7), HEATR(5), SLEV(5), CRSEC(5)          XOQDOQ
     2          ,HBLDG(5), HSTACK(5), DIAMTR(5), EXIT(5)               XOQDOQ
     3          ,NPURGE(5),NPRGHR(5),GRNDVT(16),VERSUM(16,7),GRNDHR(14) XOQDOQ
     4          ,HORSUM(14,7),TOTSUM(7),SCLASS(7)                      XOQDOQ
       DATA SCLASS/"A","B","C","D","E","F","G"/                         XOQDOQ
     1 FORMAT(80I1)                                                     XOQDOQ
     2 FORMAT(16I5)                                                     XOQDOQ
     3 FORMAT(8F10.0)                                                   XOQDOQ
     4 FORMAT(16F5.0)                                                   XOQDOQ
     5 FORMAT(20A4)                                                     XOQDOQ
   124 FORMAT(8(I5,F5.0))                                               XOQDOQ
      C = 0.5                                                           XOQDOQ
C****   C IS THE BUILDING WAKE CONSTANT                                 XOQDOQ
      NDIR=16                                                           XOQDOQ
C**** NDIR = THE NUMBER OF DIRECTIONS.                                  XOQDOQ
C*****************************************************************     XOQDOQ
C*****************************************************************     XOQDOQ
C*****************************  READ IN DATA  ************************     XOQDOQ
C*****************************************************************     XOQDOQ
      CALL INTCOM                                                       XOQDOQ
   41 READ(5,1)   KOPT                                                  XOQDOQ
      IF(EOF(5).NE.0)   GO TO 40                                        XOQDOQ
      CALL DATE(TODAY)                                                  VERS2
      CALL TIME(CLOCK)                                                  VERS2
      PRINT 960,TODAY,CLOCK                                             VERS2
  960 FORMAT(1H1,"USNRC COMPUTER CODE-XOQDOQ,VERSION 2.0",10X,"RUN DATE VERS2
     * ",A10,10X,"RUN TIME",A10/)                                       VERS2
      PRINT 500                                                         XOQDOQ
```

```
      500 FORMAT(1H ,"PRINTOUT OF INPUT CARDS")                              VERS2
          PRINT 501,   KOPT                                                  XOQDOQ
      501 FORMAT("0    1     ",16(5I1,1X))                                   XOQDOQ
C**** KOPT IS THE OPTION ARRAY. A VALUE OF 1 IS YES, A 0 MEANS BYPASS.       XOQDOQ
C        KOPT(1)   TO DISTRIBUTE INPUTTED CALMS AS THE FIRST                 VERS2
C                  WIND SPEED CLASS                                          VERS2
C        KOPT(2)   TO INPUT DATA AS PERCENT FREQUENCY                        VERS2
C        KOPT(3)   TO USE SECTOR SPREAD IN INTERMITTENT RELEASE.             XOQDOQ
C        KOPT(4)   TO PLOT X/Q VS FREQUENCY FOR INTERMITTENT RELEASES.       XOQDOQ
C        KOPT(5)   TO USE CUBIC SPLINE IN LIEU OF LEAST SQUARES FUNCTION     XOQDOQ
C                        FOR FITTING INTERMITTENT RELEASE DISTRIBUTION.      XOQDOQ
C        KOPT(6)   TO PUNCH RADIAL SEGMENT X/Q + D/Q VALUES                  VERS2
C        KOPT(7)   TO PUNCH POINT OF INTEREST X/Q + D/Q VALUES               VERS2
C        KOPT(8)   TO CORRECT OUTPUT USING STANDARD OPEN TERRAIN FACTORS     VERS2
C        KOPT(9)   TO CORRECT OUTPUT USING SITE-SPECFIC FACTORS              VERS2
C        KOPT(10)  TO USE DESERT SIGMA"S                                     VERS2
C        KOPT(11)  TO INPUT DATA WITH 30 DEGREE SECTORS FOR N,E,S,W          VERS2
C                  AND 20 SECTORS FOR ALL OTHER DIRECTIONS                   VERS2
          READ 5,TITLM                                                       XOQDOQ
C****     TITLM IS THE MAIN TITLE FOR THE RUN                                XOQDOQ
          PRINT 502,   TITLM                                                 XOQDOQ
      502 FORMAT("     2     ",20A4)                                         XOQDOQ
          READ 2,NVEL,NSTA,NDIS,INC,NPTYPE,NEXIT,NCOR                        VERS2
C****     NVEL   IS THE NUMBER OF VELOCITY CATEGORIES.  (MAXIMUM OF 14)      XOQDOQ
C         NSTA   IS THE NUMBER OF STABILITY CATEGORIES. (MAXIMUM OF 7)       XOQDOQ
C         NDIS   IS THE NUMBER OF DISTANCES OF TERRAIN DATA. (MAX OF 10)     XOQDOQ
C                IF NDIS=0,DO NOT INPUT DIST OR HT ARRAYS.                   XOQDOQ
C         INC    IS THE PERCENTILE USED FOR THE ONE-HOUR PURGE VALUE.        XOQDOQ
C         NPTYPE IS THE NUMBER OF RECEPTOR TYPES.  (MAXIMUM OF 5).           XOQDOQ
C                IF NPTYPE=0,DO NOT INPUT NPOINT,TITLPT,KDIR,OR PTDIST.      XOQDOQ
C         NEXIT IS THE NUMBER OF RELEASE EXIT POINTS.  (MAXIMUM OF 5).       XOQDOQ
C         NCOR   IS THE NUMBER OF DISTANCES OF SITE SPECIFIC CORRECTIONS     XOQDOQ
C                (MAX OF 10). IF NCOR=0,DO NOT INPUT VRDIST OR VRCR ARRAY    XOQDOQ
          PRINT 503,NVEL,NSTA,NDIS,INC,NPTYPE,NEXIT,NCOR                     VERS2
      503 FORMAT("     3     ",16I5)                                         XOQDOQ
          READ 4,   PLEV, (DECAYS(I),I=1,3), PLGRAD                          XOQDOQ
C****     PLEV   IS THE HEIGHT (METERS) OF THE MEASURED WIND DATA.           XOQDOQ
C         DECAYS ARE THE HALF-LIVES (DAYS) CONSIDERED. IF DECAYS>100, NO     XOQDOQ
C                DECAY WILL OCCUR. DEPLETION WILL OCCUR BY MAKING THE        XOQDOQ
C                HALF/LIFE A NEGATIVE.   (MAXIMUM OF 3)                      XOQDOQ
C         PLGRAD IS PLANT GRADE ELEVATION (FEET ABOVE SEA LEVEL)\            XOQDOQ
C                IF PLGRAD=0.0, DIST AND HT MUST BOTH BE INPUTTED            XOQDOQ
C                               IN METERS\                                   XOQDOQ
C                IF PLGRAD)0.0, INPUT DIST IN MILES AND HT IN FEET           XOQDOQ
C                               ABOVE PLANT GRADE LEVEL\                     XOQDOQ
C                IF PLGRAD>0.0, INPUT DIST IN MILES AND HT IN FEET           XOQDOQ
C                               ABOVE SEA LEVEL.                             XOQDOQ
          PRINT 504,  PLEV, (DECAYS(I),I=1,3), PLGRAD                        XOQDOQ
      504 FORMAT("     4     ",16F7.2)                                       XOQDOQ
          READ 4,CALM                                                        XOQDOQ
C**** CALM CONTINS THE FREQUENCIES OF CALM FOR EACH STABILITY CLASS.         XOQDOQ
          PRINT 505,   CALM                                                  XOQDOQ
      505 FORMAT("     5     ",16F7.3)                                       XOQDOQ
          IST=1                                                              XOQDOQ
          IF(KOPT(1).EQ.1)     IST=2                                         XOQDOQ
          NCALM=1                                                            XOQDOQ
          DO 63 J=1,NSTA                                                     XOQDOQ
          IF(CALM(J).GE.0.0001) GO TO 64                                     XOQDOQ
       63 CONTINUE                                                           XOQDOQ
          NCALM=0                                                            XOQDOQ
```

```
121.        64 DO 10 J=1,NSTA                                                  XOQDOQ
122.           TOT(J)=0.                                                       XOQDOQ
123.           DO 10 I=IST,NVEL                                                XOQDOQ
124.           READ 4,(FREQ(K,I,J),K=1,NDIR)                                   XOQDOQ
125.       C***    FREQ IS THE JOINT FREQUENCY DISTRIBUTION AS A FUNCTION OF WIND  XOQDOQ
126.       C               DIRECTION (K), VELOCITY CATEGORY (I), AND STABILITY     XOQDOQ
127.       C               CATEGORY (J).                                           XOQDOQ
128.          10 PRINT 506,   (FREQ(K,I,J), K=1,NDIR)                          XOQDOQ
129.         506 FORMAT("     6     ",16F7.3)                                  XOQDOQ
130.           READ 4,UCOR,UMAX                                                XOQDOQ
131.       C*** UCOR IS A CORRECTION FACTOR TO BE APPLIED TO THE VELOCITIES.       XOQDOQ
132.       C       IF UCOR IS LESS THAN OR EQUAL TO ZERO NO CORRECTION IS NEEDED.  XOQDOQ
133.       C       IF UCOR IS GREATER THAN 100 A CONVERSION FROM MILES/HOUR TO     XOQDOQ
134.       C       METERS/ SECOND WILL BE MADE.                                    XOQDOQ
135.       C    UMAX IS THE ARRAY OF MAXIMUM VELOCITIES IN THE WIND SPEED CATAGORI XOQDOQ
136.       C       THE UMAX VALUES MAY BE READ IN AS EITHER MILES/HR OR METERS /SE XOQDOQ
137.       C       BY USING THE PROPER VALUE OF UCOR.                              XOQDOQ
138.           PRINT 507,   UCOR,UMAX                                          XOQDOQ
139.         507 FORMAT("     7     ",F7.0,14F7.3)                             XOQDOQ
140.           DO 400 L=1,10                                                   XOQDOQ
141.           DO 400 K=1,16                                                   XOQDOQ
142.           VRCR(K,L)=1.0                                                   XOQDOQ
143.           VRDIST(K,L)=0.0                                                 XOQDOQ
144.           DIST(K,L)=0.0                                                   XOQDOQ
145.         400 HT(K,L)=0.0                                                   XOQDOQ
146.           IF(NCOR.EQ.0)   PRINT 5081                                      XOQDOQ
147.        5081 FORMAT(" VRDIST,VRCR NOT INPUTTED.")                          XOQDOQ
148.           IF(NCOR.EQ.0)   GO TO 70                                        XOQDOQ
149.           DO 46   I=1,NCOR                                                XOQDOQ
150.           READ 4, (VRDIST(K,I),K=1,NDIR)                                  XOQDOQ
151.           READ 4, (VRCR(K,I),K=1,NDIR)                                    XOQDOQ
152.       C***    VRDIST CONTAINS THE DISTANCES CORRESPONDING TO THE CORRECTION   XOQDOQ
153.       C       FACTORS OF ARRAY VRCR(METERS),K=1 IS FOR SOUTH, K=2 IS FOR SEE  VERS2
154.       C       VRCR ARE THE SITE-SPECIFIC CORRECTION FACTORS AS A FUNCTION     XOQDOQ
155.       C            OF DIRECTION AND DISTANCE.                                 XOQDOQ
156.           PRINT 508,   (VRDIST(K,I), K=1,NDIR)                            XOQDOQ
157.         508 FORMAT("     8     ",16F7.0)                                  XOQDOQ
158.          46 PRINT 509,   (VRCR(K,I), K=1,NDIR)                           XOQDOQ
159.         509 FORMAT("     9     ",16F7.3)                                  XOQDOQ
160.          70 IF(NDIS.EQ.0)   PRINT 5101                                   XOQDOQ
161.        5101 FORMAT(" NO TERRAIN DATA INPUTTED.")                          XOQDOQ
162.           IF(NDIS.EQ.0)   GO TO 73                                        XOQDOQ
163.           DO 47 I=1,NDIS                                                  XOQDOQ
164.           READ 4, (DIST(K,I),K=1,NDIR)                                    XOQDOQ
165.           READ 4,(HT(K,I),K=1,NDIR)                                       XOQDOQ
166.       C*** DIST(K,N) CONTAINES THE DISTANCES CORRESPONDING TO THE ELEVATIONS  XOQDOQ
167.       C       IN THE HT MATRIX. K=1 IS FOR THE SOUTH AS IN BDY                XOQDOQ
168.       C       (SEE DESCRIPTION FOR PLGRAD.)                                   XOQDOQ
169.       C*** HT ARE THE TERRAIN HEIGHTS AS A FUNCTION OF DIRECTION AND DISTANCE XOQDOQ
170.       C               CORRESPONDING TO DIST.                                  XOQDOQ
171.           PRINT 510,   (DIST(K,I), K=1,NDIR)                              XOQDOQ
172.         510 FORMAT("    10     ",16F7.0)                                  XOQDOQ
173.          47 PRINT 511,   (HT(K,I), K=1,NDIR)                             XOQDOQ
174.         511 FORMAT("    11     ",16F7.0)                                  XOQDOQ
175.           IF(PLGRAD.EQ.0.0)   GO TO 73                                    XOQDOQ
176.           DO 71   I=1,NDIS                                                XOQDOQ
177.           DO 71   K=1,NDIR                                                XOQDOQ
178.           DIST(K,I)=DIST(K,I)*1609.35                                     XOQDOQ
179.          71 HT(K,I)=HT(K,I)*0.3047                                        XOQDOQ
180.           IF(PLGRAD.LT.0.0)   GO TO 73                                    XOQDOQ
```

```
      PLGRAD=PLGRAD*0.3047                                                XOQDOQ
      DO 72   I=1,NDIS                                                    XOQDOQ
      DO 72   K=1,NDIR                                                    XOQDOQ
   72 HT(K,I)=HT(K,I)-PLGRAD                                              XOQDOQ
   73 IF(NDIS.EQ.0)   NDIS=1                                              XOQDOQ
       IF(NPTYPE.EQ.0)   PRINT 5121                                       XOQDOQ
 5121 FORMAT(" NO POINTS OF INTEREST DATA INPUTTED.")                     XOQDOQ
       IF(NPTYPE.EQ.0)   GO TO 74                                         XOQDOQ
      READ 2,     (NPOINT(I),  I=1,NPTYPE)                              XOQDOQ
C**** NPOINT IS THE NUMBER OF POINTS OF INTEREST FOR A PARTICULAR         XOQDOQ
C             RECEPTOR TYPE (NPTYPE). (MAXIMUM OF 30)                    XOQDOQ
      PRINT 512,   (NPOINT(I), I=1,NPTYPE)                               XOQDOQ
  512 FORMAT("    12     ",16I5)                                          XOQDOQ
      DO 1234   I=1,NPTYPE                                                XOQDOQ
      READ 5,    (TITLPT(I,J),  J=1,4)                                    XOQDOQ
C**** TITLPT IS THE NAME OF THE RECEPTOR TYPE  (MAX OF 16 SPACES)         XOQDOQ
      PRINT 513,   (TITLPT(I,J), J=1,4)                                   XOQDOQ
  513 FORMAT("    13     ",20A4)                                          XOQDOQ
      NP = NPOINT(I)                                                      XOQDOQ
      READ 124,(KDIR(I,N),PTDIST(I,N), N=1,NP)                            XOQDOQ
C****    KDIR IS THE DIRECTION OF INTEREST, 1=SOUTH,2=SSW,...,16=SSE.     XOQDOQ
C       PTDIST IS THE DISTANCE, IN METERS, TO THE POINT OF INTEREST       VERS2
 1234 PRINT 514,   (KDIR(I,N),PTDIST(I,N), N=1,NP)                        XOQDOQ
  514 FORMAT("    14     ",8(I3,F7.1)/)                                   VERS2
   74 DO 411   I=1,NEXIT                                                  XOQDOQ
      READ 5,   (TITLE(I,J),   J=1,20)                                    XOQDOQ
C****    TITLE IS THE OVERALL TITLE FOR THE RESPECTIVE RELEASE POINT       XOQDOQ
      PRINT 515,   (TITLE(I,J), J=1,20)                                   XOQDOQ
  515 FORMAT("    15     ",20A4)                                          XOQDOQ
      READ 4,  EXIT(I), DIAMTR(I), HSTACK(I), HBLDG(I), CRSEC(I),         XOQDOQ
     1         SLEV(I), HEATR(I)                                          XOQDOQ
C****    EXIT   IS THE VENT AVERAGE VELOCITY  (METERS/SECOND)             XOQDOQ
C        DIAMTR IS THE VENT INSIDE DIAMETER  (METERS)                     XOQDOQ
C        HSTACK IS THE HEIGHT OF THE VENT RELEASE POINT  (METERS)         XOQDOQ
C               (IF VENT IS A STACK,I.E. ELEVATED RELEASE 100 PERCENT     XOQDOQ
C               OF THE TIME, INPUT HSTACK AS THE NEGATIVE OF THE HEIGHT.  XOQDOQ
C        HBLDG  IS THE HEIGHT OF THE VENT"S BUILDING  (METERS)            XOQDOQ
C        CRSEC  IS THE MINIMUM CROSS-SECTIONAL AREA USED FOR THE VENT"S   XOQDOQ
C               BUILDING  (SQUARE METERS)                                 XOQDOQ
C        SLEV   IS THE WIND HEIGHT USED FOR THE VENT ELEVATED             XOQDOQ
C               RELEASE  (METERS)                                         XOQDOQ
C        HEATR  IS THE VENT HEAT EMISSION RATE (CAL/SEC) (GENERALLY = 0)  XOQDOQ
      PRINT 516,   EXIT(I),DIAMTR(I),HSTACK(I),HBLDG(I)                  XOQDOQ
     1                          , CRSEC(I),SLEV(I),HEATR(I)               XOQDOQ
  516 FORMAT("    16     ",2F7.3,4F7.1,F6.2)                              XOQDOQ
      READ 123,   RLSID(I), IPURGE(I), NPURGE(I), NPRGHR(I)               XOQDOQ
  123 FORMAT(A1,I4,2I5)                                                   XOQDOQ
C****    RLSID  IS A ONE LETTER IDENTIFICATION FOR THE RELEASE POINT      XOQDOQ
C        IPURGE = 1,2, OR 3, IF THE VENT IS A PURGE RELEASE POINT, CORRE  XOQDOQ
C                 TO DECAY 1,2, OR 3 USED AS BASE FOR PURGE CALCULATIONS  XOQDOQ
C                 (USUALLY NO DECAY/NO DEPLETE X/Q)\   = 0, IF NO PURGES  XOQDOQ
C        NPURGE IS THE NUMBER OF PURGES PER DATA SET PERIOD                XOQDOQ
C        NPRGHR IS THE NUMBER OF HOURS PER PURGE RELEASE                   XOQDOQ
  411 PRINT 517,   RLSID(I),IPURGE(I),NPURGE(I),NPRGHR(I)                 XOQDOQ
  517 FORMAT("    17     ",A1,I4,2I5)                                     XOQDOQ
C*************************************************************************XOQDOQ
C*************************************************************************XOQDOQ
C*************************************************************************XOQDOQ
      PRINT 960,TODAY,CLOCK                                               VERS2
      PRINT 25,    TITLM                                                  XOQDOQ
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241.        25 FORMAT(1H ,4X,20A4/)                                          VERS2
242.           IF(KOPT(6).EQ.1.OR.KOPT(7).EQ.1) PUNCH 5,TITLM                VERS2
243.           IF(KOPT(2).EQ.1) GO TO 18                                     VERS2
244.           ITOTAL=0                                                      VERS2
245.           IF(KOPT(10).EQ.1) GO TO 18                                    VERS2
246.           DO 740 J=1,NSTA                                               VERS2
247.           DO 13 I=1,NVEL                                                VERS2
248.           DO 13 K=1,NDIR                                                VERS2
249.        13 ITOTAL=ITOTAL+IFIX(FREQ(K,I,J))                               VERS2
250.       740 ITOTAL=ITOTAL+IFIX(CALM(J))                                   VERS2
251.           FAC=100./ITOTAL                                               VERS2
252.           DO 952 J=1,NSTA                                               VERS2
253.           DO 950 I=1,NVEL                                               VERS2
254.           DO 950 K=1,NDIR                                               VERS2
255.       950 FREQ(K,I,J)=FAC*FREQ(K,I,J)                                   VERS2
256.       952 CALM(J)=CALM(J)*FAC                                           VERS2
257.        18 CONTINUE                                                      VERS2
258.           NHRS=ITOTAL                                                   VERS2
259.           IF(NCALM.EQ.0) GO TO 391                                      XOQDOQ
260.           DO 17 J=1,NSTA                                                XOQDOQ
261.           DO 17 K=1,NDIR                                                XOQDOQ
262.           IF(IST.EQ.2) FREQ(K,1,J)=0.                                   XOQDOQ
263.        17 TOT(J)=TOT(J)+FREQ(K,IST,J)                                   XOQDOQ
264.           DO 39 J=1,NSTA                                                XOQDOQ
265.           IF(TOT(J).LE.0.01) TOT(J)=NDIR                                XOQDOQ
266.           REV=1./TOT(J)                                                 XOQDOQ
267.           DO 39 K=1,NDIR                                                XOQDOQ
268.        39 FREQ(K,1,J)=FREQ(K,1,J)+FREQ(K,IST,J)*REV*CALM(J)             XOQDOQ
269.       391 CONTINUE                                                      XOQDOQ
270.           UMIN(1)=0.                                                    XOQDOQ
271.           IF(UCOR.LE.0.) GO TO 15                                       XOQDOQ
272.           IF(UCOR.GT.100) UCOR=.44704                                   XOQDOQ
273.           DO 16 I=1,NVEL                                                XOQDOQ
274.        16 UMAX(I)=UMAX(I)*UCOR                                          XOQDOQ
275.        15 DO 14 I=1,NVEL                                                XOQDOQ
276.           UAVE(I)=(UMAX(I)+UMIN(I))*.5                                  XOQDOQ
277.           IF(I.EQ.NVEL) GO TO 14                                        XOQDOQ
278.           UMIN(I+1)=UMAX(I)                                             XOQDOQ
279.        14 CONTINUE                                                      XOQDOQ
280.           DO 20 I=1,NDIR                                                XOQDOQ
281.           XMX(I)=0.                                                     XOQDOQ
282.           DMX(I)=0.                                                     XOQDOQ
283.           GRNDVT(I)=0.0                                                 XOQDOQ
284.           DO 20   J=1,NSTA                                              XOQDOQ
285.           VERSUM(I,J)=0.0                                               XOQDOQ
286.        20 CONTINUE                                                      XOQDOQ
287.           DO 24   I=1,NVEL                                              XOQDOQ
288.           GRNDHR(I)=0.0                                                 XOQDOQ
289.           DO 24   J=1,NSTA                                              XOQDOQ
290.           HORSUM(I,J)=0.0                                               XOQDOQ
291.        24 CONTINUE                                                      XOQDOQ
292.           DO 38   J=1,NSTA                                              XOQDOQ
293.        38 TOTSUM(J)=0.0                                                 XOQDOQ
294.           DO 1000  J=1,NSTA                                             XOQDOQ
295.           PRINT 1001, SCLASS(J), (COMP(K),K=9,16), (COMP(K),K=1,8)      XOQDOQ
296.      1001 FORMAT("0JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION  XOQDOQ
297.          1          ATMOSPHERIC STABILITY CLASS ", A1/                  XOQDOQ
298.          2       "0UMAX (M/S)",16(3X,A4), "  TOTAL")                   XOQDOQ
299.           DO 1012  I=1,NVEL                                             XOQDOQ
300.           DO 1002  K=1,16                                               XOQDOQ
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      HORSUM(I,J)=FREQ(K,I,J)+HORSUM(I,J)                                XOQDOQ
 1002 VERSUM(K,J)=FREQ(K,I,J)+VERSUM(K,J)                                XOQDOQ
      TOTSUM(J)=HORSUM(I,J)+TOTSUM(J)                                    XOQDOQ
 1012 GRNDHR(I)=HORSUM(I,J)+GRNDHR(I)                                    XOQDOQ
      DO 1022  K=1,16                                                    XOQDOQ
 1022 GRNDVT(K)=VERSUM(K,J)+GRNDVT(K)                                    XOQDOQ
      DO 1003 I=1,NVEL                                                   XOQDOQ
      PRINT 1004,  UMAX(I), (FREQ(K,I,J),K=1,16), HORSUM(I,J)            XOQDOQ
 1004 FORMAT(" ",F5.2,5X,17F7.3)                                         XOQDOQ
 1003 CONTINUE                                                           XOQDOQ
      PRINT 1005,  (VERSUM(K,J),K=1,16), TOTSUM(J)                       XOQDOQ
 1005 FORMAT(" TOTAL    ",17F7.2/" ")                                    XOQDOQ
 1000 CONTINUE                                                           XOQDOQ
      DO 961 I=1,16                                                      VERS2
  961 SUMTOT=SUMTOT+GRNDVT(I)                                            VERS2
      IF(NHRS.EQ.0)   GO TO 84                                           XOQDOQ
      PRINT 310,   NHRS                                                  XOQDOQ
  310 FORMAT(" TOTAL HOURS CONSIDERED ARE ", I5)                         XOQDOQ
      GO TO 85                                                           XOQDOQ
   84 PRINT 311                                                          XOQDOQ
  311 FORMAT(" HOURS INPUTTED IN PERCENT.")                              XOQDOQ
   85 PRINT 261, PLEV                                                    XOQDOQ
  261 FORMAT("0WIND MEASURED AT ", F5.1, " METERS.")                     XOQDOQ
      PRINT 1006,  (COMP(K),K=9,16), (COMP(K),K=1,8), (GRNDVT(K),K=1,16) XOQDOQ
     1,SUMTOT                                                            VERS2
 1006 FORMAT("0OVERALL WIND DIRECTION FREQUENCY"/                        XOQDOQ
     1       " WIND DIRECTION:     ",16(2X,A4),2X,"TOTAL"/               VERS2
     2       " FREQUENCY:          ",17F6.1)                             VERS2
      PRINT 1007,  (UMAX(I),I=1,NVEL)                                    XOQDOQ
 1007 FORMAT("0OVERALL WIND SPEED FREQUENCY"/                            XOQDOQ
     1         " MAX WIND SPEED (M/S):   ", 14F7.3)                      XOQDOQ
      PRINT 1009,   (UAVE(I),I=1,NVEL)                                  XOQDOQ
 1009 FORMAT(" AVE WIND SPEED (M/S):   ", 14F7.3)                        XOQDOQ
      PRINT 1008,  (GRNDHR(I),I=1,NVEL)                                  XOQDOQ
 1008 FORMAT(" WIND SPEED FREQUENCY:  ", 14F7.2)                         XOQDOQ
      IF(UCOR.GT.0.) PRINT 36,UCOR                                       XOQDOQ
   36 FORMAT(" THE CONVERSION FACTOR APPLIED TO THE WIND SPEED CLASSES I XOQDOQ
     XS ",F8.3)                                                          XOQDOQ
      PRINT 31,  (COMP(K), K=1,NDIR)                                     XOQDOQ
   31 FORMAT("0DISTANCES AND TERRAIN HEIGHTS IN METERS AS FUNCTIONS OF " XOQDOQ
     1      ,"DIRECTION FROM THE SITE:"/" DIRECTION =",16(A4,2X))        XOQDOQ
      DO 32  I=1,NDIS                                                    XOQDOQ
      PRINT 35,  (DIST(K,I),  K=1,NDIR), (HT(K,I), K=1,NDIR)             XOQDOQ
   35 FORMAT(" DISTANCE ",16F6.0/" ELEVATION",16F6.0)                     XOQDOQ
   32 CONTINUE                                                           XOQDOQ
      IF(KOPT(9).EQ.0) GO TO 50                                          VERS2
      PRINT 51,  (COMP(K),K=1,NDIR)                                      XOQDOQ
   51 FORMAT("0DISTANCES AND SITE-SPECIFIC CORRECTION FACTORS AS FUNCTI" XOQDOQ
     1      ,"ONS OF DIRECTION FROM THE SITE:"/" DIRECTION =",16(A4,2X)) XOQDOQ
      DO 52   I=1,NCOR                                                   XOQDOQ
      PRINT 55,  (VRDIST(K,I),K=1,NDIR), (VRCR(K,I), K=1,NDIR)           XOQDOQ
   55 FORMAT(" DISTANCE ",16F6.0/" FACTOR   ",16F6.2)                     XOQDOQ
   52 CONTINUE                                                           XOQDOQ
   50 CONTINUE                                                           XOQDOQ
C                                                                        VERS2
C  ******** BEGIN LOOP FOR EACH RELEASE POINT                            VERS2
C                                                                        VERS2
      DO 207 IJ=1,NEXIT                                                  VERS2
      IEX=IJ                                                             VERS2
      DO 100   I=1,NPTYPE                                                XOQDOQ
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361.           NP = NPOINT(I)                                                  XOQDOQ
362.           DO 100   N=1,NP                                                 XOQDOQ
363.           DO 100   L=1,5                                                  XOQDOQ
364.         100 SAVEQS(I,N,L) = 0.0                                           XOQDOQ
365.           W=EXIT(IJ)                                                      VERS2
366.           DIA=DIAMTR(IJ)                                                  VERS2
367.           HS=HSTACK(IJ)                                                   VERS2
368.           LSTACK=0                                                        XOQDOQ
369.           IF(HSTACK(IJ).LT.0.0) LSTACK=1                                  VERS2
370.           HS=ABS(HS)                                                      XOQDOQ
371.           WINDHT=SLEV(IJ)                                                 VERS2
372.           D=HBLDG(IJ)                                                     VERS2
373.           A=CRSEC(IJ)                                                     VERS2
374.           Q=HEATR(IJ)                                                     VERS2
375.           NPHR=NPRGHR(IJ)                                                 VERS2
376.           NP=NPURGE(IJ)                                                   VERS2
377.           JPURGE=IPURGE(IJ)                                               VERS2
378.           CALL ADJWND                                                     XOQDOQ
379.           CALL ADJUST                                                     VERS2
380.           DO 19 J=1,NSTA                                                  XOQDOQ
381.           DO 19 I=1,NVEL                                                  XOQDOQ
382.          19 FQ(I,J)=0.                                                    XOQDOQ
383.           DO 21 J=1,NSTA                                                  XOQDOQ
384.           DO 21 I=1,NVEL                                                  XOQDOQ
385.           DO 21 K=1,NDIR                                                  XOQDOQ
386.           EFF(K,I,J)=0.                                                   XOQDOQ
387.           XQ(K,I,J)=0.                                                    XOQDOQ
388.           FQ(I,J)=FQ(I,J)+FREQ(K,I,J)                                     XOQDOQ
389.          21 CONTINUE                                                      XOQDOQ
390.           CALL ANNUAL(GRNDVT,JPURGE)                                      VERS2
391.           CALL DEPOS(GRNDVT,JPURGE)                                       VERS2
392.           IF(NPTYPE.EQ.0) GO TO 206                                       VERS2
393.           CALL PTDEPS                                                     VERS2
394.           IF(JPURGE.NE.0) GO TO 206                                       VERS2
395.           IPG=0                                                           VERS2
396.           CALL PTSOUT(IPG)                                                VERS2
397.         206 CONTINUE                                                      VERS2
398.           IF(JPURGE.NE.0)   CALL PURGE(NP,NPHR,JPURGE,INC)                XOQDOQ
399.       207   CONTINUE                                                      XOQDOQ
400.           GO TO 41                                                        XOQDOQ
401.          40 CONTINUE                                                      XOQDOQ
402.           STOP                                                            XOQDOQ
403.           END                                                             XOQDOQ
404.           SUBROUTINE ANNUAL(GRNDVT,JPURGE)                                VERS2
405.           COMMON /TITLE/ TITLM                                            VERS2
406.            COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                   BLANK
407.          1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                BLANK
408.          2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)            BLANK
409.          3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                BLANK
410.          4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)           BLANK
411.          5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)          BLANK
412.          6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)      BLANK
413.          7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                   BLANK
414.          8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL      BLANK
415.          9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)     BLANK
416.          1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                   BLANK
417.           DIMENSION XQS(16,11),FS(16),SAVE(10),WORD(2)                    ANNUAL
418.          1          ,SSMO(16,10),XALL(16,22),XSMA(16,22),                 ANNUAL
419.          2          R(22),HA(16,10),I8S(16,14,7),I6S(16,14,7),I3S(16,14,7) ANNUAL
420.          3          ,GRNDVT(16),MAXDIS(16),TITLM(20)                      VERS2
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421.           DATA R/.25,.5,.75,1.,1.5,2.,2.5,3.,3.5,4.,4.5,5.,7.5,10.,15.,20.   ANNUAL
422.          X,25.,30.,35.,40.,45.,50./                                          ANNUAL
423.           DATA WORD/"    ","  UN"/                                            ANNUAL
424.           LDSRT=0                                                            VERS2
425.           IF(KOPT(10).EQ.1) LDSRT=1                                          VERS2
426.       C                                                                      VERS2
427.       C *** LOOP ON VARIOUS DECAY FACTORS,COMPUTE,AND PRINT RESULTS          VERS2
428.       C                                                                      VERS2
429.           DO 3000   ITHRU=1,3                                                ANNUAL
430.           DECAY = DECAYS(ITHRU)                                              ANNUAL
431.           HFL=ABS(DECAY)                                                     ANNUAL
432.           IF(HFL.LT.1.0E-10)   GO TO 3000                                    ANNUAL
433.           FAC=0.02032                                                        ANNUAL
434.           F4=-1.0                                                            ANNUAL
435.           IF(Q.LT.1.)   GO TO 7                                              ANNUAL
436.           F=0.0043*Q                                                         ANNUAL
437.           F3=F**.333                                                         ANNUAL
438.           F4=F**.4                                                           ANNUAL
439.         7 CONTINUE                                                           VERS2
440.           DO 84 M=1,10                                                       ANNUAL
441.           SAVE(M)=0.                                                         ANNUAL
442.           DO 84 K=1,NDIR                                                     ANNUAL
443.           HA(K,M)=0.                                                         ANNUAL
444.        84 SSMO(K,M)=0.                                                       ANNUAL
445.           DO 1004 L=1,22                                                     ANNUAL
446.           DO 1004  K=1,16                                                    ANNUAL
447.           XSMA(K,L)=0.                                                       ANNUAL
448.      1004 XALL(K,L)=0.                                                       ANNUAL
449.           DO 60 K=1,NDIR                                                     ANNUAL
450.           FS(K)=0.                                                           ANNUAL
451.           DO 60 I=1,NVEL                                                     ANNUAL
452.           DO 60 J=1,NSTA                                                     ANNUAL
453.        60 FS(K)=FS(K)+FREQ(K,I,J)                                            ANNUAL
454.           DO 50 K=1,NDIR                                                     ANNUAL
455.           IF(FS(K).LE.0.) GO TO 50                                           ANNUAL
456.           FS(K)=1./FS(K)                                                     ANNUAL
457.        50 CONTINUE                                                           ANNUAL
458.           DO 66    K=1,16                                                    ANNUAL
459.           DO 66    I=1,14                                                    ANNUAL
460.           DO 66    J=1,7                                                     ANNUAL
461.           I8S(K,I,J) = 0                                                     ANNUAL
462.           I6S(K,I,J) = 0                                                     ANNUAL
463.        66 I3S(K,I,J) = 0                                                     ANNUAL
464.           DO 30    M=1,22                                                    ANNUAL
465.           DIS=R(M)*1609.347219                                               ANNUAL
466.           DD=1.0                                                             VERS2
467.           AA=1.0                                                             VERS2
468.           DO 30 J=1,NSTA                                                     ANNUAL
469.           CALL POLYN(J,DIS,SZ,LDSRT)                                         VERS2
470.           JA=J+7                                                             ANNUAL
471.           CALL POLYN(JA,DIS,SY,LDSRT)                                        VERS2
472.           DO 30 I=1,NVEL                                                     ANNUAL
473.           ADD= 0.0                                                           ANNUAL
474.           H  = 0.0                                                           ANNUAL
475.           ZH = 1.00                                                          ANNUAL
476.           ZG = 1.00                                                          ANNUAL
477.           DCY= 1.00                                                          ANNUAL
478.           DCYG=1.00                                                          ANNUAL
479.           U=UAVEEL(I,J)                                                      ANNUAL
480.           CALL RLSMOD(W,U,IVENT,ET,LSTACK)                                   ANNUAL
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481.          IF(IVENT)   24,24,25                                          ANNUAL
482.       24 U=UAVEGL(I,J)                                                 ANNUAL
483.          IF(HFL.GT.100.)   GO TO 4                                     ANNUAL
484.          TT=DIS/(86400.*U)                                             ANNUAL
485.          DCYG=EXP(-.693*TT/HFL)                                        ANNUAL
486.          IF(IVENT.EQ.-1)   GO TO 4                                     ANNUAL
487.       25 U=UAVEEL(I,J)                                                 ANNUAL
488.          IF(HFL.GT.100.) GO TO 14                                      ANNUAL
489.          TT=DIS/(86400.*U)                                             ANNUAL
490.          DCY=EXP(-.693*TT/HFL)                                         ANNUAL
491.       14 IF(IVENT.LT.1) GO TO 4                                        ANNUAL
492.          DEN=DIS*SZ*U                                                  ANNUAL
493.          DENCL=3.14159265*SY*SZ                                        ANNUAL
494.          GO TO 5                                                       ANNUAL
495.        4 U=UAVEGL(I,J)                                                 ANNUAL
496.    C                                                                   VERS2
497.    C **** IF DESERT SIGMA"S ARE USED, ONLY APPLY BUILDING WAKE CORRECTION  VERS2
498.    C       TO UNSTABLE AND NEUTRAL STABILITIES                         VERS2
499.    C                                                                   VERS2
500.          IF(KOPT(10).EQ.0) GO TO 665                                   VERS2
501.          IF(J.GE.5) DD=0.0                                             VERS2
502.      665 CONTINUE                                                      VERS2
503.          D=DD*D                                                        VERS2
504.          ARG = (SZ*SZ) + (C*D*D/3.14159265)                            ANNUAL
505.          DEN=U*DIS*SQRT(ARG)                                           ANNUAL
506.          DEN2=1.732051*U*DIS*SZ                                        ANNUAL
507.          IF(DEN2.LT.DEN) DEN=DEN2                                      ANNUAL
508.          DTERM=3.14159265*SY*SZ                                        ANNUAL
509.    C                                                                   VERS2
510.    C **** IF DESERT SIGMA"S ARE USED, ONLY APPLY BUILDING WAKE CORRECTION  VERS2
511.    C       TO UNSTABLE AND NEUTRAL STABILITIES                         VERS2
512.    C                                                                   VERS2
513.          IF(KOPT(10).EQ.0) GO TO 666                                   VERS2
514.          IF(J.GE.5) AA=0.0                                             VERS2
515.      666 CONTINUE                                                      VERS2
516.          A=AA*A                                                        VERS2
517.        6 DENCL=DTERM+(C*A)                                             ANNUAL
518.          DENCL2=3.0*DTERM                                              ANNUAL
519.          IF(DENCL2.LT.DENCL)   DENCL=DENCL2                            ANNUAL
520.        5 XOQ1 = FAC/DEN                                                ANNUAL
521.          XOQ2=0.01/(DENCL*U)                                           ANNUAL
522.    C                                                                   VERS2
523.    C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * VERS2
524.    C **** PROGRAM HAS THE ABILITY TO COMPARE CROSSWIND AND CENTERLINE VALUE VERS2
525.    C       BUT ONLY FOR CONTINUOUS RELEASES                            VERS2
526.    C                                                                   VERS2
527.    C       HOWEVER, IF REQUIRED CHANGE THE FOLLOWING STATEMENT         VERS2
528.    C       IF(XOQ1.GT.XOQ2) XOQ1=XOQ2                                  VERS2
529.          U=UAVEEL(I,J)                                                 ANNUAL
530.          DO 30   K=1,16                                                ANNUAL
531.          IF(FREQ(K,I,J).LE.0.) GO TO 30                                ANNUAL
532.          IF(DECAY.GE.0.) GO TO 1005                                    ANNUAL
533.          CALL DEPLET(DIS,J,0.,ZG)                                      ANNUAL
534.     1005 EXPO = ZG * DCYG                                              ANNUAL
535.          IF(IVENT.EQ.0)   EXPOG = EXPO                                 ANNUAL
536.          IF(IVENT.EQ.-1)   GO TO 85                                    ANNUAL
537.          CALL RISE (DH,   DIS,U,J,F4,F3,HS,W,DIA)                      ANNUAL
538.          CALL HEIGHT (K,DIS,HGT)                                       ANNUAL
539.          H=HS+DH-HGT                                                   ANNUAL
540.          IF(H.LT.0.) H=0.                                              ANNUAL
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      B=H/SZ                                                                ANNUAL
      XSMA(K,M)=XSMA(K,M)+H*FREQ(K,I,J)*FS(K)                               ANNUAL
      IF(DECAY.GE.0.)   GO TO 850                                           ANNUAL
      CALL DEPLET (DIS,J,H,ZH)                                              ANNUAL
      CALL ADJCOR (CR,I8S(K,I,J),I6S(K,I,J),I3S(K,I,J),H,K,I,J,ADD)         ANNUAL
  850 EXPO = ZH + ADD                                                       ANNUAL
      IF(B.LT.15.) GO TO 90                                                 ANNUAL
      IF(IVENT.EQ.0)   GO TO 92                                             ANNUAL
      EXPO=0.                                                               ANNUAL
      GO TO 85                                                              ANNUAL
   92 EVX = 0.0                                                             ANNUAL
      GO TO 852                                                             ANNUAL
   90 EXPO = EXP(-.5*B*B) * DCY * EXPO                                      ANNUAL
      IF(IVENT.NE.0)   GO TO 85                                             ANNUAL
      EVX=FAC*EXPO/(DIS*SZ*U)                                               ANNUAL
      EVXCL=EXPO/U*3.14159265*SY*SZ                                         ANNUAL
      IF(EVX.GT.EVXCL)   EVX=EVXCL                                          ANNUAL
  852 XOQ=XOQ1 * EXPOG                                                      ANNUAL
      TEMP = FREQ(K,I,J) * (ET*XOQ + (1.-ET)*EVX)                           ANNUAL
      GO TO 27                                                              ANNUAL
   85 TEMP = FREQ(K,I,J) * XOQ1* EXPO                                       ANNUAL
   27 XALL(K,M)=XALL(K,M)+TEMP                                              ANNUAL
   30 CONTINUE                                                              ANNUAL
      IF(KOPT(8).EQ.0) GO TO 301                                            VERS2
      DO 300   M=1,22                                                       ANNUAL
      DIS = R(M) * 1609.347219                                              ANNUAL
      RECIRC = 1.0000                                                       ANNUAL
      CALL OPENTR(DIS,RECIRC)                                               ANNUAL
      DO 300   K=1,NDIR                                                     ANNUAL
  300 XALL(K,M) = XALL(K,M) * RECIRC                                        ANNUAL
  301 IF(KOPT(9).EQ.0) GO TO 303                                            VERS2
      DO 302   M=1,22                                                       ANNUAL
      DIS = R(M) * 1609.347219                                              ANNUAL
      DO 302   K=1,NDIR                                                     ANNUAL
      CALL CORVAR(K,DIS,RECIRC)                                             ANNUAL
  302 XALL(K,M)=XALL(K,M)*RECIRC                                            ANNUAL
  303 CONTINUE                                                              ANNUAL
      IF(KOPT(11).EQ.0) GO TO 1111                                          VERS2
      DO 1 K=1,16,4                                                         ANNUAL
      DO 1 M=1,22                                                           ANNUAL
    1 XALL(K,M)=.667*XALL(K,M)                                              ANNUAL
 1111 CONTINUE                                                              ANNUAL
      NBR=2                                                                 ANNUAL
      MS=2                                                                  ANNUAL
      DO 31 MM=1,10                                                         ANNUAL
      MF=MS+NBR                                                             ANNUAL
      SEGD=0.                                                               ANNUAL
      DO 10 K=1,NDIR                                                        ANNUAL
      XQS(K,MM)=0.                                                          ANNUAL
      DO 10 M=MS,MF                                                         ANNUAL
      IF(K.EQ.1) SEGD=SEGD+R(M)                                             ANNUAL
      XQS(K,MM)=XQS(K,MM)+R(M)*XALL(K,M)                                    ANNUAL
      IF(HS.GT.1.) HA(K,MM)=HA(K,MM)+R(M)*XSMA(K,M)                         ANNUAL
   10 CONTINUE                                                              ANNUAL
      DO 2 K=1,NDIR                                                         ANNUAL
      XQS(K,MM)=XQS(K,MM)/SEGD                                              ANNUAL
    2 HA(K,MM)=HA(K,MM)/SEGD                                                ANNUAL
      MS=MF                                                                 ANNUAL
   31 CONTINUE                                                              ANNUAL
      CALL DATE(TODAY)                                                      VERS2
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      CALL TIME(CLOCK)                                                  VERS2
      PRINT 950, TODAY,CLOCK                                            VERS2
  950 FORMAT(1H1,"USNRC COMPUTER CODE-XOQDOQ,VERSION 2.0",10X,"RUN DATE  VERS2
     * ",A10,10X,"RUN TIME",A10)                                        VERS2
      PRINT 824,TITLM                                                   VERS2
  824 FORMAT(1H0,20A4/)                                                 VERS2
      PRINT 100,  (TITLE(IEX,J), J=1,20)                                ANNUAL
  100 FORMAT(1H ,20A4)                                                  VERS2
      IWORD = 1                                                         ANNUAL
      IF(DECAY.GE.0.0)   IWORD = 2                                      ANNUAL
      IF(HFL.GT.100.)   PRINT 400,  WORD(IWORD)                         ANNUAL
      IF(HFL.LE.100.)   PRINT 401,  HFL, WORD(IWORD)                    ANNUAL
  400 FORMAT(" NO DECAY,", A4, "DEPLETED")                              ANNUAL
  401 FORMAT(" ", F7.3, " DAY DECAY,", A4, "DEPLETED")                  ANNUAL
      IF(KOPT(8).EQ.1) PRINT 109                                        VERS2
  109 FORMAT(" CORRECTED USING STANDARD OPEN TERRAIN FACTORS")          ANNUAL
      IF(KOPT(9).EQ.1) PRINT 110                                        VERS2
  110 FORMAT(" CORRECTED USING SITE-SPECIFIC FACTORS")                  ANNUAL
      IF(KOPT(6).EQ.0) GO TO 67                                         VERS2
      PUNCH 64,  (TITLE(IEX,J),  J=1,20)                                ANNUAL
   64 FORMAT(20A4)                                                      ANNUAL
      IF(HFL.GT.100.)   PUNCH 400, WORD(IWORD)                          ANNUAL
      IF(HFL.LE.100.)   PUNCH 401,  HFL, WORD(IWORD)                    ANNUAL
      IF(KOPT(8).EQ.1.AND.JPURGE.EQ.0) PUNCH 109                        VERS2
      IF(KOPT(9).EQ.1.AND.JPURGE.EQ.0) PUNCH 110                        VERS2
   67 CONTINUE                                                          ANNUAL
      PRINT 111,  (R(M),  M=1,11)                                       ANNUAL
  111 FORMAT("0ANNUAL AVERAGE CHI/Q (SEC/METER CUBED)",17X,"DISTANCE IN  ANNUAL
     1MILES FROM THE SITE"/"   SECTOR",4X,11F10.3/)                     VERS2
      DO 70 K=1,NDIR                                                    ANNUAL
      DO 210 M=1,22                                                     ANNUAL
  210 XPO(M)=XALL(K,M)                                                  ANNUAL
   70 PRINT 103, COMP(K), (XALL(K,M), M=1,11)                           ANNUAL
      PRINT 810                                                         VERS2
  810 FORMAT(* *)                                                       VERS2
      PRINT 111,(R(M),M=12,22)                                          VERS2
      DO 12 K=1,NDIR                                                    ANNUAL
   12 PRINT 103, COMP(K), (XALL(K,M), M=12,22)                          ANNUAL
  103 FORMAT("    ",A4,7X,1P11E10.3)                                    ANNUAL
  108 CONTINUE                                                          ANNUAL
      CALL PRNTIN                                                       VERS2
      PRINT 950, TODAY,CLOCK                                            VERS2
      PRINT 824,TITLM                                                   VERS2
      PRINT 951,(TITLE(IEX,J),J=1,20)                                   VERS2
  951 FORMAT(1H ,20A4)                                                  VERS2
      IF(DECAY.GE.0.0) IWORD=2                                          VERS2
      IF(HFL.GT.100.) PRINT 400,WORD(IWORD)                             VERS2
      IF(HFL.LE.100.) PRINT 401,HFL,WORD(IWORD)                         VERS2
      PRINT 101                                                         ANNUAL
  101 FORMAT("0CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT"/               ANNUAL
     144X,"SEGMENT BOUNDARIES IN MILES FROM THE SITE")                  VERS2
      PRINT 200                                                         ANNUAL
  200 FORMAT(" DIRECTION   ",".5-1",9X,"1-2",9X,"2-3",9X,"3-4",9X,"4-5", ANNUAL
     X8X,"5-10",8X,"10-20",7X,"20-30",7X,"30-40",7X,"40-50"/" FROM SITE" ANNUAL
     X)                                                                 ANNUAL
      DO 170 K=1,NDIR                                                   ANNUAL
      IF(KOPT( 6).EQ.1.AND.JPURGE.EQ.0) PUNCH 65,COMP(K),               VERS2
     * (XQS(K,M),M=1,10)                                               VERS2
   65 FORMAT(A4,1X,1P7E10.3/8E10.3/8E10.3)                              ANNUAL
  170 PRINT 102, COMP(K), (XQS(K,M), M=1,10)                            ANNUAL
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  102 FORMAT("    ",A4,1P10E12.3)                                          ANNUAL
      IF(W.LE.0.0.OR.ITHRU.GT.1) GO TO 62                                  VERS2
      PRINT 40                                                             ANNUAL
   40 FORMAT("0AVERAGE EFFECTIVE STACK HEIGHT IN METERS FOR EACH SEGMENT   ANNUAL
     X"/)                                                                  ANNUAL
      PRINT 200                                                            ANNUAL
      DO 63 K=1,NDIR                                                       ANNUAL
   63 PRINT 102, COMP(K), (HA(K,M),M=1,10)                                 ANNUAL
   62 CONTINUE                                                             ANNUAL
      IF(LSTACK.EQ.0 .OR. ITHRU.NE.1)   GO TO 2000                         ANNUAL
C                                                                          VERS2
C **** FOR ELEVATED RELEASE COMPUTE MAXIMUM X/Q- OUTPUT IN PTSOUT.         VERS2
C                                                                          VERS2
      DO 601   K=1,16                                                      ANNUAL
      XMAX=0.0                                                             ANNUAL
      DO 601   M=1,22                                                      ANNUAL
      IF(XMAX.GT.XALL(K,M))   GO TO 601                                    ANNUAL
      XMAX=XALL(K,M)                                                       ANNUAL
      MAXDIS(K)=M                                                          ANNUAL
  601 CONTINUE                                                             ANNUAL
      NPTYPE=NPTYPE+1                                                      ANNUAL
      NPOINT(NPTYPE)=16                                                    ANNUAL
      DO 602   K=1,16                                                      ANNUAL
      KDIR(NPTYPE,K)=K                                                     ANNUAL
  602 PTDIST(NPTYPE,K)=R(MAXDIS(K))*1609.347219                            VERS2
 2000 CONTINUE                                                             ANNUAL
      FC1=FAC                                                              ANNUAL
C                                                                          VERS2
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *   VERS2
C     LOOP FOR EACH POINT OF INTEREST                                      VERS2
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *   VERS2
C                                                                          VERS2
      IF(NPTYPE.EQ.0) GO TO 3000                                           VERS2
      DO 23   ITYPE=1,NPTYPE                                               ANNUAL
      DD=1.0                                                               VERS2
      AA=1.0                                                               VERS2
      NP = NPOINT(ITYPE)                                                   ANNUAL
      DO 23   IPOINT=1,NP                                                  ANNUAL
      EXPO=1.                                                              ANNUAL
      H = 0.0                                                              ANNUAL
      ZG=1.                                                                ANNUAL
      ZH=1.                                                                ANNUAL
      DCYG=1.00                                                            ANNUAL
      DCY =1.00                                                            ANNUAL
      K = KDIR(ITYPE,IPOINT)                                               ANNUAL
      IF(KOPT(11).EQ.0) GO TO 2222                                         VERS2
      FAC=FC1                                                              ANNUAL
      DO 4321 NNMM=1,16,4                                                  ANNUAL
      IF(NNMM.EQ.K) FAC=.667*FC1                                           ANNUAL
 4321 CONTINUE                                                             ANNUAL
 2222 CONTINUE                                                             ANNUAL
      X = 0.0                                                              ANNUAL
      DIS=PTDIST(ITYPE,IPOINT)                                             VERS2
      DO 41   J=1,NSTA                                                     ANNUAL
      CALL POLYN(J,DIS,SZ,LDSRT)                                           VERS2
      JA=J+7                                                               ANNUAL
      CALL POLYN(JA,DIS,SY,LDSRT)                                          VERS2
      DO 41 I=1,NVEL                                                       ANNUAL
      I80=0                                                                ANNUAL
      I60=0                                                                ANNUAL
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721.            I30=0                                                   ANNUAL
722.            U=UAVEEL(I,J)                                           ANNUAL
723.            CALL RLSMOD(W,U,IVENT,ET,LSTACK)                        ANNUAL
724.            IF(IVENT) 16,17,17                                      ANNUAL
725.         17 U=UAVEEL(I,J)                                           ANNUAL
726.            IF(HFL.GT.100.)   GO TO 15                              ANNUAL
727.            TT=DIS/(86400.*U)                                       ANNUAL
728.            DCY=EXP(-.693*TT/HFL)                                   ANNUAL
729.         15 CONTINUE                                                VERS2
730.            CALL HEIGHT (K,DIS,HGT)                                 ANNUAL
731.            XOQPE=FAC/(DIS*SZ*U)                                    ANNUAL
732.            ELECL=.01/(U*3.14159265*SY*SZ)                          ANNUAL
733.            IF(XOQPE.GT.ELECL)   XOQPE=ELECL                        ANNUAL
734.            CALL RISE (DH,   DIS,U,J,F4,F3,HS,W,DIA)                ANNUAL
735.            H=HS+DH-HGT                                             ANNUAL
736.            IF(H.LT.0.) H=0.                                        ANNUAL
737.            B=H/SZ                                                  ANNUAL
738.            IF(B.LT.15.) GO TO 91                                   ANNUAL
739.            EXPO=0.                                                 ANNUAL
740.            GO TO 9                                                 ANNUAL
741.         91 EXPO=EXP(-.5*B*B)*DCY                                   ANNUAL
742.            IF(DECAY.GE.0.) GO TO 9                                 ANNUAL
743.            DO 855 M=1,22                                           ANNUAL
744.            SETDIS=1609.347*R(M)                                    ANNUAL
745.            IF(SETDIS.GE.DIS) GO TO 856                             ANNUAL
746.            CALL HEIGHT (K,SETDIS,HGT)                              ANNUAL
747.            CALL RISE (DH,SETDIS,U,J,F4,F3,HS,W,DIA)                ANNUAL
748.            HP=HS+DH-HGT                                            ANNUAL
749.            CALL ADJCOR(CR,I80,I60,I30,HP,K,I,J,ADD)                ANNUAL
750.       855 CONTINUE                                                 ANNUAL
751.       856 CALL DEPLET(DIS,J,H,ZH)                                  ANNUAL
752.            CALL ADJCOR(CR,I80,I60,I30,H,K,I,J,ADD)                 ANNUAL
753.            EXPO=EXPO*(ZH+ADD)                                      ANNUAL
754.          9 IF(IVENT.EQ.0)   GO TO 28                               ANNUAL
755.            XOQP=XOQPE                                              ANNUAL
756.            GO TO 21                                                ANNUAL
757.         28 XOQ=(1.0-ET)*EXPO*XOQPE                                 ANNUAL
758.         16 U=UAVEGL(I,J)                                           ANNUAL
759.      C                                                             VERS2
760.      C **** IF DESERT SIGMA"S ARE USED, ONLY APPLY BUILDING WAKE TO NEUTRAL   VERS2
761.      C       AND UNSTABLE STABILITIES- CONTINUOUS RELEASE          VERS2
762.      C                                                             VERS2
763.            IF(JPURGE.EQ.1) GO TO 765                               VERS2
764.            IF(KOPT(10).EQ.0) GO TO 765                             VERS2
765.            IF(J.GE.5) DD=0.0                                       VERS2
766.       765 CONTINUE                                                 VERS2
767.            D=DD*D                                                  VERS2
768.            ARG = (SZ*SZ) + (C*D*D/3.14159265)                      ANNUAL
769.            DEN=U*DIS*SQRT(ARG)                                     ANNUAL
770.            DEN2=1.73205*U*DIS*SZ                                   ANNUAL
771.            IF(DEN2.LT.DEN) DEN=DEN2                                ANNUAL
772.            XOQP=FAC/DEN                                            ANNUAL
773.            DTERM=3.14159265*SY*SZ                                  ANNUAL
774.      C                                                             VERS2
775.      C **** IF DESERT SIGMA"S ARE USED, ONLY APPLY BUILDING WAKE CORRECTION T VERS2
776.      C       UNSTABLE AND NEUTRAL STABILITIES-CONTINUUOUS RELEASES VERS2
777.      C                                                             VERS2
778.            IF(JPURGE.EQ.1) GO TO 766                               VERS2
779.            IF(KOPT(10).EQ.0) GO TO 766                             VERS2
780.            IF(J.GE.5) AA=0.0                                       VERS2
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766 CONTINUE                                                          VERS2
    A=AA*A                                                            VERS2
  8 DENCL=DTERM+(C*A)                                                 ANNUAL
    DENCL2=3.0*DTERM                                                  ANNUAL
    IF(DENCL2.LT.DENCL)   DENCL=DENCL2                                ANNUAL
    GRNDCL=.01/(DENCL*U)                                              ANNUAL
C                                                                     VERS2
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * VERS2
C **** PROGRAM HAS THE ABILITY TO COMPARE CROSSWIND AND CENTERLINE VALUE VERS2
C      BUT ONLY FOR CONTINUOUS RELEASES                               VERS2
C                                                                     VERS2
C      HOWEVER, IF THIS FEATURE IS REQUIRED ACTIVATE THE FOLLOWING    VERS2
C                                                                     VERS2
C     IF(XOQP.GE.GRNDCL) XOQP=GRNDCL                                  VERS2
C                                                                     VERS2
C * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * VERS2
    IF(DECAY.LT.0.) CALL DEPLET(DIS,J,0.,ZG)                          ANNUAL
    IF(HFL.GT.100.)   GO TO 22                                        ANNUAL
    TT = DIS/(86400.*U)                                               ANNUAL
    DCYG=EXP(-.693*TT/HFL)                                            ANNUAL
 22 EXPO = DCYG * ZG                                                  ANNUAL
    IF(IVENT.NE.0) GO TO 21                                           ANNUAL
    X=X+(FREQ(K,I,J)*(XOQ+ET*EXPO*XOQP))                              ANNUAL
    GO TO 42                                                          ANNUAL
 21 X=X+(FREQ(K,I,J)*EXPO*XOQP)                                       ANNUAL
 42 CONTINUE                                                          VERS2
 41 CONTINUE                                                          ANNUAL
    RECIRC = 1.0000                                                   ANNUAL
    IF(KOPT(8).EQ.1) CALL OPENTR(DIS,RECIRC)                          VERS2
    IF(KOPT(9).EQ.1) CALL CORVAR(K,DIS,RECIRC)                        VERS2
    SAVEQS(ITYPE,IPOINT,ITHRU) = X * RECIRC                           ANNUAL
 23 CONTINUE                                                          ANNUAL
3000 CONTINUE                                                         ANNUAL
    RETURN                                                            ANNUAL
    END                                                               ANNUAL
    SUBROUTINE DEPOS(GRNDVT,JPURGE)                                   VERS2
    COMMON /TITLE/ TITLM                                              VERS2
     COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                     BLANK
    1     ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                  BLANK
    2     ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)              BLANK
    3     ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                  BLANK
    4      ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)             BLANK
    5     ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)            BLANK
    6      ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)        BLANK
    7      ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                     BLANK
    8         ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL        BLANK
    9      ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)       BLANK
    1      ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                     BLANK
     DIMENSION Y(16,22),X(22),DEPSEG(16,10),SAVE(10),GRNDVT(16)       DEPOS
     DIMENSION TITLM(20)                                              VERS2
     DATA X/.25,.5,.75,1.,1.5,2.,2.5,3.,3.5,4.,4.5,5.,7.5,10.,15.,20., DEPOS
    1        25.,30.,35.,40.,45.,50./                                 DEPOS
     DO 200  K=1,NDIR                                                 DEPOS
     DO 200  M=1,22                                                   DEPOS
     Y(K,M) = 0.0                                                     DEPOS
200  CONTINUE                                                         DEPOS
     DO 1000  K=1,NDIR                                                DEPOS
     DO 1000  I=1,NVEL                                                DEPOS
     DO 1000  J=1,NSTA                                                DEPOS
     I80=0                                                            DEPOS
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841.            I60=0                                                          DEPOS
842.            I30=0                                                          DEPOS
843.            UBAR=UAVEEL(I,J)                                               DEPOS
844.            CALL RLSMOD(W,UBAR,IVENT,ET,LSTACK)                            DEPOS
845.            IF(IVENT)   111,120,110                                        DEPOS
846.        111 CONTINUE                                                       DEPOS
847.            DO 1111   M=1,22                                               DEPOS
848.            DIS = X(M) * 1609.347219                                       DEPOS
849.            CALL DEPOST (DIS,J,0.0,Z)                                      DEPOS
850.            ADJY = (Z * FREQ(K,I,J)) / (39.2699 * DIS)                     DEPOS
851.            Y(K,M) = Y(K,M) + ADJY                                         DEPOS
852.        1111 CONTINUE                                                      DEPOS
853.            GO TO 1000                                                     DEPOS
854.        110 CONTINUE                                                       DEPOS
855.            DO 112   M=1,22                                                DEPOS
856.            DIS = X(M) * 1609.347219                                       DEPOS
857.            CALL HEIGHT (K,DIS,HGT)                                        DEPOS
858.            CALL RISE (DH,   DIS,UBAR,J,0.,0.,HS,W,DIA)                    DEPOS
859.            H = HS + DH - HGT                                              DEPOS
860.            CALL ADJCOR (CRC,I80,I60,I30,H,K,I,J,ADD)                      DEPOS
861.            CALL DEPOST (DIS,J,H,Z)                                        DEPOS
862.            ADJY = (Z * CRC * FREQ(K,I,J)) / (39.2699 * DIS)               DEPOS
863.            Y(K,M) = Y(K,M) + ADJY                                         DEPOS
864.        112 CONTINUE                                                       DEPOS
865.            GO TO 1000                                                     DEPOS
866.        120 CONTINUE                                                       DEPOS
867.        122 ETELE = 1.0 - ET                                               DEPOS
868.            DO 113  M=1,22                                                 DEPOS
869.            DIS = X(M) * 1609.347219                                       DEPOS
870.            CALL HEIGHT (K,DIS,HGT)                                        DEPOS
871.            CALL RISE (DH,   DIS,UBAR,J,0.,0.,HS,W,DIA)                    DEPOS
872.            H = HS + DH - HGT                                              DEPOS
873.            CALL DEPOST (DIS,J,H,F)                                        DEPOS
874.            CALL ADJCOR (CRC,I80,I60,I30,H,K,I,J,ADD)                      DEPOS
875.            YE = F * CRC * ETELE                                           DEPOS
876.            CALL DEPOST (DIS,J,0.0,B)                                      DEPOS
877.            YG = B * ET                                                    DEPOS
878.            Z = YG + YE                                                    DEPOS
879.            ADJY = (Z * FREQ(K,I,J)) / (39.2699 * DIS)                     DEPOS
880.            Y(K,M) = Y(K,M) + ADJY                                         DEPOS
881.        113 CONTINUE                                                       DEPOS
882.        1000 CONTINUE                                                      DEPOS
883.            IF(KOPT(8).EQ.0) GO TO 301                                     VERS2
884.            DO 300   M=1,22                                                DEPOS
885.            DIS = X(M) * 1609.347219                                       DEPOS
886.            RECIRC = 1.0000                                                DEPOS
887.            CALL OPENTR(DIS,RECIRC)                                        DEPOS
888.            DO 300   K=1,NDIR                                              DEPOS
889.          300 Y(K,M) = Y(K,M) * RECIRC                                     DEPOS
890.          301 IF(KOPT(9).EQ.0) GO TO 303                                   VERS2
891.            DO 302   M=1,22                                                DEPOS
892.            DIS=X(M)*1609.347219                                           DEPOS
893.            DO 302   K=1,NDIR                                              DEPOS
894.            CALL CORVAR(K,DIS,RECIRC)                                      DEPOS
895.          302 Y(K,M)=Y(K,M)*RECIRC                                         DEPOS
896.          303 CONTINUE                                                     DEPOS
897.            CALL DATE(TODAY)                                               VERS2
898.            CALL TIME(CLOCK)                                               VERS2
899.            PRINT 950, TODAY,CLOCK                                         VERS2
900.          950 FORMAT(1H1,"USNRC COMPUTER CODE-XOQDOQ,VERSION 2.0",10X,"RUN DATE  VERS2
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     * ",A10,10X,"RUN TIME",A10)                                          VERS2
       PRINT 824,TITLM                                                    VERS2
 824   FORMAT(1H0,20A4/)                                                  VERS2
       PRINT 25, (TITLE(IEX,J),  J=1,20)                                  DEPOS
  25   FORMAT(1H ,20A4)                                                   VERS2
       IF(KOPT(8).EQ.1) PRINT 206                                         VERS2
       IF(KOPT(9).EQ.1) PRINT 207                                         VERS2
       PRINT 100,   (X(M),  M=1,11)                                       DEPOS
 100   FORMAT(" ********************     RELATIVE DEPOSITION PER UNIT ",  DEPOS
      1       "AREA (M**-2) AT FIXED POINTS BY DOWNWIND SECTORS     ****" DEPOS
      2      ,"****************"/" DIRECTION", T57, "DISTANCES IN MILES"/  DEPOS
      3       " FROM SITE   ", 11F10.2)                                   DEPOS
       DO 601   K=1,NDIR                                                  DEPOS
 601   PRINT 101,   COMP(K),  (Y(K,M),  M=1,11)                           DEPOS
 101   FORMAT("   ", A4, 8X, 1P11E10.3)                                   DEPOS
       PRINT 102,   (X(M),  M=12,22)                                      DEPOS
 102   FORMAT("0DIRECTION", T57, "DISTANCES IN MILES"/                    DEPOS
      1       " FROM SITE   ", 11F10.2)                                   DEPOS
       DO 602   K=1,NDIR                                                  DEPOS
 602   PRINT 101,   COMP(K),  (Y(K,M),  M=12,22)                          DEPOS
 108   CONTINUE                                                           DEPOS
       NBR=2                                                              DEPOS
       MS=2                                                               DEPOS
       DO 31   MM=1,10                                                    DEPOS
       MF = MS + NBR                                                      DEPOS
       SEGD = 0.                                                          DEPOS
       DO 10   K=1, NDIR                                                  DEPOS
       DEPSEG(K,MM) =0.                                                   DEPOS
       DO 10   M = MS,MF                                                  DEPOS
       IF(K.EQ.1)   SEGD = SEGD + X(M)                                    DEPOS
       DEPSEG(K,MM) = DEPSEG(K,MM) + (X(M) * Y(K,M))                      DEPOS
 10    CONTINUE                                                           DEPOS
       DO 2   K=1,NDIR                                                    DEPOS
 2     DEPSEG(K,MM) = DEPSEG(K,MM)/SEGD                                   DEPOS
       MS = MF                                                            DEPOS
 31    CONTINUE                                                           DEPOS
       PRINT 950, TODAY,CLOCK                                             VERS2
       PRINT 824,TITLM                                                    VERS2
       PRINT 951,(TITLE(IEX,J),J=1,20)                                    VERS2
 951   FORMAT(1H ,20A4)                                                   VERS2
       WRITE (6,205)                                                      DEPOS
 205   FORMAT("0************************     RELATIVE DEPOSITION PER ",   DEPOS
      1       "UNIT AREA (M**-2) BY DOWNWIND SECTORS     ************",   DEPOS
      2       "***********"/ " ", T45, "SEGMENT BOUNDARIES IN MILES"/     DEPOS
      3       " DIRECTION   .5-1         1-2         2-3         3-4",    DEPOS
      4       "         4-5         5-10        10-20       20-30",       DEPOS
      5       "       30-40       40-50"/" FROM SITE")                   DEPOS
       DO 600  K=1,NDIR                                                   DEPOS
       WRITE (6, 2222)     COMP(K),   (DEPSEG(K,M),  M=1,10)              DEPOS
 2222  FORMAT (" ", A4, T8, 1P10E12.3)                                    DEPOS
 600   CONTINUE                                                           DEPOS
       IF(KOPT(6).EQ.0) GO TO 701                                         VERS2
       PUNCH 251,(TITLE(IEX,J),  J=1,20)                                  DEPOS
 251   FORMAT("          DEPOSITION"/20A4)                                DEPOS
       IF(KOPT(8).EQ.1.AND.JPURGE.EQ.0) PUNCH 206                         VERS2
 206   FORMAT(" CORRECTED USING STANDARD OPEN TERRAIN FACTORS")           DEPOS
       IF(KOPT(9).EQ.1.AND.JPURGE.EQ.0) PUNCH 207                         VERS2
 207   FORMAT(" CORRECTED USING SITE-SPECIFIC FACTORS")                   DEPOS
       DO 700  K=1,NDIR                                                   DEPOS
       IF(JPURGE.EQ.0) PUNCH 2221,COMP(K),(DEPSEG(K,M),M=1,10)            VERS2
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 961.     2221  FORMAT (A4, T6, 1P7E10.3/1P3E10.3)                                DEPOS
 962.     700   CONTINUE                                                          DEPOS
 963.       701 CALL PRNTIN                                                       DEPOS
 964.           RETURN                                                            DEPOS
 965.           END                                                               DEPOS
 966.           SUBROUTINE PTDEPS                                                 PTDEPS
 967.            COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                     BLANK
 968.          1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                  BLANK
 969.          2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)              BLANK
 970.          3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                  BLANK
 971.          4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)             BLANK
 972.          5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)            BLANK
 973.          6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)        BLANK
 974.          7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                     BLANK
 975.          8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL        BLANK
 976.          9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)       BLANK
 977.          1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                     BLANK
 978.           DIMENSION X(22)                                                   PTDEPS
 979.           DATA X/.25,.5,.75,1.,1.5,2.,2.5,3.,3.5,4.,4.5,5.,7.5,10.,15.,     PTDEPS
 980.          1       20.,25.,30.,35.,40.,45.,50./                              PTDEPS
 981.           IF(NPTYPE.EQ.0) GO TO 13                                          VERS2
 982.           DO 12   ITYPE=1,NPTYPE                                            PTDEPS
 983.           NP = NPOINT(ITYPE)                                                PTDEPS
 984.           DO 12   IPOINT=1,NP                                               PTDEPS
 985.           K = KDIR(ITYPE,IPOINT)                                            PTDEPS
 986.           DIS=PTDIST(ITYPE,IPOINT)                                          VERS2
 987.           Y = 0.0                                                           PTDEPS
 988.           DO 1000  I=1,NVEL                                                 PTDEPS
 989.           DO 1000  J=1,NSTA                                                 PTDEPS
 990.           I80=0                                                             PTDEPS
 991.           I60=0                                                             PTDEPS
 992.           I30=0                                                             PTDEPS
 993.           UBAR=UAVEEL(I,J)                                                  PTDEPS
 994.           CALL RLSMOD(W,UBAR,IVENT,ET,LSTACK)                               PTDEPS
 995.           IF(IVENT)   111,122,110                                           PTDEPS
 996.     111   CALL DEPOST (DIS,J,0.0,Z)                                         PTDEPS
 997.           ADJY = (Z * FREQ(K,I,J)) / (39.2699 * DIS)                        PTDEPS
 998.           Y = Y + ADJY                                                      PTDEPS
 999.           GO TO 1000                                                        PTDEPS
1000.       110 CONTINUE                                                         VERS2
1001.           DO 112   M=1,22                                                   PTDEPS
1002.           SETDIS = X(M) * 1609.347219                                       PTDEPS
1003.           IF(SETDIS.GE.DIS)  GO TO 1121                                     PTDEPS
1004.           CALL HEIGHT (K,SETDIS,HGT)                                        PTDEPS
1005.           CALL RISE (DH,SETDIS,UBAR,J,0.,0.,HS,W,DIA)                       PTDEPS
1006.           H = HS + DH - HGT                                                 PTDEPS
1007.           CALL ADJCOR (CRC,I80,I60,I30,H,K,I,J,ADD)                         PTDEPS
1008.       112 CONTINUE                                                         VERS2
1009.      1121 CALL HEIGHT (K,DIS,HGT)                                          PTDEPS
1010.           CALL RISE (DH,   DIS,UBAR,J,0.,0.,HS,W,DIA)                       PTDEPS
1011.           H = HS + DH - HGT                                                 PTDEPS
1012.           CALL DEPOST (DIS,J,H,Z)                                           PTDEPS
1013.           CALL ADJCOR (CRC,I80,I60,I30,H,K,I,J,ADD)                         PTDEPS
1014.           ADJY = (Z * CRC * FREQ(K,I,J)) / (39.2699 * DIS)                  PTDEPS
1015.           Y = Y + ADJY                                                      PTDEPS
1016.           GO TO 1000                                                        PTDEPS
1017.     122   ETELE = 1.0 - ET                                                  PTDEPS
1018.           DO 113   M=1,22                                                   PTDEPS
1019.           SETDIS = X(M) * 1609.347219                                       PTDEPS
1020.           IF(SETDIS.GE.DIS)  GO TO 1122                                     PTDEPS
```

```
1021.           CALL HEIGHT (K,SETDIS,HGT)                                      PTDEPS
1022.           CALL RISE (DH,SETDIS,UBAR,J,0.,0.,HS,W,DIA)                     PTDEPS
1023.           H = HS + DH - HGT                                               PTDEPS
1024.           CALL ADJCOR (CRC,I80,I60,I30,H,K,I,J,ADD)                       PTDEPS
1025.         113 CONTINUE                                                      VERS2
1026.        1122 CONTINUE                                                      VERS2
1027.           CALL HEIGHT (K,DIS,HGT)                                         PTDEPS
1028.           CALL RISE (DH,   DIS,UBAR,J,0.,0.,HS,W,DIA)                     PTDEPS
1029.           H = HS + DH - HGT                                               PTDEPS
1030.           CALL DEPOST (DIS,J,H,F)                                         PTDEPS
1031.           CALL ADJCOR (CRC,I80,I60,I30,H,K,I,J,ADD)                       PTDEPS
1032.           YE = F * CRC * ETELE                                            PTDEPS
1033.           CALL DEPOST (DIS,J,0.0,B)                                       PTDEPS
1034.           YG = B * ET                                                     PTDEPS
1035.           Z = YG + YE                                                     PTDEPS
1036.           ADJY = (Z * FREQ(K,I,J)) / (39.2699 * DIS)                      PTDEPS
1037.           Y = Y + ADJY                                                    PTDEPS
1038.        1000  CONTINUE                                                     PTDEPS
1039.           RECIRC = 1.0000                                                 PTDEPS
1040.           IF(KOPT(8).EQ.1) CALL OPENTR(DIS,RECIRC)                        VERS2
1041.           IF(KOPT(9).EQ.1) CALL CORVAR(K,DIS,RECIRC)                      VERS2
1042.           SAVEQS(ITYPE,IPOINT,4) = Y * RECIRC                             PTDEPS
1043.        12    CONTINUE                                                     PTDEPS
1044.           13 CONTINUE                                                     VERS2
1045.           RETURN                                                          PTDEPS
1046.           END                                                             PTDEPS
1047.           SUBROUTINE PURGE(NPURGE,NPRGHR,JPURGE,INC)                      PURGE
1048.            COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                   BLANK
1049.          1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                BLANK
1050.          2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)            BLANK
1051.          3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                BLANK
1052.          4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)           BLANK
1053.          5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)          BLANK
1054.          6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)      BLANK
1055.          7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                   BLANK
1056.          8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL      BLANK
1057.          9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)     BLANK
1058.          1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                   BLANK
1059.           CALL MIXD15(INC)                                                PURGE
1060.           DO 12   ITYPE=1,NPTYPE                                          PURGE
1061.           NP = NPOINT(ITYPE)                                              PURGE
1062.           DO 12   IPOINT=1,NP                                             PURGE
1063.           ANNMX = SAVEQS(ITYPE,IPOINT,JPURGE)                             PURGE
1064.           IF(ANNMX.LT.1.0E-50)   GO TO 12                                 PURGE
1065.           F15MX = SAVEQS(ITYPE,IPOINT,5)                                  PURGE
1066.           IF(F15MX.LT.ANNMX) F15MX=ANNMX                                  VERS2
1067.           IF(F15MX.GT.ANNMX*1000.0) F15MX=ANNMX                           VERS2
1068.           QUOTNT = ANNMX / F15MX                                          PURGE
1069.           SLOPE = (ALOG(QUOTNT)) / ALOG(8760.)                            PURGE
1070.           NTOTAL = NPRGHR * NPURGE                                        PURGE
1071.           FACTOR = (FLOAT(NTOTAL)/8760.0) ** SLOPE                        PURGE
1072.           DO 13   L=1,4                                                   PURGE
1073.        13 SAVEQS(ITYPE,IPOINT,L) = SAVEQS(ITYPE,IPOINT,L) * FACTOR        PURGE
1074.        12 CONTINUE                                                        PURGE
1075.           IPG=1                                                           PURGE
1076.           CALL PTSOUT (IPG)                                               PURGE
1077.           PRINT 52, NPURGE, NPRGHR                                        PURGE
1078.        52 FORMAT("0TOTAL NUMBER OF PURGES:", I5/                          PURGE
1079.          1       " HOURS PER PURGE:       ", I5)                         PURGE
1080.           RETURN                                                          PURGE
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      END                                                                PURGE
      SUBROUTINE MIXD15(INC)                                             MIXD15
      COMMON /TITLE/ TITLM                                               VERS2
       COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                      BLANK
     1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                  BLANK
     2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)              BLANK
     3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                  BLANK
     4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)             BLANK
     5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)            BLANK
     6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)        BLANK
     7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                     BLANK
     8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL        BLANK
     9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)       BLANK
     1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                     BLANK
      COMMON /SIGMA /SIG                                                 MIXD15
      DIMENSION XP(49),XX(100),YY(100),FREQ15(14,7),YPF(100)             MIXD15
      DIMENSION XXXS(100),YYYS(100),XQ15S(100),FQ15S(100)                MIXD15
      DATA XP/0.02507,0.05015,0.07527,0.10043,0.12566,0.15097,0.17637,   MIXD15
     1        0.20189,0.22754,0.25335,0.27932,0.30548,0.33185,0.35846,   MIXD15
     2        0.38532,0.41246,0.43991,0.46770,0.49585,0.52440,0.55338,   MIXD15
     3        0.58284,0.61281,0.64335,0.67449,0.70630,0.73885,0.77219,   MIXD15
     4        0.80642,0.84162,0.87790,0.91537,0.95416,0.99446,1.03643,   MIXD15
     5        1.08032,1.12639,1.17499,1.22653,1.28155,1.34076,1.40507,   MIXD15
     6        1.47579,1.55477,1.64485,1.75069,1.88079,2.05375,2.32635/   MIXD15
      DO 9   ITYPE=1,NPTYPE                                              MIXD15
      NP=NPOINT(ITYPE)                                                   MIXD15
      DO 9   IPOINT=1,NP                                                 MIXD15
      K=KDIR(ITYPE,IPOINT)                                               MIXD15
      DIS=PTDIST(ITYPE,IPOINT)                                           VERS2
      AMILES=DIS/1609.347219                                             VERS2
      CALL DATE(TODAY)                                                   VERS2
      CALL TIME(CLOCK)                                                   VERS2
      PRINT 960,TODAY,CLOCK                                              VERS2
  960 FORMAT(1H1,"USNRC COMPUTER CODE-XOQDOQ,VERSION 2.0",10X,"RUN DATE  VERS2
     * ",A10,10X,"RUN TIME",A10)                                         VERS2
      PRINT 824,TITLM                                                    VERS2
  824 FORMAT(1H0,20A4/)                                                  VERS2
      PRINT 99                                                           MIXD15
   99 FORMAT(" SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE")          VERS2
      IF(KOPT(03).EQ.1)     PRINT 97                                     MIXD15
   97 FORMAT(" SECTOR SPREAD VALUE CALCULATED")                          MIXD15
      PRINT 96,(TITLE(IEX,J),J=1,20),RLSID(IEX),(TITLPT(ITYPE,J),J=1,4), MIXD15
     1         COMP(K),AMILES,PTDIST(ITYPE,IPOINT)                      VERS2
   96 FORMAT("0",20A4/" ID:",A1,3X,4A4,"   DIRECTION:",A4,"   DISTANCE:" MIXD15
     1      ,F6.2," MILES (",F6.0," METERS)")                           MIXD15
      TOTA=0.                                                            MIXD15
      TOTS=0.                                                            MIXD15
      DO 12 I=1,NVEL                                                     MIXD15
      DO 12   J=1,NSTA                                                   MIXD15
      IF(J.LT.4) GO TO 12                                                MIXD15
      TOTS=TOTS+FREQ(K,I,J)                                              MIXD15
   12 TOTA=TOTA+FREQ(K,I,J)                                              MIXD15
      IF(TOTA.GT.1.0E-6)   GO TO 10                                      MIXD15
  101 FORMAT("0NO OCCURRENCES IN THIS DIRECTION")                        MIXD15
      PRINT 101                                                          MIXD15
      GO TO 9                                                            MIXD15
   10 RHRS=100./TOTA                                                     MIXD15
      TOTS=TOTS*RHRS                                                     MIXD15
      NPER=IFIX(TOTS)                                                    MIXD15
      DO 23 I=1,NVEL                                                     MIXD15
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      DO 23   J=1,NSTA                                                  MIXD15
   23 FREQ15(I,J)=FREQ(K,I,J)*RHRS                                      MIXD15
      CALL CALC (K, DIS,FREQ15)                                         MIXD15
      CALL ORDER (NUM,MM,XQ15,FQ15)                                     MIXD15
      IF(KOPT(04).EQ.0)     GO TO 200                                   MIXD15
      DO 1000 NN=1,MM                                                   MIXD15
      XQ15S(NN)=XQ15(NN)                                                MIXD15
      IF(XQ15S(NN).LE.0.0) XQ15S(NN)=1.0E-50                            MIXD15
 1000 FQ15S(NN)=FQ15(NN)                                                MIXD15
      LDPTS=MM                                                          MIXD15
  200 CONTINUE                                                          MIXD15
      PRINT 100                                                         MIXD15
  100 FORMAT("0BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FRE MIXD15
     XQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.")             MIXD15
      I=1                                                               MIXD15
  112 LST=I+9                                                           MIXD15
      PRINT 123, (XQ15(NN),NN=I,LST), (FQ15(NN),NN=I,LST)               MIXD15
  123 FORMAT(1H0,1P10E12.3/1H ,0P10F12.3)                               MIXD15
      IF(LST.GE.MM)   GO TO 113                                         MIXD15
      I=I+10                                                            MIXD15
      GO TO 112                                                         MIXD15
  113 IF(KOPT(5).EQ.1)   GO TO 114                                      MIXD15
      DO 41   L=1,49                                                    MIXD15
      XX(50-L)=-XP(L)                                                   MIXD15
   41 XX(50+L)=XP(L)                                                    MIXD15
      XX(50)=0.                                                         MIXD15
      DO 32   L=1,MM                                                    MIXD15
      IF(FQ15(L).GE.TOTS)   GO TO 24                                    MIXD15
   32 XQ15(L)=ALOG10(XQ15(L))                                           MIXD15
   24 L=L-1                                                             MIXD15
      CALL CONV (FQ15,MM)                                               MIXD15
      CALL LSTSQR (FQ15,YY,FQ15,XQ15,L,3,L,101.,101.)                   MIXD15
      LM=0                                                              MIXD15
      DB=0.                                                             MIXD15
      DS=0.                                                             MIXD15
      DO 332 LN=1,L                                                     MIXD15
      IF(XQ15(LN).LT.YY(LN))   GO TO 332                                MIXD15
      LM=LM+1                                                           MIXD15
      DA=YY(LN)-XQ15(LN)                                                MIXD15
      DB=DB+DA                                                          MIXD15
      DS=DS+DA**2                                                       MIXD15
  332 CONTINUE                                                          MIXD15
      RL=FLOAT(LM)                                                      MIXD15
      DB=DB/RL                                                          MIXD15
      DS=DS/RL                                                          MIXD15
      SHIFT=2.*SQRT(RL*(DS-DB**2)/(RL-1.))                              MIXD15
      CALL LSTSQR (XX,YY,FQ15,XQ15,L,3,NPER,101.,101.)                  MIXD15
      PRINT 124                                                         MIXD15
  124 FORMAT("0LEAST SQUARES FIT:")                                     MIXD15
      GO TO 115                                                         MIXD15
  114  DO 42   L=1,100                                                 MIXD15
   42 XX(L)=L                                                           MIXD15
   27 MI=MM
      DO 28 L=2,MI
      MIL=MI-L+2
      IF((FQ15(MIL)-FQ15(MIL-1)).LT.5.0) GO TO 28
      NN=MM+1
      DO 26 LL=MIL,MM
      NN=NN-1
      FQ15(NN+1)=FQ15(NN)
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1201.            XQ15(NN+1)=XQ15(NN)
1202.         26 CONTINUE
1203.            MM=MM+1
1204.            XQ15(MIL)=0.5*(XQ15(MIL+1)+XQ15(MIL-1))
1205.            FQ15(MIL)=0.5*(FQ15(MIL+1)+FQ15(MIL-1))
1206.            PRINT 128, XQ15(MIL),FQ15(MIL)
1207.        128 FORMAT(1H ,5X,1PE12.3,0PF12.3)
1208.         28 CONTINUE
1209.            IF(MM.GT.MI) GO TO 27
1210.            DO 33   L=1,MM                                                  MIXD15
1211.            IF(XQ15(L).LE.0.0)   XQ15(L)=1.0E-50                            MIXD15
1212.            XQ15(L) = ALOG10(XQ15(L))                                       MIXD15
1213.            IF(FQ15(L).GE.TOTS)   GO TO 25                                  MIXD15
1214.         33 CONTINUE                                                        MIXD15
1215.         25 N=L                                                             MIXD15
1216.            M=NPER                                                          MIXD15
1217.            SHIFT=0.0                                                       MIXD15
1218.            SIG=-25.0                                                       MIXD15
1219.            CALL SPLINE(FQ15,XQ15,N,0.0,0.0,XX,YY,YPF,M)                    MIXD15
1220.            PRINT 125                                                       MIXD15
1221.        125 FORMAT("0CUBIC SPLINE FIT:")                                    MIXD15
1222.        115 PRINT 122                                                       MIXD15
1223.        122 FORMAT(6X,"CHI/Q",10X,"PERCENT OF TIME"/" SEC/METER CUBED",3X,"REA MIXD15
1224.          XCHED OR EXCEEDED"/)                                              MIXD15
1225.            NN1=1                                                           MIXD15
1226.            NN2=3                                                           MIXD15
1227.            NN3=2                                                           MIXD15
1228.            LFPTS=0                                                         MIXD15
1229.            DO 102 N2=1,2                                                   MIXD15
1230.            DO 13 L=NN1,NN2,NN3                                             MIXD15
1231.            YY(L)=YY(L)+SHIFT                                               MIXD15
1232.            XXX=FLOAT(L)                                                    MIXD15
1233.            YYY=10.**YY(L)                                                  MIXD15
1234.            IF(KOPT(04).EQ.0)     GO TO 13                                  MIXD15
1235.            LFPTS=LFPTS+1                                                   MIXD15
1236.            XXXS(LFPTS)=XXX                                                 MIXD15
1237.            YYYS(LFPTS)=YYY                                                 MIXD15
1238.            IF(YYYS(LFPTS).LE.0.0)   YYYS(LFPTS)=1.0E-50                    MIXD15
1239.         13 PRINT 44,YYY,XXX                                                MIXD15
1240.         44 FORMAT(1PE13.3,0PF19.3)                                         MIXD15
1241.            NN1=5                                                           MIXD15
1242.            NN2=NPER                                                        MIXD15
1243.        102 NN3=5                                                           MIXD15
1244.            SAVEQS(ITYPE,IPOINT,5)=10.0**YY(INC)                            MIXD15
1245.            AA=SAVEQS(ITYPE,IPOINT,5)                                       VERS2
1246.            BB=SAVEQS(ITYPE,IPOINT,1)                                       VERS2
1247.            IF(AA.LT.BB) AA=BB                                              VERS2
1248.            IF(AA.GT.BB*1000.0) AA=BB                                       VERS2
1249.            SAVEQS(ITYPE,IPOINT,5)=AA                                       VERS2
1250.            PRINT 45, INC,SAVEQS(ITYPE,IPOINT,5)                            MIXD15
1251.         45 FORMAT("0THE ",I2,"TH PERCENTILE IS:", 1PE9.2)                  MIXD15
1252.            IF(KOPT(4).EQ.1) CALL LOGFPT(XXXS,YYYS,XQ15S,FQ15S,LFPTS,LDPTS) MIXD15
1253.          9 CONTINUE                                                        MIXD15
1254.            RETURN                                                          MIXD15
1255.            END                                                             MIXD15
1256.            SUBROUTINE CALC (K, DIS,FREQ15)                                 CALC
1257.             COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                   BLANK
1258.           1     ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                 BLANK
1259.           2     ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)             BLANK
1260.           3     ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                 BLANK
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1261.          4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)          BLANK
1262.          5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)         BLANK
1263.          6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)     BLANK
1264.          7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                  BLANK
1265.          8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL     BLANK
1266.          9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)    BLANK
1267.          1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                  BLANK
1268.           DIMENSION FREQ15(14,7)                                         CALC
1269.           IF(KOPT(10).EQ.1) LDSRT=1                                      VERS2
1270.           NUM=0                                                          CALC
1271.           DO 1   J=1,NSTA                                                CALC
1272.           CALL POLYN(J,DIS,SZ,LDSRT)                                     VERS2
1273.           JY=J+7                                                         CALC
1274.           CALL POLYN(JY,DIS,SY,LDSRT)                                    VERS2
1275.           DO 1 I=1,NVEL                                                  CALC
1276.           IF(FREQ15(I,J).LE.0)   GO TO 1                                 CALC
1277.           NUM=NUM+1                                                      CALC
1278.           XELV=0.                                                        CALC
1279.           XELVSS=0.                                                      CALC
1280.           XGRD=0.                                                        CALC
1281.           XGRDSS=0.                                                      CALC
1282.           U=UMAXEL(I,J)                                                  CALC
1283.           CALL RLSMOD(W,U,IVENT,ET,LSTACK)                               CALC
1284.           IF(IVENT)  2,3,3                                               CALC
1285.         3 CALL HEIGHT(K,DIS,HGT)                                         CALC
1286.           CALL RISE (DH,   DIS,U,J,0.,0.,HS,W,DIA)                       CALC
1287.           H=HS+DH-HGT                                                    CALC
1288.           IF(H.LT.0.) H=0.                                               CALC
1289.           B=H/SZ                                                         CALC
1290.           XNUM=0.                                                        CALC
1291.           IF(B.LT.15.) XNUM=EXP(-.5*B*B)                                 CALC
1292.           XDEN=U*3.1416*SY*SZ                                            CALC
1293.           XELV=XNUM/XDEN                                                 CALC
1294.           IF(KOPT(03).EQ.0)     GO TO 5                                  CALC
1295.           XDEN=DIS*SZ*U                                                  CALC
1296.           XELVSS=2.032*XNUM/XDEN                                         CALC
1297.           IF(XELVSS.LT.XELV)   XELV=XELVSS                               CALC
1298.         5 CONTINUE                                                       CALC
1299.           IF(IVENT.EQ.1) GO TO 8                                         CALC
1300.         2 U=UMAXGL(I,J)                                                  CALC
1301.           DTERM=U*SY*SZ*3.1416                                           CALC
1302.         9 XDEN=DTERM+(U*C*A)                                             CALC
1303.           XDEN2=3.*DTERM                                                 CALC
1304.           IF(XDEN2.LT.XDEN) XDEN=XDEN2                                   CALC
1305.           XGRD=1./XDEN                                                   CALC
1306.           IF(KOPT(03).EQ.0)     GO TO 8                                  CALC
1307.           ARG=(SZ*SZ)+(D*D*C*0.318310)                                   CALC
1308.           XDEN=U*DIS*SQRT(ARG)                                           CALC
1309.           XDEN2=1.73205*U*DIS*SZ                                         CALC
1310.           IF(XDEN2.LT.XDEN) XDEN=XDEN2                                   CALC
1311.           XGRDSS=2.032/XDEN                                              CALC
1312.           IF(XGRDSS.LT.XGRD)   XGRD=XGRDSS                               CALC
1313.         8 XQ15(NUM)=ET*XGRD+(1.-ET)*XELV                                 CALC
1314.           FQ15(NUM)=FREQ15(I,J)                                          CALC
1315.         1 CONTINUE                                                       CALC
1316.           RETURN                                                         CALC
1317.           END                                                            CALC
1318.           SUBROUTINE ORDER(N,KK,OX,OF)                                   ORDER
1319.           DIMENSION OX(1),OF(1)                                          ORDER
1320.     C**** THIS ROUTINE USES THE SHELL METHOD TO ORDER AN ARRAY.          ORDER
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      M=N                                                               ORDER
  104 M=M/2                                                             ORDER
      IF(M.EQ.0) GO TO 100                                              ORDER
      K=N-M                                                             ORDER
      J=1                                                               ORDER
  103 I=J                                                               ORDER
  102 L=M+I                                                             ORDER
      IF(OX(I).GE.OX(L)) GO TO 101                                      ORDER
      X=OX(I)                                                           ORDER
      Y=OF(I)                                                           ORDER
      OX(I)=OX(L)                                                       ORDER
      OF(I)=OF(L)                                                       ORDER
      OX(L)=X                                                           ORDER
      OF(L)=Y                                                           ORDER
      I=I-M                                                             ORDER
      IF(I.GE.1) GO TO 102                                              ORDER
  101 J=J+1                                                             ORDER
      IF(J.LE.K) GO TO 103                                              ORDER
      GO TO 104                                                         ORDER
  100 KK=1                                                              ORDER
      II=1                                                              ORDER
  200 II=II+1                                                           ORDER
      IF(II.GT.N) GO TO 201                                             ORDER
      IF(OX(KK).GT.OX(II)) GO TO 202                                    ORDER
      OF(KK)=OF(KK)+OF(II)                                              ORDER
      GO TO 200                                                         ORDER
  202 KK=KK+1                                                           ORDER
      OX(KK)=OX(II)                                                     ORDER
      OF(KK)=OF(II)+OF(KK-1)                                            ORDER
      GO TO 200                                                         ORDER
  201 CONTINUE                                                          ORDER
      II=KK+1                                                           ORDER
      NP=N+9                                                            ORDER
      IF(NP.GT.1008)  NP=1008                                           ORDER
      DO 204 I=II,NP                                                    ORDER
      OX(I)=0.                                                          ORDER
  204 OF(I)=0.                                                          ORDER
      RETURN                                                            ORDER
      END                                                               ORDER
      SUBROUTINE CONV(A,NUM)                                            CONV
      DIMENSION F(49),XF(49),A(1)                                       CONV
      DATA F/.01,.05,.1,.5,1.,2.,3.,4.,5.,6.,7.,8.,9.,10.,12.,14.,16.   CONV
     X,18.,20.,25.,30.,35.,40.,45.,50.,55.,60.,65.,70.,75.,80.,82.,84.  CONV
     X,86.,88.,90.,91.,92.,93.,94.,95.,96.,97.,98.,99.,99.5,99.9,99.95  CONV
     X,99.99/                                                           CONV
      DATA XF/-3.73183,-3.29097,-3.09036,-2.57591,-2.32635,-2.05378     CONV
     X,-1.88081,-1.75069,-1.64485,-1.55477,-1.4758,-1.40507,-1.34076    CONV
     X,-1.28155,-1.17499,-1.08032,-.99446,-.91537,-.84163,-.67499,-.5244 CONV
     X,-.38532,-.25335,-.12566,0.,.12566,.25335,.38532,.5244,.67449     CONV
     X,.84163,.91537,.99446,1.08032,1.17499,1.28155,1.34076,1.40507     CONV
     X,1.4758,1.55477,1.64485,1.75069,1.88081,2.05378,2.32635,2.57591   CONV
     X,3.09036,3.29097,3.73183/                                         CONV
      ZIP=0.                                                            CONV
      EPS=.0001                                                         CONV
    5 NNN=NUM                                                           CONV
      DO 1 J=1,NNN                                                      CONV
      IF(A(J).LT.F(1)) GO TO 3                                          CONV
      IF(A(J).GT.F(49)) A(J)=F(49)                                      CONV
      DO 10 I=2,49                                                      CONV
      IF(A(J).GE.F(I-1) .AND. A(J).LE.F(I)) GO TO 2                     CONV
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1381.      10 CONTINUE                                                    CONV
1382.       3 DO 4 K=2,NUM                                                CONV
1383.       4 A(K-1)=A(K)                                                 CONV
1384.         NUM=NUM-1                                                   CONV
1385.         GO TO 5                                                     CONV
1386.       2 IF(I.GE.25) GO TO 7                                         CONV
1387.         Z1=-XF(I)                                                   CONV
1388.         Z2=-XF(I-1)                                                 CONV
1389.         FI=50.-A(J)                                                 CONV
1390.         GO TO 14                                                    CONV
1391.       7 Z1=XF(I-1)                                                  CONV
1392.         Z2=XF(I)                                                    CONV
1393.         FI=A(J)-50.                                                 CONV
1394.      14 DO 15 N=1,50                                                CONV
1395.         Z=.5*(Z1+Z2)                                                CONV
1396.         FT=39.8942*GAUSS(Z,ZIP)                                     CONV
1397.         FAC=FT-FI                                                   CONV
1398.         IF(ABS(FAC).LE.EPS) GO TO 16                                CONV
1399.         IF(FAC.GT.0.) GO TO 17                                      CONV
1400.         Z1=Z                                                        CONV
1401.         GO TO 15                                                    CONV
1402.      17 Z2=Z                                                        CONV
1403.      15 CONTINUE                                                    CONV
1404.      16 A(J)=Z                                                      CONV
1405.         IF(I.LT.25) A(J)=-Z                                         CONV
1406.       1 CONTINUE                                                    CONV
1407.         RETURN                                                      CONV
1408.         END                                                         CONV
1409.         FUNCTION GAUSS(B,A)                                         GAUSS
1410.         F(X)=EXP(-.125*(X*(B-A)+A+B)*(X*(B-A)+A+B))                 GAUSS
1411.         X1=.93246951                                                GAUSS
1412.         X2=.66120939                                                GAUSS
1413.         X3=.23861919                                                GAUSS
1414.         X4=-X3                                                      GAUSS
1415.         X5=-X2                                                      GAUSS
1416.         X6=-X1                                                      GAUSS
1417.         GAUSS=.1713249*(F(X1)+F(X6))+.36076157*(F(X2)+F(X5))        GAUSS
1418.        X+.46791393*(F(X3)+F(X4))                                    GAUSS
1419.         GAUSS=.5*(B-A)*GAUSS                                        GAUSS
1420.         RETURN                                                      GAUSS
1421.         END                                                         GAUSS
1422.         SUBROUTINE LSTSQR(XX,YY,X,Y,NPTS,NDEG,NR,XS,YS)             LSTSQR
1423.         DIMENSION XX(1),YY(1),X(1),Y(1),A(10,10),B(10),C(600,10)    LSTSQR
1424.         NP1=NDEG+1                                                  LSTSQR
1425.         DO 30 I=1,NPTS                                              LSTSQR
1426.      30 C(I,1)=1.0                                                  LSTSQR
1427.         DO 35 J=2,NP1                                               LSTSQR
1428.         DO 35 I=1,NPTS                                              LSTSQR
1429.      35 C(I,J)=C(I,J-1)*X(I)                                        LSTSQR
1430.         DO 40 I=1,NP1                                               LSTSQR
1431.         DO 40 J=1,NP1                                               LSTSQR
1432.         A(I,J)=0.0                                                  LSTSQR
1433.         DO 40 K=1,NPTS                                              LSTSQR
1434.      40 A(I,J)=A(I,J)+C(K,I)*C(K,J)                                 LSTSQR
1435.         DO 45 I=1,NP1                                               LSTSQR
1436.         B(I)=0.0                                                    LSTSQR
1437.         DO 45 K=1,NPTS                                              LSTSQR
1438.      45 B(I)=B(I)+C(K,I)*Y(K)                                       LSTSQR
1439.         CALL INVERS(A,NP1,B,DET,IFS)                                LSTSQR
1440.         IF(IFS.NE.0) GO TO 53                                       LSTSQR
```

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      PRINT 54                                                          LSTSQR
   54 FORMAT(" SINGULAR MATRIX")                                        LSTSQR
      GO TO 500                                                         LSTSQR
   53 CONTINUE                                                          LSTSQR
      DO 60 I=1,NR                                                      LSTSQR
      YY(I)=B(1)                                                        LSTSQR
      VAL=1.                                                            LSTSQR
      DO 61 J=2,NP1                                                     LSTSQR
      VAL=VAL*XX(I)                                                     LSTSQR
   61 YY(I)=YY(I)+B(J)*VAL                                              LSTSQR
   60 CONTINUE                                                          LSTSQR
      IF(XS.GT.2.5) GO TO 500                                           LSTSQR
      YS=B(1)                                                           LSTSQR
      VAL=1.                                                            LSTSQR
      DO 20 J=2,NP1                                                     LSTSQR
      VAL=VAL*XS                                                        LSTSQR
   20 YS=YS+B(J)*VAL                                                    LSTSQR
  500 RETURN                                                            LSTSQR
      END                                                               LSTSQR
      SUBROUTINE INVERS(A,N,B,DET,IFS)                                  INVERS
      DIMENSION A(10,10),B(10),IPVOT(10),INDEX(10,2),PIVOT(10)          INVERS
      EQUIVALENCE (IROW,JROW),(ICOL,JCOL)                               INVERS
      IFS=0                                                             INVERS
      DET=1.                                                            INVERS
      DO 17 J=1,N                                                       INVERS
   17 IPVOT(J)=0                                                        INVERS
      DO 135 I=1,N                                                      INVERS
      T=0.                                                              INVERS
      DO 9 J=1,N                                                        INVERS
      IF(IPVOT(J).EQ.1) GO TO 9                                         INVERS
      DO 23   K=1,N                                                     INVERS
      IF(IPVOT(K)-1) 43,23,81                                           INVERS
   43 IF(ABS(T).GE.ABS(A(J,K))) GO TO 23                                INVERS
      IROW=J                                                            INVERS
      ICOL=K                                                            INVERS
      T=A(J,K)                                                          INVERS
   23 CONTINUE                                                          INVERS
    9 CONTINUE                                                          INVERS
      IPVOT(ICOL)=IPVOT(ICOL)+1                                         INVERS
      IF(IROW.EQ.ICOL) GO TO 109                                        INVERS
      DET=-DET                                                          INVERS
      DO 12 L=1,N                                                       INVERS
      T=A(IROW,L)                                                       INVERS
      A(IROW,L)=A(ICOL,L)                                               INVERS
   12 A(ICOL,L)=T                                                       INVERS
      T=B(IROW)                                                         INVERS
      B(IROW)=B(ICOL)                                                   INVERS
      B(ICOL)=T                                                         INVERS
  109 INDEX(I,1)=IROW                                                   INVERS
      INDEX(I,2)=ICOL                                                   INVERS
      PIVOT(I)=A(ICOL,ICOL)                                             INVERS
      DET=DET*PIVOT(I)                                                  INVERS
      IF(DET) 66,81,66                                                  INVERS
   66 IFS=1                                                             INVERS
      A(ICOL,ICOL)=1.                                                   INVERS
      DO 205 L=1,N                                                      INVERS
  205 A(ICOL,L)=A(ICOL,L)/PIVOT(I)                                      INVERS
      B(ICOL)=B(ICOL)/PIVOT(I)                                          INVERS
      DO 135   LI=1,N                                                   INVERS
      IF(LI.EQ.ICOL) GO TO 135                                          INVERS
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1501.            T=A(LI,ICOL)                                                    INVERS
1502.            A(LI,ICOL)=0.                                                   INVERS
1503.            DO 89 L=1,N                                                     INVERS
1504.         89 A(LI,L)=A(LI,L)-A(ICOL,L)*T                                     INVERS
1505.            B(LI)=B(LI)-B(ICOL)*T                                           INVERS
1506.        135 CONTINUE                                                        INVERS
1507.            DO 3   I=1,N                                                    INVERS
1508.            L=N-I+1                                                         INVERS
1509.            IF(INDEX(L,1).EQ.INDEX(L,2)) GO TO 3                            INVERS
1510.            JROW=INDEX(L,1)                                                 INVERS
1511.            JCOL=INDEX(L,2)                                                 INVERS
1512.            DO 549 K=1,N                                                    INVERS
1513.            T=A(K,JROW)                                                     INVERS
1514.            A(K,JROW)=A(K,JCOL)                                             INVERS
1515.            A(K,JCOL)=T                                                     INVERS
1516.        549 CONTINUE                                                        INVERS
1517.          3 CONTINUE                                                        INVERS
1518.         81 RETURN                                                          INVERS
1519.            END                                                             INVERS
1520.            SUBROUTINE LOGFPT(XXXPLT,YYYPLT,XQ15,FQ15,NXXX,NXQ15)           LOGFPT
1521.      C     SUBROUTINE FOR LOG FREQ PLOTS TO INTERFACE WITH METEOROLOGY      LOGFPT
1522.      C      DISPERSION PROGRAM    R.CODELL USNRC APRIL 1976                 LOGFPT
1523.            DIMENSION XXXPLT(1),YYYPLT(1),XQ15(1),FQ15(1),DEV1(100),DEV2(100) LOGFPT
1524.      C     FIND MAX OF Y OR XQ15                                            LOGFPT
1525.            YMAX=-1.E10                                                     LOGFPT
1526.            DO 1 N=1,NXXX                                                   LOGFPT
1527.          1 IF(YYYPLT(N).GT.YMAX) YMAX=YYYPLT(N)                            LOGFPT
1528.            DO 2 N=1,NXQ15                                                  LOGFPT
1529.          2 IF(XQ15(N).GT.YMAX) YMAX=XQ15(N)                                LOGFPT
1530.      C     ROUND UP EXPONENT AND SUBTRACT 3                                 LOGFPT
1531.            IEXP=ALOG10(YMAX)-3                                             LOGFPT
1532.            DO 3 N=1,NXXX                                                   LOGFPT
1533.            CALL DEVATE(XXXPLT(N),DEV1(N))                                  LOGFPT
1534.          3 YYYPLT(N)=ALOG10(YYYPLT(N))                                     LOGFPT
1535.            DO 4 N=1,NXQ15                                                  LOGFPT
1536.            CALL DEVATE(FQ15(N),DEV2(N))                                    LOGFPT
1537.          4 XQ15(N)=ALOG10(XQ15(N))                                         LOGFPT
1538.            PRINT 10                                                        LOGFPT
1539.         10 FORMAT(1H1)                                                     LOGFPT
1540.      C      SORT VALUES WHICH FIT INTO FIRST 3 DECADES                      LOGFPT
1541.            DO 20 N=1,NXXX                                                  LOGFPT
1542.            IF(YYYPLT(N).LT.IEXP) GOTO 21                                   LOGFPT
1543.         20 CONTINUE                                                        LOGFPT
1544.            N=NXXX                                                          LOGFPT
1545.         21 N1=N                                                            LOGFPT
1546.            DO 30 N=1,NXQ15                                                 LOGFPT
1547.            IF(XQ15(N).LT.IEXP) GOTO 31                                     LOGFPT
1548.         30 CONTINUE                                                        LOGFPT
1549.            N=NXQ15                                                         LOGFPT
1550.         31 N2=N                                                            LOGFPT
1551.            CALL PPLT(DEV2,XQ15,DEV1,YYYPLT,IEXP,N2,N1,EX,EY,0)             LOGFPT
1552.            IEXP=ALOG10(YMAX)-6                                             LOGFPT
1553.      C      DATA WHICH FIT INTO SECOND SET OF 3 DECADES                     LOGFPT
1554.            DO 40 N=N1,NXXX                                                 LOGFPT
1555.            M=N-N1+1                                                        LOGFPT
1556.            DEV1(M)=DEV1(N)                                                 LOGFPT
1557.         40 YYYPLT(M)=YYYPLT(N)                                             LOGFPT
1558.            N1=NXXX-N1+1                                                    LOGFPT
1559.            DO 50 N=N2,NXQ15                                                LOGFPT
1560.            M=N-N2+1                                                        LOGFPT
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1561.          DEV2(M)=DEV2(N)                                                  LOGFPT
1562.       50 XQ15(M)=XQ15(N)                                                  LOGFPT
1563.          N2=NXQ15-N2+1                                                    LOGFPT
1564.          CALL PPLT(DEV2,XQ15,DEV1,YYYPLT,IEXP,N2,N1,EX,EY,0)              LOGFPT
1565.          RETURN                                                           LOGFPT
1566.          END                                                              LOGFPT
1567.          SUBROUTINE PPLT(X,Y,DX,DY,IEXP,NPLTS,JPLTS,EX,EY,NMISS)          PPLT
1568.          DIMENSION XSCAL(19),LINE(19),IPRT(122),X(1),Y(1),                PPLT
1569.         1 DX(1),DY(1),EX(1),EY(1)                                         PPLT
1570.          DATA XSCAL/99.9,99.8,99.5,99.,98.,95.,90.,80.,70.,50.,30.,20.,10., PPLT
1571.         .     5., 2., 1., .5, .2,.1/                                      PPLT
1572.          DATA LINE /   2,   6,  12, 17, 22, 30, 37, 45, 51, 61, 71, 77,85, PPLT
1573.         .     92,100,105,110,116,120/                                     PPLT
1574.          DATA IV/1HI/,IBLK/1H /,IDSH/1H-/                                 PPLT
1575.          DATA IHIS/1HO/,IEST/1HE/,ICMP/1HX/,IEXC/1H$/                     PPLT
1576.          XLMTP=3.0904                                                     PPLT
1577.          XLMTN=-3.0904                                                    PPLT
1578.          WRITE(6,30)                                                      PPLT
1579.       30 FORMAT(/59X,20HEXCEEDENCE FREQUENCY)                             PPLT
1580.          WRITE(6,40)(XSCAL(20-I),I=1,19)                                  PPLT
1581.       40 FORMAT(9X,F4.1,F4.1,F6.1,F4.0,F5.0,F8.0,F7.0,F8.0,F6.0,F10.0,    PPLT
1582.         1 F10.0,F6.0,F8.0,F7.0,F8.0,F5.0,F6.1,F6.1,F5.1)                  PPLT
1583.          IEXP=IEXP+3                                                      PPLT
1584.          YVAL=IEXP                                                        PPLT
1585.          YINC=1./18.                                                      PPLT
1586.          YVAL=YVAL+YINC-1./36.                                            PPLT
1587.          NCNT=1                                                           PPLT
1588.          JCNT=1                                                           PPLT
1589.          MCNT=1                                                           PPLT
1590.          DO 210 L=1,55                                                    PPLT
1591.          YVAL=YVAL-YINC                                                   PPLT
1592.          YPVAR=10**(YVAL-FLOAT(IEXP))                                     PPLT
1593.          DO 50 I=1,122                                                    PPLT
1594.          IPRT(I)=IBLK                                                     PPLT
1595.       50 CONTINUE                                                         PPLT
1596.          IF(L.EQ.1.OR.L.EQ.19.OR.L.EQ.37.OR.L.EQ.55) GO TO 55             PPLT
1597.          GO TO 70                                                         PPLT
1598.       55 DO 60 I=3,119                                                    PPLT
1599.          IPRT(I)=IDSH                                                     PPLT
1600.       60 CONTINUE                                                         PPLT
1601.       70 DO 80 II=1,19                                                    PPLT
1602.          I=LINE(II)                                                       PPLT
1603.          IPRT(I)=IV                                                       PPLT
1604.       80 CONTINUE                                                         PPLT
1605.          IF(NCNT.GT.NPLTS) GO TO 130                                      PPLT
1606.       90 IF(Y(NCNT).LT.YVAL) GO TO 130                                    PPLT
1607.          IF(X(NCNT).LE.XLMTP) GO TO 100                                   PPLT
1608.          IPRT(121)=IEXC                                                   PPLT
1609.          GO TO 120                                                        PPLT
1610.      100 IF(X(NCNT).GE.XLMTN) GO TO 110                                   PPLT
1611.          IPRT(1)=IEXC                                                     PPLT
1612.          GO TO 120                                                        PPLT
1613.      110 I=(X(NCNT)-XLMTN)/.05237+2.5                                     PPLT
1614.          IPRT(I)=IHIS                                                     PPLT
1615.      120 NCNT=NCNT+1                                                      PPLT
1616.          IF(MCNT.GT.NMISS) GO TO 125                                      PPLT
1617.          IF(EY(MCNT).LT.YVAL)GO TO 125                                    PPLT
1618.          IF(EX(MCNT).GT.XLMTP) GO TO 124                                  PPLT
1619.          IF(EX(MCNT).LT.XLMTN) GO TO 124                                  PPLT
1620.          IF(EX(MCNT).NE.X(NCNT-1)) GO TO 125                              PPLT
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1621.            IPRT(I)=IEST                                                    PPLT
1622.          124 MCNT=MCNT+1                                                   PPLT
1623.          125 IF(NCNT.LE.NPLTS) GO TO 90                                    PPLT
1624.          130 IF(JCNT.GT.JPLTS) GO TO 170                                   PPLT
1625.              IF(DY(JCNT).LT.YVAL) GO TO 170                                PPLT
1626.              IF(DX(JCNT).LE.XLMTP) GO TO 140                               PPLT
1627.              IPRT(121)=IEXC                                                PPLT
1628.              GO TO 160                                                     PPLT
1629.          140 IF(DX(JCNT).GE.XLMTN) GO TO 150                               PPLT
1630.              IPRT(1)=IEXC                                                  PPLT
1631.              GO TO 160                                                     PPLT
1632.          150 I=(DX(JCNT)-XLMTN)/.05237+2.5                                 PPLT
1633.              IPRT(I)=ICMP                                                  PPLT
1634.          160 JCNT=JCNT+1                                                   PPLT
1635.              GO TO 130                                                     PPLT
1636.          170 IF(L.EQ.1.OR.L.EQ.19.OR.L.EQ.37.OR.L.EQ.55) GO TO 190         PPLT
1637.              ITMP=10.**YVAL                                                PPLT
1638.              IF(L.GT.4.AND.L.LT.15) GO TO 1170                             PPLT
1639.              IF(ITMP.LT.IYSC) GO TO 195                                    PPLT
1640.              GO TO 179                                                     PPLT
1641.         1170 ITP=L-4                                                       PPLT
1642.          179 WRITE(6,180) YPVAR,(IPRT(123-I),I=1,122)                      PPLT
1643.          180 FORMAT(3X,F5.2,1X,122A1)                                      PPLT
1644.              GO TO 210                                                     PPLT
1645.          190 IYSC=10**IEXP                                                 PPLT
1646.              IEXP=IEXP-1                                                   PPLT
1647.              IYINC=IYSC/5                                                  PPLT
1648.          195 IEX1=IEXP+1                                                   PPLT
1649.              WRITE(6,200) IEX1,(IPRT(123-I),I=1,122)                       PPLT
1650.          200 FORMAT(1X,4H10**,I3,1X,122A1)                                 PPLT
1651.              IYSC=IYSC-IYINC                                               PPLT
1652.          210 CONTINUE                                                      PPLT
1653.              WRITE(6,220) IHIS,IEST,ICMP,IEXC                              PPLT
1654.          220 FORMAT(10X,A1,15H =RECORDED DATA,5X,A1,20H =RECONSTITUTED DATA ,  PPLT
1655.             .     5X,A1,26H =COMPUTED FREQUENCY CURVE,5X,A1,19H =BEYOND PLOT RA PPLT
1656.             .NGE )                                                         PPLT
1657.              RETURN                                                        PPLT
1658.              END                                                           PPLT
1659.              SUBROUTINE DEVATE(PROB,DEV)                                   DEVATE
1660.          C               INPUT IS EXCEEDENCE FREQUENCY IN PERCENT          DEVATE
1661.          C               OUTPUT IS CORRESPONDING DEVIATE                   DEVATE
1662.              IF(PROB.LT.0.05)   PROB=0.05                                  DEVATE
1663.              IF(PROB.GT.99.95)  PROB=99.95                                 DEVATE
1664.              NEG=0                                                         DEVATE
1665.              TPROB=PROB                                                    DEVATE
1666.              DEV=0.                                                        DEVATE
1667.              IF(TPROB.LE.50.) GO TO 10                                     DEVATE
1668.              TPROB=100.-TPROB                                              DEVATE
1669.              NEG=1                                                         DEVATE
1670.           10 DO 20 I=1,20                                                  DEVATE
1671.              CALL AREA(DEV,CPROB)                                          DEVATE
1672.              TEMP=TPROB-CPROB                                              DEVATE
1673.              IF(ABS(TEMP).LT..00005) GO TO 50                              DEVATE
1674.              DEV=DEV-(TEMP/100.)/(EXP(-.5*DEV**2)/(2.*3.1415926536)**.5)   DEVATE
1675.           20 CONTINUE                                                      DEVATE
1676.              IF(NEG.LT.1) GO TO 30                                         DEVATE
1677.              CPROB=100.-CPROB                                              DEVATE
1678.              DEV=-DEV                                                      DEVATE
1679.           30 WRITE(6,40) PROB,CPROB,DEV                                    DEVATE
1680.           40 FORMAT(/26H DID NOT CONVERGE FOR PROB ,F7.3,5X,15H RESULTS--PROB=  DEVATE
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1681.          1,F7.3,5X,8HDEVIATE= ,F7.3)                                    DEVATE
1682.            RETURN                                                       DEVATE
1683.         50 IF(NEG.GT.0) DEV=-DEV                                        DEVATE
1684.            RETURN                                                       DEVATE
1685.            END                                                          DEVATE
1686.            SUBROUTINE AREA(DEV,PROB)                                    AREA
1687.            DOUBLE PRECISION TMP,TEMP,FAC                                AREA
1688.            CONST=1./(2.*3.1415926536)**.5                               AREA
1689.            NEG=0                                                        AREA
1690.            TMP=DEV                                                      AREA
1691.            IF(DEV.GE.0.) GO TO 8                                        AREA
1692.            TMP=-DEV                                                     AREA
1693.            NEG=1                                                        AREA
1694.          8 PROB=0.                                                      AREA
1695.            IF(TMP.GT.5.) GO TO 25                                       AREA
1696.            PROB=TMP                                                     AREA
1697.            FAC=1.                                                       AREA
1698.            DO 10 I=2,50                                                 AREA
1699.            XI=I                                                         AREA
1700.            FAC=FAC*(XI-1.)                                              AREA
1701.            TMPP=(-1)**(I-1)                                             AREA
1702.            ITP=2*I-1                                                    AREA
1703.            TEMP=TMPP*TMP**ITP/((2.*XI-1.)*FAC*2.**(I-1))                AREA
1704.            PROB=PROB+TEMP                                               AREA
1705.            ERR=DABS(TEMP)                                               AREA
1706.            IF(ERR.LT..0000001) GO TO 20                                 AREA
1707.         10 CONTINUE                                                     AREA
1708.         20 PROB=(.5-PROB*CONST)*100.                                    AREA
1709.         25 IF(NEG.GT.0) PROB=100.-PROB                                  AREA
1710.            RETURN                                                       AREA
1711.            END                                                          AREA
1712.            SUBROUTINE DEPLET (DIS,JSTAB,HEIGHT,ANSWER)                  DEPLET
1713.      C     REVISION 1 - OCTOBER 1976                                    DEPLET
1714.            DISLN = ALOG(DIS)                                            DEPLET
1715.            JS = JSTAB - 4                                               DEPLET
1716.            ANSWER = 1.000000                                            DEPLET
1717.            IF(HEIGHT.LE.15.0) GO TO 1                                   DEPLET
1718.            IF(HEIGHT.LE.45.0) GO TO 2                                   DEPLET
1719.            IF(HEIGHT.LE.80.0) GO TO 3                                   DEPLET
1720.            IF(JS)  4,5,7                                                DEPLET
1721.      4     IF(DIS.LE.600.0)  RETURN                                     DEPLET
1722.            IF(DIS.GT.10000.0)  GO TO 20                                 DEPLET
1723.            ANSWER = .864906 + (.07226318*DISLN) - (.007984452*DISLN*DISLN)  DEPLET
1724.            GO TO 7                                                      DEPLET
1725.         20 IF(DIS.GT.60000.0) GO TO 21                                  DEPLET
1726.            ANSWER = -2.2825 + (.745051*DISLN) - (.04395715*DISLN*DISLN) DEPLET
1727.            GO TO 7                                                      DEPLET
1728.         21 ANSWER = -.7504639 + (.5173622*DISLN) - (.03590246*DISLN*DISLN)  DEPLET
1729.            GO TO 7                                                      DEPLET
1730.      5     IF(DIS.LE.1700.0)  RETURN                                    DEPLET
1731.            IF(DIS.GT.10000.0)  GO TO 22                                 DEPLET
1732.            ANSWER = .1212574 + (.2528144*DISLN) - (.01812868*DISLN*DISLN)  DEPLET
1733.            GO TO 7                                                      DEPLET
1734.         22 IF(DIS.GT.70000.0)  GO TO 23                                 DEPLET
1735.            ANSWER = .3417348 + (.2006985*DISLN) - (.01506006*DISLN*DISLN)  DEPLET
1736.            GO TO 7                                                      DEPLET
1737.         23 ANSWER = 2.533078 - (.1632279*DISLN)                         DEPLET
1738.            GO TO 7                                                      DEPLET
1739.      1     IF(DIS.GT.1000.0)  GO TO 24                                  DEPLET
1740.            ANSWER = .7793717 + (.09578526*DISLN) - (.01132715*DISLN*DISLN)  DEPLET
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1741.            GO TO 7                                                    DEPLET
1742.         24 IF(DIS.GT.10000.0)  GO TO 25                               DEPLET
1743.            ANSWER = .5659763 + (.1425852*DISLN) - (.01363635*DISLN*DISLN)  DEPLET
1744.            GO TO 7                                                    DEPLET
1745.         25 ANSWER = .7203016 + (.1085504*DISLN) - (.01172335*DISLN*DISLN)  DEPLET
1746.            GO TO 7                                                    DEPLET
1747.      2     IF(JS)  8,9,10                                             DEPLET
1748.      8     IF(DIS.LE.180.0) RETURN                                    DEPLET
1749.            IF(DIS.GT.20000.0)  GO TO 26                               DEPLET
1750.            ANSWER = .9535697 + (.04267785*DISLN) - (.0065097*DISLN*DISLN)  DEPLET
1751.            GO TO 7                                                    DEPLET
1752.         26 IF(DIS.GT.50000.0)  GO TO 27                               DEPLET
1753.            ANSWER = -4.521979 + (1.153126*DISLN) - (.06286699*DISLN*DISLN)  DEPLET
1754.            GO TO 7                                                    DEPLET
1755.         27 ANSWER = -1.441149 + (.6080616*DISLN) - (.03878529*DISLN*DISLN)  DEPLET
1756.            GO TO 7                                                    DEPLET
1757.      9     IF(DIS.LE.400.0)  RETURN                                   DEPLET
1758.            ANSWER = .8622019 + (.07496899*DISLN) - (.00873217*DISLN*DISLN)  DEPLET
1759.            GO TO 7                                                    DEPLET
1760.      10    IF(DIS.LE.6000.0)  RETURN                                  DEPLET
1761.            IF(DIS.GT.20000.0) GO TO 28                                DEPLET
1762.            ANSWER = -3.524029 + (1.055262*DISLN) - (.06153549*DISLN*DISLN)  DEPLET
1763.            GO TO 7                                                    DEPLET
1764.         28 ANSWER = 4.247176 - (.4075444*DISLN) + (.007074166*DISLN*DISLN)  DEPLET
1765.            GO TO 7                                                    DEPLET
1766.      3     IF(JS)  11,12,13                                           DEPLET
1767.      11    IF(DIS.LE.300.0) RETURN                                    DEPLET
1768.            IF(DIS.GT.10000.0) GO TO 29                                DEPLET
1769.            ANSWER = .6938609 + (.1123458*DISLN) - (.01046413*DISLN*DISLN)  DEPLET
1770.            GO TO 7                                                    DEPLET
1771.         29 IF(DIS.GE.50000.0)  GO TO 30                               DEPLET
1772.            ANSWER = 2.10853 - (.1364853*DISLN)                        DEPLET
1773.            GO TO 7                                                    DEPLET
1774.         30 ANSWER = -3.952915 + (1.059189*DISLN) - (.05883216*DISLN*DISLN)  DEPLET
1775.            GO TO 7                                                    DEPLET
1776.      12    IF(DIS.LE.1000.0)  RETURN                                  DEPLET
1777.            IF(DIS.GT.10000.0)  GO TO 31                               DEPLET
1778.            ANSWER = .6127362 + (.1386609*DISLN) - (.01197688*DISLN*DISLN)  DEPLET
1779.            GO TO 7                                                    DEPLET
1780.         31 ANSWER = .4809772 + (.1645758*DISLN) - (.0132591*DISLN*DISLN)  DEPLET
1781.            GO TO 7                                                    DEPLET
1782.      13    IF(DIS.LE.60000.0)  RETURN                                 DEPLET
1783.            ANSWER = -8.220195 + (1.694657*DISLN) - (.07789403*DISLN*DISLN)  DEPLET
1784.      7     CONTINUE                                                   DEPLET
1785.            IF(ANSWER.GT.1.00000)   ANSWER = 1.00000                   DEPLET
1786.            RETURN                                                     DEPLET
1787.            END                                                        DEPLET
1788.            SUBROUTINE SPLINE(X,Y,L,YP1,YPL,XF,YF,YPF,M)               SPLINE
1789.      C                                                                SPLINE
1790.      C---- THIS PROGRAM COMPUTES THE CUBIC SPLINE FUNCTION PASSING THRU THE  SPLINE
1791.      C     SEQUENCE OF POINTS (X(1),Y(1)),...,(X(L),Y(L)) HAVING SLOPE YP1 AT SPLINE
1792.      C     X(1) AND SLOPE YPL AT X(L).  IT IS THEN INTERPOLATED AT THE POINTS SPLINE
1793.      C     XF(1),...,XF(M) TO YIELD BOTH THE VALUE YF AND SLOPE YPF AT EACH  SPLINE
1794.      C     POINT.                                                     SPLINE
1795.      C                                                                SPLINE
1796.      C---- INPUT   X   ARRAY OF INDEPENDENT VARIABLE.  LENGTH .GE. L  SPLINE
1797.      C                 X MUST BE MONOTONE INCREASING I.E. X(I) .LT. X(I+1)  SPLINE
1798.      C             Y   ARRAY OF   DEPENDENT VARIABLE.  LENGTH .GE. L  SPLINE
1799.      C             L   NUMBER OF POINTS IN THE X AND Y ARRAYS.        SPLINE
1800.      C             YP1 SLOPE DYDX AT X(1)                             SPLINE
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1801.      C              YPL SLOPE DYDX AT X(L)                                    SPLINE
1802.      C              XF  ARRAY OF INDEPENDENT VARIABLE WHERE THE SPLINE        SPLINE
1803.      C                  FUNCTION IS TO BE INTERPOLATED.  LENGTH .GE. M        SPLINE
1804.      C              M   NUMBER OF POINTS IN THE XF ARRAY.                     SPLINE
1805.      C     OUTPUT   YF  ARRAY OF INTERPOLATED VALUES PAIRED AS (XF(I),YF(I))  SPLINE
1806.      C                  LENGTH .GE.M                                          SPLINE
1807.      C              YPF ARRAY OF SLOPES OF THE SPLINE FUNCTION AT THE POINTS  SPLINE
1808.      C                  XF.  LENGTH .GE. M                                    SPLINE
1809.      C                                                                        SPLINE
1810.      C---- IF L.LE.1, L.GT.LMAX, OR M.LE.0 CONTROL IS RETURNED TO THE CALLING SPLINE
1811.      C     PROGRAM WITH NO CALCULATIONS MADE.                                 SPLINE
1812.      C                                                                        SPLINE
1813.            DIMENSION X(1),Y(1),XF(1),YF(1),YPF(1)                             SPLINE
1814.      C                                                                        SPLINE
1815.            DIMENSION C(100),D(100),P(100),Q(100),U(100),V(100),VP(100)        SPLINE
1816.            COMMON /SIGMA /SIG                                                 SPLINE
1817.      C---- LMAX IS THE DIMENSION OF THE ARRAYS C,D,P,Q,U,V, AND VP.           SPLINE
1818.            DATA LMAX/100/                                                     SPLINE
1819.      C                                                                        SPLINE
1820.            IF(L.LE.   1) GO TO 16                                             SPLINE
1821.            IF(L.GT.LMAX) GO TO 16                                             SPLINE
1822.            IF(M.LE.   0) GO TO 16                                             SPLINE
1823.      C                                                                        SPLINE
1824.      C---- COMPUTE SPLINE PARAMETERS                                          SPLINE
1825.            LL=L                                                               SPLINE
1826.            DO 1 J=1,LL                                                        SPLINE
1827.            P(J)=X(J)                                                          SPLINE
1828.          1 Q(J)=Y(J)                                                          SPLINE
1829.            YP1I=YP1                                                           SPLINE
1830.            YPLI=YPL                                                           SPLINE
1831.            CALL CURV(LL,P,Q,YP1I,YPLI,C,D,SIG)                                SPLINE
1832.            DO 10 J=1,M                                                        SPLINE
1833.            IT=J                                                               SPLINE
1834.            T=XF(J)                                                            SPLINE
1835.            YPF(J)=0.                                                          SPLINE
1836.         10 YF(J)=CURV2(T,LL,P,Q,C,SIG,IT)                                     SPLINE
1837.         16 RETURN                                                             SPLINE
1838.            END                                                                SPLINE
1839.            SUBROUTINE CURV(N,X,Y,SLP1,SLPN,YP,TEMP,SIGMA)                     CURV
1840.            INTEGER N                                                          CURV
1841.            REAL X(N),Y(N),SLP1,SLPN,YP(N),TEMP(N),SIGMA                       CURV
1842.      C THIS SUBROUTINE DETERMINES THE PARAMETERS NECESSARY TO                 CURV
1843.      C COMPUTE AN INTERPOLATORY SPLINE UNDER TENSION THROUGH                  CURV
1844.      C A SEQUENCE OF FUNCTIONAL VALUES. THE SLOPES AT THE TWO                 CURV
1845.      C ENDS OF THE CURVE MAY BE SPECIFIED OR OMITTED. FOR ACTUAL              CURV
1846.      C COMPUTATION OF POINTS ON THE CURVE IT IS NECESSARY TO CALL             CURV
1847.      C THE FUNCTION CURV2.                                                    CURV
1848.      C ON INPUT--                                                             CURV
1849.      C N      IS THE NUMBER OF VALUES TO BE INTERPOLATED (N.GE.2),            CURV
1850.      C X    IS AN ARRAY OF THE N INCREASING ABSCISSAE OF THE                  CURV
1851.      C      FUNCTIONAL VALUES,                                                CURV
1852.      C Y    IS AN ARRAY OF THE N ORDINATES OF THE VALUES,(I.E.Y(K)            CURV
1853.      C      IS THE FUNCTIONAL VALUE CORRESPONDING TO X(K)),                   CURV
1854.      C SLP1 AND SLPN CONTAIN THE DESIRED VALUES FOR THE FIRST                 CURV
1855.      C      DERIVATIVE OF THE CURVE AT X(1) AND X(N), RESPECTIVELY.           CURV
1856.      C      IF THE QUANTITY SIGMA IS NEGATIVE THESE VALUES WILL BE            CURV
1857.      C      DETERMINED INTERNALLY AND THE USER NEED ONLY FURNISH              CURV
1858.      C      PLACE-HOLDING PARAMETERS FOR SLP1 AND SLPN. SUCH PLACE-           CURV
1859.      C      HOLDING PARAMETERS WILL BE IGNORED BUT NOT DESTROYED,             CURV
1860.      C YP   IS AN ARRAY OF LENGTH AT LEAST N                                  CURV
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1861.      C TEMP IS AN ARRAY OF LENGTH AT LEAST N WHICH IS USED FOR                CURV
1862.      C      SCRATCH STORAGE                                                   CURV
1863.      C   AND                                                                  CURV
1864.      C SIGMA CONTAINS THE TENSION FACTOR. THIS IS NON-ZERO AND                CURV
1865.      C      INDICATES THE CURVINESS DESIRED. IF ABS(SIGMA) IS NEARLY          CURV
1866.      C      ZERO (E.G. .001) THE RESULTING CURVE IS APPROXIMATELY A           CURV
1867.      C      CUBIC SPLINE. IF ABS(SIGMA) IS LARGE (E.G. 50.) THE               CURV
1868.      C      RESULTING CURVE IS NEARLY A POLYGONAL LINE. THE SIGN              CURV
1869.      C      OF SIGMA INDICATES WHETHER THE DERIVATIVE INFORMATION             CURV
1870.      C      HAS BEEN INPUT OR NOT. IF SIGMA IS NEGATIVE THE ENDPOINT          CURV
1871.      C      DERIVATIVES WILL BE DETERMINED INTERNALLY.  A STANDARD            CURV
1872.      C      VALUE FOR SIGMA IS APPROXIMATELY 1. IN ABSOLUTE VALUE.            CURV
1873.      C ON OUTPUT -                                                            CURV
1874.      C YP   CONTAINS VALUES PROPORTIONAL TO THE SECOND DERIVATIVE             CURV
1875.      C      OF THE CURVE AT THE GIVEN NODES.                                  CURV
1876.      C                                                                        CURV
1877.      C N,X,Y,SLP1,SLPN AND SIGMA ARE UNALTERED.                               CURV
1878.      C                                                                        CURV
1879.      C                                                                        CURV
1880.      C REFERENCE  A.K.CLINE, ALGORITHM 476,                                   CURV
1881.      C      COMM.ACM,VOL.17,NO.4, APRIL 1974, PP.220-223                      CURV
1882.      C      AND   A.K.CLINE  SCALAR- AND PLANAR-VALUED CURVE                  CURV
1883.      C      FITTING USING SPLINES UNDER TENSION                               CURV
1884.      C      COMM.ACM,VOL.17,NO.4, APRIL 1974, PP.2218-220                     CURV
1885.      C                                                                        CURV
1886.            NM1=N-1                                                          CURV
1887.            NP1=N+1                                                          CURV
1888.            DELX1=X(2)-X(1)                                                  CURV
1889.            DX1=(Y(2)-Y(1))/DELX1                                            CURV
1890.      C DETERMINE SLOPES IF NECESSARY                                        CURV
1891.            SLPP1=SLP1                                                       CURV
1892.            SLPPN=SLPN                                                       CURV
1893.            IF(SIGMA) 50,70,10                                               CURV
1894.      C DENORMALIZE TENSION FACTOR                                           CURV
1895.         10 SIGMAP=ABS(SIGMA)*FLOAT(NM1)/(X(N)-X(1))                         CURV
1896.      C SET UP RIGHT HAND SIDE AND TRIDIAGONAL SYSTEM FOR YP AND             CURV
1897.      C PERFORM FORWARD ELIMINATION                                          CURV
1898.            DELS=SIGMAP*DELX1                                                CURV
1899.            EXPS=EXP(DELS)                                                   CURV
1900.            SINHS=.5*(EXPS-1./EXPS)                                          CURV
1901.            SINHIN=1./(DELX1*SINHS)                                          CURV
1902.            DIAG1=SINHIN*(DELS*.5*(EXPS+1./EXPS)-SINHS)                      CURV
1903.            DIAGIN=1./DIAG1                                                  CURV
1904.            YP(1)=DIAGIN*(DX1-SLPP1)                                         CURV
1905.            SPDIAG=SINHIN*(SINHS-DELS)                                       CURV
1906.            TEMP(1)=DIAGIN*SPDIAG                                            CURV
1907.            IF(N.EQ.2) GO TO 30                                              CURV
1908.            DO 20 I=2,NM1                                                    CURV
1909.            DELX2=X(I+1)-X(I)                                                CURV
1910.            DX2=(Y(I+1)-Y(I))/DELX2                                          CURV
1911.            DELS=SIGMAP*DELX2                                                CURV
1912.            EXPS=EXP(DELS)                                                   CURV
1913.            SINHS=.5*(EXPS-1./EXPS)                                          CURV
1914.            SINHIN=1./(DELX2*SINHS)                                          CURV
1915.            DIAG2=SINHIN*(DELS*.5*(EXPS+1./EXPS)-SINHS)                      CURV
1916.            DIAGIN=1./(DIAG1+DIAG2-SPDIAG*TEMP(I-1))                         CURV
1917.            YP(I)=DIAGIN*(DX2-DX1-SPDIAG*YP(I-1))                            CURV
1918.            SPDIAG=SINHIN*(SINHS-DELS)                                       CURV
1919.            TEMP(I)=DIAGIN*SPDIAG                                            CURV
1920.            DX1=DX2                                                          CURV
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1921.        20 DIAG1=DIAG2                                                  CURV
1922.        30 DIAGIN=1./(DIAG1-SPDIAG*TEMP(N-1))                          CURV
1923.           YP(N)=DIAGIN*(SLPPN-DX2-SPDIAG*YP(N-1))                     CURV
1924.     C PERFORM BACK SUBSTITUTION                                       CURV
1925.           DO 40 I=2,N                                                 CURV
1926.           IBAK=NP1-I                                                  CURV
1927.        40 YP(IBAK)=YP(IBAK)-TEMP(IBAK)*YP(IBAK+1)                     CURV
1928.           RETURN                                                      CURV
1929.        50 IF(N.EQ.2) GO TO 60                                         CURV
1930.     C IF NO DERIVATIVES ARE GIVEN USE SECOND ORDER POLYNOMIAL         CURV
1931.     C INTERPOLATION ON INPUT DATA FOR VALUES AT ENDPOINTS.            CURV
1932.           DELX2=X(3)-X(2)                                             CURV
1933.           DELX12=X(3)-X(1)                                            CURV
1934.           C1=-(DELX12+DELX1)/DELX12/DELX1                             CURV
1935.           C2=DELX12/DELX1/DELX2                                       CURV
1936.           C3=-DELX1/DELX12/DELX2                                      CURV
1937.           SLPP1=C1*Y(1)+C2*Y(2)+C3*Y(3)                               CURV
1938.           DELN=X(N)-X(N-1)                                            CURV
1939.           DELNM1=X(N-1)-X(N-2)                                        CURV
1940.           DELNN=X(N)-X(N-2)                                           CURV
1941.           C1=(DELNN+DELN)/DELNN/DELN                                  CURV
1942.           C2=-DELNN/DELN/DELNM1                                       CURV
1943.           C3=DELN/DELNN/DELNM1                                        CURV
1944.           SLPPN=C3*Y(N-2)+C2*Y(N-1)+C1*Y(N)                           CURV
1945.           PRINT 901, SLPP1,SLPPN                                      CURV
1946.       901 FORMAT(1H0,"SLOPE AT ENDS",2E12.4)                          CURV
1947.           GO TO 10                                                    CURV
1948.     C IF ONLY TWO POINTS AND NO DERIVATIVES ARE GIVEN, USE            CURV
1949.     C STRAIGHT LINE FOR CURVE                                         CURV
1950.        60 YP(1)=0.                                                    CURV
1951.           YP(2)=0.                                                    CURV
1952.           RETURN                                                      CURV
1953.     C                                                                 CURV
1954.     C---- ORDINARY CUBIC SPLINE CASE                                  CURV
1955.        70 DIAG1=2.*DELX1                                              CURV
1956.           DIAGIN=1./DIAG1                                             CURV
1957.           YP(1)=DIAGIN*(DX1-SLPP1)                                    CURV
1958.           SPDIAG=DELX1                                                CURV
1959.           TEMP(1)=DIAGIN*SPDIAG                                       CURV
1960.           IF(N.EQ.2) GO TO 30                                         CURV
1961.           DO 80 I=2,NM1                                               CURV
1962.           DELX2=X(I+1)-X(I)                                           CURV
1963.           DX2=(Y(I+1)-Y(I))/DELX2                                     CURV
1964.           DIAG2=2.*DELX2                                              CURV
1965.           DIAGIN=1./(DIAG1+DIAG2-SPDIAG*TEMP(I-1))                    CURV
1966.           YP(I)=DIAGIN*(DX2-DX1-SPDIAG*YP(I-1))                       CURV
1967.           SPDIAG=DELX2                                                CURV
1968.           TEMP(I)=DIAGIN*SPDIAG                                       CURV
1969.           DX1=DX2                                                     CURV
1970.        80 DIAG1=DIAG2                                                 CURV
1971.           GO TO 30                                                    CURV
1972.           END                                                         CURV
1973.           FUNCTION CURV2(T,N,X,Y,YP,SIGMA,IT)                         CURV2
1974.           INTEGER N,IT                                                CURV2
1975.           REAL T,X(N),Y(N),YP(N),SIGMA                                CURV2
1976.     C THIS FUNCTION INTERPOLATES A CURVE AT A GIVEN POINT             CURV2
1977.     C        USING A SPLINE UNDER TENSION. THE SUBROUTINE CURV1 SHOULD CURV2
1978.     C        BE CALLED EARLIER TO DETERMINE CERTAIN NECESSARY          CURV2
1979.     C        PARAMETERS.                                               CURV2
1980.     C                                                                 CURV2
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1981.      C ON INPUT -                                                          CURV2
1982.      C T       CONTAINS A REAL VALUE TO BE MAPPED ONTO THE INTERPO-        CURV2
1983.      C         LATING CURVE.                                               CURV2
1984.      C N       CONTAINS THE NUMBER OF POINTS WHICH WERE INTERPOLATED       CURV2
1985.      C         TO DETERMINE THE CURVE,                                     CURV2
1986.      C X AND Y ARE ARRAYS CONTAINING THE ORDINATES AND ABSCISSAS           CURV2
1987.      C         OF THE INTERPOLATED POINTS,                                 CURV2
1988.      C YP      IS AN ARRAY WITH VALUES PROPORTIONAL TO THE SECOND          CURV2
1989.      C         DERIVATIVE OF THE CURVE AT THE NODES,                       CURV2
1990.      C SIGMA CONTAINS THE TENSION FACTOR (ITS SIGN IS IGNORED),            CURV2
1991.      C IT      IS AN INTEGER SWITCH. IF IT IS NOT 1 THIS INDICATES         CURV2
1992.      C         THAT THE FUNCTION HAS BEEN CALLED PREVIOUSLY (WITH N,X,     CURV2
1993.      C         Y,YP AND SIGMA UNALTERED) AND THAT THIS VALUE OF T          CURV2
1994.      C         EXCEEDS THE PREVIOUS VALUE. WITH SUCH INFORMATION THE       CURV2
1995.      C         FUNCTION IS ABLE TO PERFORM THE INTERPOLATION MUCH MORE     CURV2
1996.      C         RAPIDLY. IF A USER SEEKS TO INTERPOLATE AT A SEQUENCE       CURV2
1997.      C         OF POINTS, EFFICIENCY IS GAINED BY ORDERING THE VALUES      CURV2
1998.      C         INCREASING AND SETTING IT TO THE INDEX OF THE CALL.         CURV2
1999.      C         IF IT IS 1 THE SEARCH FOR THE INTERVAL (X(K-1),X(K))        CURV2
2000.      C         CONTAINING T STARTS WITH K=2                                CURV2
2001.      C                                                                     CURV2
2002.      C THE PARAMETERS N,X,Y,YP AND SIGMA SHOULD BE INPUT                   CURV2
2003.      C         UNALTERED FROM THE OUTPUT OF CURV1.                         CURV2
2004.      C                                                                     CURV2
2005.      C ON OUTPUT -                                                         CURV2
2006.      C CURV2 CONTAINS THE INTERPOLATED VALUE. FOR T LESS THAN              CURV2
2007.      C         X(1) CURV2=Y(1). FOR T GREATER THAN X(N) CURV2=Y(N).        CURV2
2008.      C                                                                     CURV2
2009.      C NONE OF THE INPUT PARAMETERS ARE ALTERED.                           CURV2
2010.      C                                                                     CURV2
2011.            IF(T.LE.X(1)) GO TO 60                                         CURV2
2012.            IF(T.GE.X(N)) GO TO 62                                         CURV2
2013.      C IF IT.NE.1 START SEARCH WHERE PREVIOUSLY TERMINATED.                CURV2
2014.      C OTHERWISE START FROM BEGINNING                                      CURV2
2015.            IF(IT.NE.1) GO TO 10                                           CURV2
2016.          1 I1=2                                                           CURV2
2017.      C SEARCH FOR INTERVAL                                                 CURV2
2018.         10 DO 20 I=I1,N                                                   CURV2
2019.            IF(X(I)-T) 20,20,30                                            CURV2
2020.         20 CONTINUE                                                       CURV2
2021.            I=N                                                            CURV2
2022.      C CHECK TO INSURE CORRECT INTERVAL                                    CURV2
2023.         30 IF(X(I-1).GT.T) GO TO 1                                        CURV2
2024.      C SET UP AND PERFORM INTERPOLATION                                    CURV2
2025.         40 DEL1=T-X(I-1)                                                  CURV2
2026.            DEL2=X(I)-T                                                    CURV2
2027.            DELS=X(I)-X(I-1)                                               CURV2
2028.            IF(SIGMA.EQ.0.) GO TO 70                                       CURV2
2029.            S=X(N)-X(1)                                                    CURV2
2030.      C DENORMALIZE SIGMA                                                   CURV2
2031.            SIGMAP=ABS(SIGMA)*FLOAT(N-1)/S                                 CURV2
2032.            EXPS1=EXP(SIGMAP*DEL1)                                         CURV2
2033.            SINHD1=.5*(EXPS1-1./EXPS1)                                     CURV2
2034.            EXPS=EXP(SIGMAP*DEL2)                                          CURV2
2035.            SINHD2=.5*(EXPS-1./EXPS)                                       CURV2
2036.            EXPS=EXPS1*EXPS                                                CURV2
2037.            SINHS=.5*(EXPS-1./EXPS)                                        CURV2
2038.            CURVE=(YP(I)*SINHD1+YP(I-1)*SINHD2)/SINHS+                     CURV2
2039.           1((Y(I)-YP(I))*DEL1+(Y(I-1)-YP(I-1))*DEL2)/DELS                 CURV2
2040.            I1=I                                                           CURV2
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      50 CURV2=CURVE                                                    CURV2
         RETURN                                                         CURV2
C T .LE. X(1)                                                         CURV2
      60 CURVE=Y(1)                                                    CURV2
      61 I1=2                                                          CURV2
         GO TO 50                                                       CURV2
C T .GE. X(N)                                                         CURV2
      62 CURVE=Y(N)                                                    CURV2
         GO TO 61                                                       CURV2
C                                                                      CURV2
C---- ORDINARY CUBIC SPLINE CASE                                       CURV2
      70 A=(DEL2*Y(I-1)+DEL1*Y(I))/DELS                                CURV2
         X2 =T**2                                                       CURV2
         XI2=X(I-1)**2                                                  CURV2
         B=(X2*T-XI2*X(I-1))/DELS                                       CURV2
         C=3.*X(I-1)*T*DEL1/DELS                                        CURV2
         D=3.*(X2-XI2)                                                  CURV2
         E=DEL1*DELS                                                    CURV2
         F=6.*X(I-1)*DEL1                                               CURV2
         G=-B+C+D-2.*E-F                                                CURV2
         H=B-C-E                                                        CURV2
         CURVE=A+G*YP(I-1)+H*YP(I)                                      CURV2
         GO TO 50                                                       CURV2
         END                                                            CURV2
         SUBROUTINE DEPOST (DIS,JSTAB,HEIGHT,ANSWER)                    DEPOST
C        REVISION 1 - OCTOBER 1976                                      DEPOST
         DOUBLE PRECISION ANSWER                                        DEPOST
         DISLN = ALOG(DIS)                                              DEPOST
         JS= JSTAB - 4                                                  DEPOST
         IF(HEIGHT.LE.15.0) GO TO 1                                     DEPOST
         IF(HEIGHT.LE.45.0)  GO TO 2                                    DEPOST
         IF(HEIGHT.LE.80.0) GO TO 3                                     DEPOST
         IF(JS)  4,5,6                                                  DEPOST
       4 IF(DIS.GT.400.0) GO TO 50                                      DEPOST
         SUM = -57.04822 + (13.82261*DISLN) - (1.019382*DISLN*DISLN)    DEPOST
         GO TO 1000                                                     DEPOST
      50 IF(DIS.GE.3000.0) GO TO 51                                     DEPOST
         SUM = -35.26215 + (7.297182*DISLN) - (.5343292*DISLN*DISLN)    DEPOST
         GO TO 1000                                                     DEPOST
      51 IF(DIS.GT.30000.0)  GO TO 52                                   DEPOST
         SUM= -1.488902 - (1.694416*DISLN) + (.06353313*DISLN*DISLN)    DEPOST
         GO TO 1000                                                     DEPOST
      52 SUM = -45.70724 + (6.464447*DISLN) - (.3122405*DISLN*DISLN)    DEPOST
         GO TO 1000                                                     DEPOST
       5 IF(DIS.GE.1500.0) GO TO 53                                     DEPOST
         SUM = -63.81157 + (11.90979*DISLN) - (.6561428*DISLN*DISLN)    DEPOST
         GO TO 1000                                                     DEPOST
      53 IF(DIS.GE.10000.0) GO TO 54                                    DEPOST
         SUM = -44.54416 + (8.03507*DISLN) - (.4868832*DISLN*DISLN)     DEPOST
         GO TO 1000                                                     DEPOST
      54 SUM = -9.971805 + (.1761891*DISLN) - (.04063289*DISLN*DISLN)   DEPOST
         GO TO 1000                                                     DEPOST
       6 ANSWER = 0.00000                                               DEPOST
         RETURN                                                         DEPOST
       1 IF(DIS.GT.1000.0) GO TO 55                                     DEPOST
         SUM = -9.07794 + (.4357604*DISLN) - (.07881594*DISLN*DISLN)    DEPOST
         GO TO 1000                                                     DEPOST
      55 IF(DIS.GT.10000.0) GO TO 56                                    DEPOST
         SUM = -6.64143 - (.2466506*DISLN) - (.03098147*DISLN*DISLN)    DEPOST
         GO TO 1000                                                     DEPOST
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2101.        56 SUM= -14.06597 + (1.10343*DISLN) - (.09031373*DISLN*DISLN)        DEPOST
2102.           GO TO 1000                                                        DEPOST
2103.         2 IF(JS)  8,9,10                                                    DEPOST
2104.         8 IF(DIS.GE.400.0) GO TO 57                                         DEPOST
2105.           SUM = -35.30917 + (9.57035*DISLN) - (.8727484*DISLN*DISLN)        DEPOST
2106.           GO TO 1000                                                        DEPOST
2107.        57 IF(DIS.GT.2000.0) GO TO 58                                        DEPOST
2108.           SUM = -3.946649 - (.882866*DISLN)                                 DEPOST
2109.           GO TO 1000                                                        DEPOST
2110.        58 IF(DIS.GE.5000.0) GO TO 59                                        DEPOST
2111.           SUM = -3.256392 - (1.20884*DISLN) + (.03092014*DISLN*DISLN)       DEPOST
2112.           GO TO 1000                                                        DEPOST
2113.        59 IF(DIS.GE.13000.0) GO TO 60                                       DEPOST
2114.           SUM = -5.975507 - (.6270642*DISLN)                                DEPOST
2115.           GO TO 1000                                                        DEPOST
2116.        60 IF(DIS.GT.20000.0) GO TO 61                                       DEPOST
2117.           SUM = 12.1268 - (4.455138*DISLN) + (.202586*DISLN*DISLN)          DEPOST
2118.           GO TO 1000                                                        DEPOST
2119.        61 IF(DIS.GE.60000.0) GO TO 62                                       DEPOST
2120.           SUM = -10.79479 + (.01276474*DISLN) - (.01497699*DISLN*DISLN)     DEPOST
2121.           GO TO 1000                                                        DEPOST
2122.        62 SUM = -54.18442 + (7.877314*DISLN) - (.3715153*DISLN*DISLN)       DEPOST
2123.           GO TO 1000                                                        DEPOST
2124.         9 IF(DIS.GT.200.0) GO TO 63                                         DEPOST
2125.           SUM = -42.9116 + (8.624134*DISLN) - (.5286823*DISLN*DISLN)        DEPOST
2126.           GO TO 1000                                                        DEPOST
2127.        63 IF(DIS.GT.400.0) GO TO 64                                         DEPOST
2128.           SUM = -45.08005 + (9.502915*DISLN) - (.6178266*DISLN*DISLN)       DEPOST
2129.           GO TO 1000                                                        DEPOST
2130.        64 IF(DIS.GT.1500.0) GO TO 65                                        DEPOST
2131.           SUM = -46.40474 + (10.93155*DISLN) - (.8182561*DISLN*DISLN)       DEPOST
2132.           GO TO 1000                                                        DEPOST
2133.        65 IF(DIS.GT.7000.0) GO TO 66                                        DEPOST
2134.           SUM = -12.06068 + (1.105205*DISLN) - (.1167178*DISLN*DISLN)       DEPOST
2135.           GO TO 1000                                                        DEPOST
2136.        66 IF(DIS.GE.15000.0) GO TO 67                                       DEPOST
2137.           SUM = -4.148934 - (.821923*DISLN)                                 DEPOST
2138.           GO TO 1000                                                        DEPOST
2139.        67 SUM = -4.640997 - (.7696691*DISLN)                                DEPOST
2140.           GO TO 1000                                                        DEPOST
2141.        10 IF(DIS.GE.5000.0) GO TO 68                                        DEPOST
2142.           SUM = -156.334 + (29.93037*DISLN) - (1.5483*DISLN*DISLN)          DEPOST
2143.           GO TO 1000                                                        DEPOST
2144.        68 IF(DIS.GT.8400.0) GO TO 69                                        DEPOST
2145.           SUM = -140.62 + (26.18382*DISLN) - (1.324944*DISLN*DISLN)         DEPOST
2146.           GO TO 1000                                                        DEPOST
2147.        69 IF(DIS.GE.42000.0) GO TO 70                                       DEPOST
2148.           SUM = -87.89882 + (15.38889*DISLN) - (.7753119*DISLN*DISLN)       DEPOST
2149.           GO TO 1000                                                        DEPOST
2150.        70 SUM = -12.94973 + (1.265261*DISLN) - (.1098207*DISLN*DISLN)       DEPOST
2151.           GO TO 1000                                                        DEPOST
2152.         3 IF(JS) 11,12,13                                                   DEPOST
2153.        11 IF(DIS.GT.400.0) GO TO 71                                         DEPOST
2154.           SUM = -30.45023 + (5.76941*DISLN) - (.394098*DISLN*DISLN)         DEPOST
2155.           GO TO 1000                                                        DEPOST
2156.        71 IF(DIS.GT.900.0) GO TO 101                                        DEPOST
2157.           SUM = -36.23268 + (8.23023*DISLN) - (.6448782*DISLN*DISLN)        DEPOST
2158.           GO TO 1000                                                        DEPOST
2159.       101 IF(DIS.GT.3000.0) GO TO 72                                       DEPOST
2160.           SUM = -1.56127 - (1.725164*DISLN) + (.0694564*DISLN*DISLN)        DEPOST
```

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      GO TO 1000                                                        DEPOST
   72 IF(DIS.GT.13000.0) GO TO 73                                       DEPOST
      SUM = -5.807573 - (.6388715*DISLN)                                DEPOST
      GO TO 1000                                                        DEPOST
   73 IF(DIS.GT.50000.0) GO TO 74                                       DEPOST
      SUM = -.2792892 - (1.959056*DISLN) + (.07773757*DISLN*DISLN)      DEPOST
      GO TO 1000                                                        DEPOST
   74 SUM= -58.14337 + ( 8.633218*DISLN) - (.4071184*DISLN*DISLN)       DEPOST
      GO TO 1000                                                        DEPOST
   12 IF(DIS.GE.300.0) GO TO 75                                         DEPOST
      SUM = -177.431 + (55.32239*DISLN) - (4.658777*DISLN*DISLN)        DEPOST
      GO TO 1000                                                        DEPOST
   75 IF(DIS.GT.1000.0) GO TO 76                                        DEPOST
      SUM = -58.73299 + (12.91683*DISLN) - (.8705195*DISLN*DISLN)       DEPOST
      GO TO 1000                                                        DEPOST
   76 IF(DIS.GT.3000.0) GO TO 77                                        DEPOST
      SUM = -45.04643 + (9.088059*DISLN) - (.6027659*DISLN*DISLN)       DEPOST
      GO TO 1000                                                        DEPOST
   77 IF(DIS.GT.20000.0) GO TO 78                                       DEPOST
      SUM = -13.59167 + (1.164582*DISLN) - (.1036683*DISLN*DISLN)       DEPOST
      GO TO 1000                                                        DEPOST
   78 SUM = -4.867893 -(.7430947*DISLN)                                 DEPOST
      GO TO 1000                                                        DEPOST
   13 IF(DIS.GE.80000.0) GO TO 79                                       DEPOST
      SUM = -357.2949 + (59.55312*DISLN) - (2.583151*DISLN*DISLN)       DEPOST
      GO TO 1000                                                        DEPOST
   79 SUM = -134.0653 +(20.00078*DISLN) - (.8306277*DISLN*DISLN)        DEPOST
 1000 ANSWER = EXP(SUM)                                                 DEPOST
      RETURN                                                            DEPOST
      END                                                               DEPOST
      SUBROUTINE ADJUST                                                 ADJUST
       COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                     BLANK
     1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                  BLANK
     2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)              BLANK
     3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                  BLANK
     4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)             BLANK
     5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)            BLANK
     6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)        BLANK
     7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                     BLANK
     8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL        BLANK
     9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)       BLANK
     1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                     BLANK
       DIMENSION SETDIS(10),DST(25),HG(25)                              ADJUST
       DATA SETDIS/1207.,2414.,4023.,5632.,7241.,12068.,24135.,40225.,  ADJUST
     1            56315.,72405./                                        ADJUST
       I4(I,J,K,L)=I+16*(J-1+14*(K-1+7*(L-1)))                          ADJUST
       DO 2000  K=1,NDIR                                                ADJUST
       DO 2000  I=1,NVEL                                                ADJUST
       DO 2000  J=1,NSTA                                                ADJUST
       MD=0                                                             ADJUST
       DO 700  N=1,NDIS                                                 ADJUST
       DIS = DIST(K,N)                                                  ADJUST
       UBAR=UAVEEL(I,J)                                                 ADJUST
       CALL RISE (DH,DIS,UBAR,J,0.,0.,HS,W,DIA)                         ADJUST
       CALL HEIGHT (K,DIS,HGT)                                          ADJUST
       H = HS + DH - HGT                                                ADJUST
       MD = MD+1                                                        ADJUST
       DST(MD) = DIS                                                    ADJUST
       HG(MD) = H                                                       ADJUST
       IF(H.LT.15.0)  GO TO 703                                         ADJUST
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2221.      700   CONTINUE                                                    ADJUST
2222.            DO 704  M=1,10                                             ADJUST
2223.            IF(DIST(K,NDIS).GE.SETDIS(M))  GO TO 704                   ADJUST
2224.            DIS = SETDIS(M)                                            ADJUST
2225.            UBAR=UAVEEL(I,J)                                           ADJUST
2226.            CALL RISE (DH,DIS,UBAR,J,0.,0.,HS,W,DIA)                   ADJUST
2227.            CALL HEIGHT (K,DIS,HGT)                                    ADJUST
2228.            H = HS + DH - HGT                                          ADJUST
2229.            MD = MD+1                                                  ADJUST
2230.            DST(MD) = DIS                                              ADJUST
2231.            HG(MD) = H                                                 ADJUST
2232.            IF(H.LT.15.0)  GO TO 703                                   ADJUST
2233.      704   CONTINUE                                                    ADJUST
2234.      703   CONTINUE                                                    ADJUST
2235.            MAX = MD                                                   ADJUST
2236.            DO  707  L=1,3                                             ADJUST
2237.            DPLTAD(I4(K,I,J,L))=0.0                                    ADJUST
2238.        707 DEPADJ(I4(K,I,J,L))=1.0                                    ADJUST
2239.            MD = 1                                                     ADJUST
2240.            IF(HG(MD).GT.80.0)  GO TO 708                              ADJUST
2241.            IF(HG(MD).GT.45.0.AND.HG(MD).LE.80.0)  GO TO 709           ADJUST
2242.            IF(HG(MD).GT.15.0.AND.HG(MD).LE.45.0)  GO TO 710           ADJUST
2243.            GO TO 2000                                                 ADJUST
2244.      710   MD = MD+1                                                   ADJUST
2245.            IF(MD.GT.MAX)   GO TO 2000                                 ADJUST
2246.      711   IF(HG(MD).GE.15.0)  GO TO 710                              ADJUST
2247.            HN = HG(MD-1)                                              ADJUST
2248.            DN = DST(MD-1)                                             ADJUST
2249.            HF = HG(MD)                                                ADJUST
2250.            DF = DST(MD)                                               ADJUST
2251.            HDIF = HF - HN                                             ADJUST
2252.            IF(HDIF.EQ.0.0)   GO TO 314                                ADJUST
2253.            DIS = DN + ((DF-DN)*(15.0-HN)/(HF-HN))                     ADJUST
2254.            GO TO 316                                                  ADJUST
2255.      314   DIS = DN                                                    ADJUST
2256.      316   CONTINUE                                                    ADJUST
2257.            CALL DEPLET (DIS,J,30.0,DPL3)                              ADJUST
2258.            CALL DEPLET (DIS,J,0.0,DPL0)                               ADJUST
2259.            DPLTAD(I4(K,I,J,3))=DPL3-DPL0                              ADJUST
2260.            DEPADJ(I4(K,I,J,3))=DPL3/DPL0                              ADJUST
2261.            GO TO 2000                                                 ADJUST
2262.      709   MD = MD+1                                                   ADJUST
2263.            IF(MD.GT.MAX)   GO TO 2000                                 ADJUST
2264.      712   IF(HG(MD).GE.45.0)  GO TO 709                              ADJUST
2265.            HN = HG(MD-1)                                              ADJUST
2266.            DN = DST(MD-1)                                             ADJUST
2267.            HF = HG(MD)                                                ADJUST
2268.            DF = DST(MD)                                               ADJUST
2269.            HDIF = HF - HN                                             ADJUST
2270.            IF(HDIF.EQ.0.0)   GO TO 344                                ADJUST
2271.            DIS = DN + ((DF-DN)*(45.0-HN)/(HF-HN))                     ADJUST
2272.            GO TO 346                                                  ADJUST
2273.      344   DIS = DN                                                    ADJUST
2274.      346   CONTINUE                                                    ADJUST
2275.            CALL DEPLET (DIS,J,60.0,DPL6)                              ADJUST
2276.            CALL DEPLET (DIS,J,30.0,DPL3)                              ADJUST
2277.            DEPADJ(I4(K,I,J,2))=DPL6/DPL3                              ADJUST
2278.            DPLTAD(I4(K,I,J,2))=DPL6-DPL3                              ADJUST
2279.            GO TO 711                                                  ADJUST
2280.      708   MD = MD+1                                                   ADJUST
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2281.            IF(MD.GT.MAX)   GO TO 2000                                    ADJUST
2282.            IF(HG(MD).GE.80.0)  GO TO 708                                 ADJUST
2283.            HN = HG(MD-1)                                                 ADJUST
2284.            DN = DST(MD-1)                                                ADJUST
2285.            HF = HG(MD)                                                   ADJUST
2286.            DF = DST(MD)                                                  ADJUST
2287.            HDIF = HF - HN                                                ADJUST
2288.            IF(HDIF.EQ.0.0)   GO TO 384                                   ADJUST
2289.            DIS = DN + ((DF-DN)*(80.0-HN)/(HF-HN))                        ADJUST
2290.            GO TO 386                                                     ADJUST
2291.      384   DIS = DN                                                      ADJUST
2292.      386   CONTINUE                                                      ADJUST
2293.            CALL DEPLET (DIS,J,100.0,DPL8)                                ADJUST
2294.            CALL DEPLET (DIS,J,60.0,DPL6)                                 ADJUST
2295.            DEPADJ(I4(K,I,J,1))=DPL8/DPL6                                 ADJUST
2296.            DPLTAD(I4(K,I,J,1))=DPL8-DPL6                                 ADJUST
2297.            GO TO 712                                                     ADJUST
2298.      2000  CONTINUE                                                      ADJUST
2299.            RETURN                                                        ADJUST
2300.            END                                                           ADJUST
2301.            SUBROUTINE ADJCOR (DEPANS,I80,I60,I30,H,K,I,J,DPLANS)         ADJCOR
2302.             COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                 BLANK
2303.           1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)              BLANK
2304.           2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)          BLANK
2305.           3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)              BLANK
2306.           4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)         BLANK
2307.           5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)        BLANK
2308.           6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)    BLANK
2309.           7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                 BLANK
2310.           8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL    BLANK
2311.           9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)   BLANK
2312.           1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                 BLANK
2313.            I4(I,J,K,L)=I+16*(J-1+14*(K-1+7*(L-1)))                       ADJCOR
2314.            DEPANS = 1.000                                                ADJCOR
2315.            DPLANS = 0.00000                                              ADJCOR
2316.            IF(H.GT.80.0)   GO TO 1                                       ADJCOR
2317.            IF(H.GT.45.0)   GO TO 2                                       ADJCOR
2318.            IF(H.GT.15.0)   GO TO 3                                       ADJCOR
2319.            IF(I80.EQ.1)    GO TO 5                                       ADJCOR
2320.            IF(I60.EQ.1)    GO TO 6                                       ADJCOR
2321.            IF(I30.EQ.0)    RETURN                                        ADJCOR
2322.            DEPANS=DEPADJ(I4(K,I,J,3))                                    ADJCOR
2323.            DPLANS=DPLTAD(I4(K,I,J,3))                                    ADJCOR
2324.            RETURN                                                        ADJCOR
2325.      1     I80=1                                                         ADJCOR
2326.            RETURN                                                        ADJCOR
2327.      2     I60=1                                                         ADJCOR
2328.            IF(I80.EQ.0)   RETURN                                         ADJCOR
2329.            DEPANS=DEPADJ(I4(K,I,J,1))                                    ADJCOR
2330.            DPLANS=DPLTAD(I4(K,I,J,1))                                    ADJCOR
2331.            RETURN                                                        ADJCOR
2332.      3     I30=1                                                         ADJCOR
2333.            IF(I80.EQ.1)   GO TO 4                                        ADJCOR
2334.            IF(I60.EQ.0)   RETURN                                         ADJCOR
2335.            DEPANS=DEPADJ(I4(K,I,J,2))                                    ADJCOR
2336.            DPLANS=DPLTAD(I4(K,I,J,2))                                    ADJCOR
2337.            RETURN                                                        ADJCOR
2338.          4 DEPANS=DEPADJ(I4(K,I,J,1)) * DEPADJ(I4(K,I,J,2))              ADJCOR
2339.            DPLANS=DPLTAD(I4(K,I,J,1))+DPLTAD(I4(K,I,J,2))                ADJCOR
2340.            RETURN                                                        ADJCOR
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     5 DEPANS=DEPADJ(I4(K,I,J,1))*DEPADJ(I4(K,I,J,2))*DEPADJ(I4(K,I,J,3)) ADJCOR
       DPLANS=DPLTAD(I4(K,I,J,1))+DPLTAD(I4(K,I,J,2))+DPLTAD(I4(K,I,J,3)) ADJCOR
       RETURN                                                            ADJCOR
     6 DEPANS=DEPADJ(I4(K,I,J,2)) * DEPADJ(I4(K,I,J,3))                  ADJCOR
       DPLANS=DPLTAD(I4(K,I,J,2))+DPLTAD(I4(K,I,J,3))                    ADJCOR
       RETURN                                                            ADJCOR
       END                                                               ADJCOR
       SUBROUTINE ADJWND                                                 ADJWND
        COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                     BLANK
      1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                  BLANK
      2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)              BLANK
      3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                  BLANK
      4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)              BLANK
      5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)            BLANK
      6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)        BLANK
      7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                     BLANK
      8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL        BLANK
      9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)       BLANK
      1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                     BLANK
       DIMENSION CE(7),CG(7),E(7)                                        ADJWND
       DATA E/4*0.25,3*0.5/                                              ADJWND
       DO 1   I=1,NVEL                                                  ADJWND
       DO 1   J=1,NSTA                                                   ADJWND
       CE(J)=(WINDHT/PLEV)**E(J)                                         ADJWND
       CG(J)=(10.0/PLEV)**E(J)                                           ADJWND
       UMAXEL(I,J)=UMAX(I)*CE(J)                                         ADJWND
       UMAXGL(I,J)=UMAX(I)*CG(J)                                         ADJWND
       UAVEEL(I,J)=UAVE(I)*CE(J)                                         ADJWND
     1 UAVEGL(I,J)=UAVE(I)*CG(J)                                         ADJWND
       RETURN                                                            VERS2
       END                                                               ADJWND
       SUBROUTINE RLSMOD(W,U,IVENT,ET,LSTACK)                            RLSMOD
       RATIO=W/U                                                         RLSMOD
       IF(RATIO.GE.5.0 .OR. LSTACK.EQ.1)   GO TO 2                       RLSMOD
       IF(RATIO.LT.1.0)   GO TO 1                                        RLSMOD
       IVENT = 0                                                         RLSMOD
       ET = 0.3 - 0.06 * RATIO                                           RLSMOD
       IF(RATIO.LE.1.5)  ET = 2.58 - 1.58 * RATIO                        RLSMOD
       RETURN                                                            RLSMOD
     1 IVENT = -1                                                        RLSMOD
       ET = 1.0                                                          RLSMOD
       RETURN                                                            RLSMOD
     2 IVENT = 1                                                         RLSMOD
       ET = 0                                                            RLSMOD
       RETURN                                                            RLSMOD
       END                                                               RLSMOD
       SUBROUTINE HEIGHT (K,DIS,HGT)                                     HEIGHT
        COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                     BLANK
      1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                  BLANK
      2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)              BLANK
      3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                  BLANK
      4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)              BLANK
      5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)            BLANK
      6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)        BLANK
      7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                     BLANK
      8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL        BLANK
      9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)       BLANK
      1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                     BLANK
       HGT = HT(K,NDIS)                                                  HEIGHT
       IF(DIS.GE.DIST(K,NDIS))  RETURN                                   HEIGHT
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2401.           HN = 0.0                                                        HEIGHT
2402.           DN = 0.0                                                        HEIGHT
2403.           DO 108  M=1,NDIS                                                HEIGHT
2404.           IF(DIST(K,M).GE.DIS)  GO TO 109                                 HEIGHT
2405.       108 CONTINUE                                                        HEIGHT
2406.           M = NDIS                                                        HEIGHT
2407.       109 IF(M.EQ.1)  GO TO 112                                           HEIGHT
2408.           HN = HT(K,M-1)                                                  HEIGHT
2409.           DN = DIST(K,M-1)                                                HEIGHT
2410.       112 HF = HT(K,M)                                                    HEIGHT
2411.           DF = DIST(K,M)                                                  HEIGHT
2412.           HGT = HN + (HF-HN) * (DIS-DN)/(DF-DN)                           HEIGHT
2413.           RETURN                                                          HEIGHT
2414.           END                                                             HEIGHT
2415.           SUBROUTINE RISE (DH,DIS,U,IZ,F4,F3,HS,W,DIA)                    RISE
2416.           DH=0.0                                                          RISE
2417.           IF(DIA.LT.1.0E-05)  RETURN                                      RISE
2418.           IF(F4.GT.0.) GO TO 101                                          RISE
2419.           DH=1.44*((W/U    )**.667)*((DIS/DIA)**.333)*DIA                 RISE
2420.           IF(IZ.LE.4) GO TO 102                                           RISE
2421.           FM=W*W*DIA*DIA*.25                                              RISE
2422.           IF(IZ.EQ.5) S=.000875                                           RISE
2423.           IF(IZ.EQ.6) S=.00175                                            RISE
2424.           IF(IZ.EQ.7) S=.00245                                            RISE
2425.           DKK=4.*(FM/S)**.25                                              VERS2
2426.           IF(DKK.LT.DH)DH=DKK                                             VERS2
2427.           DT=1.5*(FM/U    )**.333/S**.1667                                RISE
2428.           IF(DT.LT.DH) DH=DT                                              RISE
2429.       102 DT=3.*W*DIA/U                                                   RISE
2430.           IF(DT.LT.DH) DH=DT                                              RISE
2431.           IF(W.LT.1.5*U    ) DH=DH-3.*(1.5-W/U    )*DIA                   RISE
2432.           GO TO 200                                                       RISE
2433.       101 CMF=3.28083333                                                  RISE
2434.           CFM=.30480061                                                   RISE
2435.           DISF=DIS*CMF                                                    RISE
2436.           HSF=HS*CMF                                                      RISE
2437.           A=16./25.                                                       RISE
2438.           B=11./5.                                                        RISE
2439.           C=1.6                                                           RISE
2440.           UF=U    *CMF                                                    RISE
2441.           IF(HSF.GE.1000.) XSTAR=33.*F4                                   RISE
2442.           IF(HSF.LT.1000.) XSTAR=.52*F4*HSF**.6                           RISE
2443.           IF(IZ.GT.4) GO TO 1                                             RISE
2444.           IF(DISF.LE.XSTAR) GO TO 2                                       RISE
2445.           XST5=5.*XSTAR                                                   RISE
2446.           IF(DISF.GE.XST5) DISF=XST5                                      RISE
2447.           P=DISF/XSTAR                                                    RISE
2448.           DEN=1.+.8*P                                                     RISE
2449.           DH=C*F3*XSTAR**.667*(.4+P*(A+B*P))/(UF*DEN*DEN)                 RISE
2450.           GO TO 3                                                         RISE
2451.         1 CONTINUE                                                        RISE
2452.           IF(IZ.EQ.5) S=.000875                                           RISE
2453.           IF(IZ.EQ.6) S=.00175                                            RISE
2454.           IF(IZ.EQ.7) S=.00245                                            RISE
2455.           XSTAR=2.4*UF/SQRT(S)                                            RISE
2456.           IF(DISF.LT.XSTAR) GO TO 2                                       RISE
2457.           DH=2.9*F3/(UF*S)**.333                                          RISE
2458.           GO TO 3                                                         RISE
2459.         2 DH=C*F3*DISF**.667/UF                                           RISE
2460.         3 DH=DH*CFM                                                       RISE
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2461.      200 RETURN                                                          RISE
2462.          END                                                             RISE
2463.          SUBROUTINE POLYN(IC,AVAL,RESULT,LDSRT)                          VERS2
2464.          DIMENSION AY(6),AZ(6,3),BZ(6,3),CZ(6,3),DIS(2)                  POLYN
2465.          DIMENSION SZ(7,3),AK(11),EX(11),X(7)                            VERS2
2466.          DATA SZ/1.114,1.322,1.633,2.0,2.431,2.889,3.398,0.982,1.230,1.519, VERS2
2467.         1        1.845,2.255,2.69,3.114,0.903,1.130,1.398,1.708,2.079,   VERS2
2468.         2        2.462,2.903/                                            VERS2
2469.          DATA AK,EX,X/.144,.443,.78,1.38,.519,.348,.297,.449,.279,.294,.303 VERS2
2470.         1            ,.826,.517,.314,.11,.921,.901,.891,.731,.865,.916,.975 VERS2
2471.         2             ,2.0,2.301,2.602,2.903,3.204,3.505,3.806/          VERS2
2472.          DATA AY/.3658,.2751,.2089,.1471,.1046,.0722/                    POLYN
2473.          DATA AZ/.192,.156,.116,.079,.063,.053,     .00066,.0382,.113,.222 POLYN
2474.         X,.211,.086,    .00024,.055,.113,1.26,6.73,18.05/                POLYN
2475.          DATA BZ/.936,.922,.905,.881,.871,.814,    1.941,1.149,.911,.725  POLYN
2476.         X,.678,.74,    2.094,1.098,.911,.516,.305,.18/                   POLYN
2477.          DATA CZ/6*0.,9.27,3.3,0.,-1.7,-1.3,-.35,    -9.6,2.,0.,-13.,-34. POLYN
2478.         X,-48.6/                                                         POLYN
2479.          DATA DIS/100.,1000./,BY/.9031/                                  POLYN
2480.          IF(LDSRT.EQ.1) GO TO 100                                        VERS2
2481.          IF(IC.LE.7) GO TO 20                                            POLYN
2482.          IF(IC.EQ.14) GO TO 25                                           POLYN
2483.          IX=IC-7                                                         POLYN
2484.          RESULT=AY(IX)*AVAL**BY                                          POLYN
2485.          GO TO 999                                                       POLYN
2486.       25 F=AY(6)*AVAL**BY                                                POLYN
2487.          E=AY(5)*AVAL**BY                                                POLYN
2488.          RESULT=2.*ALOG10(F)-ALOG10(E)                                   POLYN
2489.          GO TO 500                                                       POLYN
2490.       20 DO 2 L=1,2                                                      POLYN
2491.          IF(AVAL.LT.DIS(L)) GO TO 3                                      POLYN
2492.        2 CONTINUE                                                        POLYN
2493.          L=3                                                             POLYN
2494.        3 IF(IC.EQ.7) GO TO 30                                            POLYN
2495.          RESULT=AZ(IC,L)*AVAL**BZ(IC,L)+CZ(IC,L)                         POLYN
2496.          GO TO 999                                                       POLYN
2497.       30 F=AZ(6,L)*AVAL**BZ(6,L)+CZ(6,L)                                 POLYN
2498.          E=AZ(5,L)*AVAL**BZ(5,L)+CZ(5,L)                                 POLYN
2499.          RESULT=2.*ALOG10(F)-ALOG10(E)                                   POLYN
2500.          GO TO 500                                                       VERS2
2501.    C  ***** COMPUTE DESERT TYPE SIGMA"S *****                            VERS2
2502.      100 IF(IC.LE.3) GO TO 10                                            VERS2
2503.          II=IC-3                                                         VERS2
2504.          RESULT=AK(II)*AVAL**EX(II)                                      VERS2
2505.          GO TO 999                                                       VERS2
2506.       10 RESULT=0.                                                       VERS2
2507.          AVLG=ALOG10(AVAL)                                               VERS2
2508.          DO 1 J=1,7                                                      VERS2
2509.          XN=1.                                                           VERS2
2510.          XD=1.                                                           VERS2
2511.          DO 4 K=1,7                                                      VERS2
2512.          IF(K.EQ.J) GO TO 4                                              VERS2
2513.          XN=XN*(AVLG-X(K))                                               VERS2
2514.          XD=XD*(X(J)-X(K))                                               VERS2
2515.        4 CONTINUE                                                        VERS2
2516.        1 RESULT=RESULT+SZ(J,IC)*XN/XD                                    VERS2
2517.      500 RESULT=10.**RESULT                                              VERS2
2518.      999 IF(RESULT.GT.1000.) RESULT=1000.                                VERS2
2519.          RETURN                                                          VERS2
2520.          END                                                             VERS2
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2521.            SUBROUTINE CORVAR(K,DIS,VARCOR)                                CORVAR
2522.             COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                  BLANK
2523.           1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)               BLANK
2524.           2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)           BLANK
2525.           3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)               BLANK
2526.           4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)          BLANK
2527.           5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)         BLANK
2528.           6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)     BLANK
2529.           7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                  BLANK
2530.           8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL      BLANK
2531.           9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)    BLANK
2532.           1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                  BLANK
2533.            IF(DIS.LE.VRDIST(K,1))  GO TO 1                               CORVAR
2534.            IF(DIS.GE.VRDIST(K,NCOR))  GO TO 2                            CORVAR
2535.            DO 10   M=2,NCOR                                              CORVAR
2536.            IF(VRDIST(K,M).GE.DIS)   GO TO 11                             CORVAR
2537.          10 CONTINUE                                                     CORVAR
2538.          11 VN=ALOG(VRCR(K,M-1))                                         CORVAR
2539.             VF=ALOG(VRCR(K,M))                                           CORVAR
2540.             DN=ALOG(VRDIST(K,M-1))                                       CORVAR
2541.             DF=ALOG(VRDIST(K,M))                                         CORVAR
2542.             DISLN=ALOG(DIS)                                              CORVAR
2543.             VR=VN+((VF-VN)*(DISLN-DN)/(DF-DN))                           CORVAR
2544.             VARCOR=EXP(VR)                                               CORVAR
2545.             RETURN                                                       CORVAR
2546.           1 VARCOR=VRCR(K,1)                                             CORVAR
2547.             RETURN                                                       CORVAR
2548.           2 VARCOR=VRCR(K,NCOR)                                          CORVAR
2549.             RETURN                                                       CORVAR
2550.             END                                                          CORVAR
2551.             SUBROUTINE OPENTR (DIS,FAC)                                  OPENTR
2552.             X = ALOG(DIS)                                                OPENTR
2553.             IF(DIS.GE.10000.0)  GO TO 1                                  OPENTR
2554.             FAC = EXP(16.125 - (3.18951* X) + (0.1569306 * X * X))       OPENTR
2555.             IF (FAC.GT.4.00)  GO TO 3                                    OPENTR
2556.             RETURN                                                       OPENTR
2557.       1     IF(DIS.GE.16090.0)  GO TO 2                                  OPENTR
2558.             FAC = EXP(1.1865 - (0.1225 * X))                             OPENTR
2559.             RETURN                                                       OPENTR
2560.       2     FAC = 1.00                                                   OPENTR
2561.             RETURN                                                       OPENTR
2562.           3 FAC= 4.00                                                    OPENTR
2563.             RETURN                                                       OPENTR
2564.             END                                                          OPENTR
2565.             SUBROUTINE PTSOUT (IPG)                                      PTSOUT
2566.             COMMON /TITLE/ TITLM                                         VERS2
2567.              COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                BLANK
2568.           1      ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)               BLANK
2569.           2      ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)           BLANK
2570.           3      ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)               BLANK
2571.           4       ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)          BLANK
2572.           5      ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)         BLANK
2573.           6       ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)     BLANK
2574.           7       ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                  BLANK
2575.           8          ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL      BLANK
2576.           9       ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)    BLANK
2577.           1       ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                  BLANK
2578.            DIMENSION WORD1(2),WORD2(2),WORD3(2),WORD4(2),WORD(3),ABSDK(3) PTSOUT
2579.           1         ,TITLEL(4),TITLM(20)                                 VERS2
2580.            DATA TITLEL/"MAXI","MUM ","CHI/","Q   "/                      PTSOUT
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2581.          DATA WORD1,WORD2,WORD3,WORD4/"  NO","EMPT"," DEC","Y   ","AY","  " PTSOUT
2582.         1                            ,"    ","  UN"/                        PTSOUT
2583.          IF(LSTACK.EQ.0) GO TO 14                                           VERS2
2584.          DO 15   L=1,4                                                      PTSOUT
2585.         15 TITLPT(NPTYPE,L)=TITLEL(L)                                       PTSOUT
2586.         14 CONTINUE                                                         PTSOUT
2587.          IF(NPTYPE.EQ.0) GO TO 55                                           VERS2
2588.          CALL DATE(TODAY)                                                   VERS2
2589.          CALL TIME(CLOCK)                                                   VERS2
2590.          PRINT 950, TODAY,CLOCK                                             VERS2
2591.        950 FORMAT(1H1,"USNRC COMPUTER CODE-XOQDOQ,VERSION 2.0",10X,"RUN DATE  VERS2
2592.           * ",A10,10X,"RUN TIME",A10)                                      VERS2
2593.          PRINT 824,TITLM                                                    VERS2
2594.        824 FORMAT(1H0,20A4/)                                                VERS2
2595.          PRINT 1,  (TITLE(IEX,J),  J=1,20)                                  PTSOUT
2596.          1 FORMAT(1H ,20A4)                                                 VERS2
2597.          IF(KOPT(7).EQ.1) PUNCH 21,(TITLE(IEX,J),J=1,20)                    VERS2
2598.         21 FORMAT(20A4)                                                     PTSOUT
2599.          IF(IPG.EQ.1)  PRINT 12                                             PTSOUT
2600.          IF(IPG.EQ.1.AND.KOPT(7).EQ.1) PUNCH 12                             VERS2
2601.         12 FORMAT(" INTERMITTENT RELEASE CALCULATIONS")                      PTSOUT
2602.          IF(KOPT(8).EQ.1) PRINT 2                                           VERS2
2603.          IF(KOPT(9).EQ.1) PRINT 13                                          VERS2
2604.          IF(KOPT(8).EQ.1.AND.KOPT(7).EQ.1) PUNCH 2                          VERS2
2605.          IF(KOPT(9).EQ.1.AND.KOPT(7).EQ.1) PUNCH 13                         VERS2
2606.          2 FORMAT(" CORRECTED USING STANDARD OPEN TERRAIN FACTORS")          PTSOUT
2607.         13 FORMAT(" CORRECTED USING SITE-SPECIFIC FACTORS")                  PTSOUT
2608.          PRINT 3                                                            PTSOUT
2609.          3 FORMAT(" SPECIFIC POINTS OF INTEREST"/                           PTSOUT
2610.           1   "0RELEASE     TYPE  OF      DIRECTION       DISTANCE",T62,    PTSOUT
2611.           2   "X/Q", T78, "X/Q", T94, "X/Q", T110, "D/Q"/                    PTSOUT
2612.           3   "   ID",T14,"LOCATION",T28,"FROM SITE",T39,"(MILES)  (METERS) ( VERS2
2613.           4SEC/CUB.METER) (SEC/CUB.METER) (SEC/CUB.METER) (PER SQ.METER)")  VERS2
2614.          DO 50   I=1,3                                                      PTSOUT
2615.          ABSDK(I) = ABS(DECAYS(I))                                          PTSOUT
2616.          IF(ABSDK(I).LE.100.)   GO TO 90                                    PTSOUT
2617.          IWORD = 1                                                          PTSOUT
2618.          GO TO 100                                                          PTSOUT
2619.         90 IF(ABSDK(I).LT.1.E-10)   GO TO 91                                PTSOUT
2620.          GO TO 101                                                          PTSOUT
2621.         91 IWORD = 2                                                        PTSOUT
2622.        100 CONTINUE                                                        PTSOUT
2623.          IF(I.EQ.1)    PRINT 4,  WORD1(IWORD), WORD2(IWORD), WORD3(IWORD)   PTSOUT
2624.          IF(I.EQ.2)    PRINT 5,  WORD1(IWORD), WORD2(IWORD), WORD3(IWORD)   PTSOUT
2625.          IF(I.EQ.3)    PRINT 6,  WORD1(IWORD), WORD2(IWORD), WORD3(IWORD)   PTSOUT
2626.          4 FORMAT(" ",T57,2A4, A2)                                          VERS2
2627.          5 FORMAT("+",T72,2A4, A2)                                          VERS2
2628.          6 FORMAT("+",T88,2A4, A2)                                          VERS2
2629.          GO TO 50                                                           PTSOUT
2630.        101 IF(I.EQ.1)    PRINT 7,  ABSDK(I)                                 PTSOUT
2631.          IF(I.EQ.2)    PRINT 8,  ABSDK(I)                                   PTSOUT
2632.          IF(I.EQ.3)   PRINT 9,  ABSDK(I)                                    PTSOUT
2633.          7 FORMAT(" ", T55, F6.3, " DAY DECAY")                             PTSOUT
2634.          8 FORMAT("+", T72, F6.3, " DAY DECAY")                             PTSOUT
2635.          9 FORMAT("+", T88, F6.3, " DAY DECAY")                             PTSOUT
2636.         50 CONTINUE                                                         PTSOUT
2637.          DO 60   I=1,3                                                      PTSOUT
2638.          IF(DECAYS(I).LT.0.0)    GO TO 80                                   PTSOUT
2639.          WORD(I) = WORD4(2)                                                 PTSOUT
2640.          GO TO 60                                                           PTSOUT
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      80 WORD(I) = WORD4(1)                                                    PTSOUT
      60 CONTINUE                                                              PTSOUT
         PRINT 10,   (WORD(I),  I=1,3)                                         PTSOUT
      10 FORMAT(" ",T56,A4,"DEPLETED",4X,A4,"DEPLETED",4X,A4,"DEPLETED")      PTSOUT
         JA=1                                                                  PTSOUT
         DO 51    I=1,NPTYPE                                                   PTSOUT
         NP = NPOINT(I)                                                        PTSOUT
         DO 51   N=1,NP                                                        PTSOUT
         K = KDIR(I,N)                                                         PTSOUT
         DMETRS=PTDIST(I,N)                                                    VERS2
         DMILES=PTDIST(I ,N)/1609.347219                                       VERS2
     150 CONTINUE                                                              PTSOUT
         PRINT 11,RLSID(IEX),(TITLPT(I,J),J=1,4),COMP(K),DMILES,               VERS2
        1            DMETRS, (SAVEQS(I,N,L),  L=1,4)                         PTSOUT
      11 FORMAT(" ",3X,A1,5X,4A4,3X,A4,6X,F6.2,3X,F6.0,6X,4(1PE7.1,9X))       PTSOUT
         IF(KOPT(7).EQ.1) PUNCH 22,RLSID(IEX),(TITLPT(I,J),J=1,4)              VERS2
        1                  ,COMP(K),PTDIST(I,N), (SAVEQS(I,N,L), L=1,4)      PTSOUT
      22 FORMAT(T3,A1,1X,4A4,T19,A4,F7.2,1P4E10.3)                            PTSOUT
      51 CONTINUE                                                             PTSOUT
      55 CONTINUE                                                             VERS2
         CALL PRNTIN                                                          PTSOUT
         RETURN                                                               PTSOUT
         END                                                                  PTSOUT
         SUBROUTINE PRNTIN                                                    PRNTIN
          COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                        BLANK
        1     ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                      BLANK
        2     ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)                  BLANK
        3     ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                      BLANK
        4      ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)                 BLANK
        5     ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)                BLANK
        6      ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)            BLANK
        7      ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                         BLANK
        8         ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL            BLANK
        9      ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)           BLANK
        1      ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                         BLANK
         URE=W*0.2                                                            PRNTIN
         ARGU=PLEV/WINDHT                                                     PRNTIN
         STABLE=SQRT(ARGU)                                                    PRNTIN
         UNSTBL=SQRT(STABLE)                                                  PRNTIN
         UES=URE*STABLE                                                       PRNTIN
         UGS=W*STABLE                                                         PRNTIN
         UEU=URE*UNSTBL                                                       PRNTIN
         UGU=W*UNSTBL                                                         PRNTIN
         PRINT 1, HS,WINDHT,DIA,D,W,A,Q                                       PRNTIN
        1 FORMAT("0VENT AND BUILDING PARAMETERS:"/                            PRNTIN
        1       "     RELEASE HEIGHT  (METERS)",F8.2,19X,"REP. WIND HEIGHT"   PRNTIN
        2   ,7X,"(METERS)",F11.1/                                             PRNTIN
        3       "     DIAMETER        (METERS)",F8.2,19X,"BUILDING HEIGHT"    PRNTIN
        4   ,8X,"(METERS)",F11.1/                                             PRNTIN
        5       "     EXIT VELOCITY   (METERS)",F8.2,19X,"BLDG.MIN.CRS.SEC"   PRNTIN
        6      ,".AREA  (SQ.METERS)",F8.1/                                    PRNTIN
        7   1H ,T57,"HEAT EMISSION RATE     (CAL/SEC)",F10.1)                 PRNTIN
         IF(LSTACK.EQ.1)   GO TO 3                                            PRNTIN
         IF(W.LT.0.1)   GO TO 4                                               PRNTIN
         PRINT 2, PLEV,URE,UES,UEU,URE,W,UES,UGS,UEU,UGU,W,UGS,UGU            PRNTIN
        2 FORMAT("0AT THE RELEASE HEIGHT:",T50,"'  AT THE MEASURED WIND "     PRNTIN
        1      ,"HEIGHT (",F5.1," METERS):"/                                  PRNTIN
        2       " VENT RELEASE MODE   WIND SPEED (METERS/SEC)     ' "         PRNTIN
        3      ," VENT RELEASE MODE   WIND SPEED (METERS/SEC)",               PRNTIN
        4                      "      WIND SPEED (METERS/SEC)"/" ",T50,"'"    PRNTIN
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     5      ,T73,"STABLE CONDITIONS",T103,"UNSTABLE/NEUTRAL CONDITIONS"/ PRNTIN
     6       "     ELEVATED        LESS THAN",F7.3,T50,"'      ELEVATED" PRNTIN
     7  ,T73,"LESS THAN",F7.3,14X,"LESS THAN",F7.3/                       PRNTIN
     8       "     MIXED           BETWEEN",F9.3," AND",F7.3," ' "       PRNTIN
     9      ,"     MIXED           BETWEEN",F9.3," AND",F7.3,             PRNTIN
     1                          "   BETWEEN",F9.3," AND",F7.3/            PRNTIN
     2       "     GROUND LEVEL    ABOVE",F11.3,T50,"' "                 PRNTIN
     3     , "     GROUND LEVEL    ABOVE",F11.3,14X,                     PRNTIN
     4                            "ABOVE",F11.3)                        PRNTIN
      RETURN                                                             PRNTIN
    3 PRINT 10                                                           PRNTIN
   10 FORMAT("0ALL ELEVATED RELEASES.")                                  PRNTIN
      RETURN                                                             PRNTIN
    4 PRINT 11                                                           PRNTIN
   11 FORMAT("0ALL GROUND LEVEL RELEASES.")                              PRNTIN
      RETURN                                                             PRNTIN
      END                                                                PRNTIN
      SUBROUTINE INTCOM                                                  INTCOM
       COMMON DEPADJ(4704),DPLTAD(4704),XQ(16,14,7)                      BLANK
     1     ,EFF(16,14,7),FREQ(16,14,7),SAVEQS(8,30,5)                    BLANK
     2     ,DIST(16,10),HT(16,10),KDIR(8,30),PTDIST(8,30)                BLANK
     3     ,TITLE(5,20),FQ(14,7),TITLPT(8,4),KOPT(80)                    BLANK
     4      ,BDY(16), DMX(16), XMX(16), COMP(16), FORD(14)               BLANK
     5     ,UAVE(14),IPURGE(5),RLSID(5),NPOINT(8),DECAYS(3)              BLANK
     6      ,W, DIA, HS, WINDHT, D, A, Q, PLEV,COR(7),XPO(1764)          BLANK
     7      ,UGU,UGS,UES,UEU,URE,C,NDIR,IEX,NPTYPE                       BLANK
     8         ,FQ15(100),NSTA,NUM,NDIS,UMAX(14),XQ15(100),NVEL          BLANK
     9      ,UMAXEL(14,7),UMAXGL(14,7),UAVEEL(14,7),UAVEGL(14,7)         BLANK
     1      ,VRDIST(16,10),VRCR(16,10),NCOR,LSTACK                       BLANK
      DIMENSION XOMP(16)                                                 INTCOM
      DATA XOMP/"   S"," SSW","  SW"," WSW","   W"," WNW","  NW"," NNW"  INTCOM
     X,"   N"," NNE","  NE"," ENE","   E"," ESE","  SE"," SSE"/         INTCOM
      DO 10   I= 1,16                                                    INTCOM
   10 COMP(I) = XOMP(I)                                                  INTCOM
      RETURN                                                             INTCOM
      END                                                                INTCOM
```

APPENDIX B

APPENDIX B

Three test cases were run for the program. The cases considered were:

Mixed Mode Release with Purge and Continuous Ground Level Release. Terrain heights inputted along with specific points of interest. Open terrain recirculation (Test Case 1);

Continuous Elevated Release. Terrain heights inputted along with specific points of interest (Test Case 2), and

Mixed Mode Continuous Release. Site specific recirculation factors inputted (Test Case 3).

A listing of the input cards for each case is given in this appendix. Appendix C provides the output.

```
1.      1010000010000
2.      XOQDOQ - TEST CASE  #1
3.           5     7     3     5     3     2     0
4.        10.0  101. 2.26 -8.0     0
5.           0     0     4     4     4     4     4
6.           0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
7.           0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
8.           0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
9.           0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
10.          0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
11.          0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
12.          0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
13.          0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
14.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
15.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
16.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
17.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
18.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
19.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
20.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
21.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
22.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
23.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
24.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
25.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
26.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
27.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
28.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
29.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
30.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
31.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
32.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
33.          1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
34.         -1   1.0   2.0   4.0   8.0  16.0
35.        100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100   100
36.          0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
37.        800   800   800   800   800   800   800   800   800   800   800   800   800   800   800   800   800
38.         16    16    16    16    16    16    16    16    16    16    16    16    16    16    16    16    16
39.      10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000 10000
40.        200   200   200   200   200   200   200   200   200   200   200   200   200   200   200   200   200
41.          3     3     2
42.      SITE BOUNDARY
43.           1  805     1  966     1 1127
44.      COWS
45.           1 1931     8 4989    16 4345
46.      RESIDENCES
47.           1 1931     8 6437
48.      EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
49.        10.0  2.0 45.0 40.02000. 45.0  0.0
50.      A    1   25     4
51.      EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
52.          0.0  0.0 30.0 25.0 900. 10.0  0.0
53.      B    0     0     0
```

```
101000000000
XOQDOQ - TEST CASE  #2
    5    7    3    5    3    1    0
 10.0 101. 2.26 -8.0    0
    0    0    4    4    4    4    4
    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    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    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    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
    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
    1    0    0    0    0    0    0    2    0    0    0    0    0    0    0    1
   -1  1.0  2.0  4.0  8.0 16.0
  100  100  100  100  100  100  100  100  100  100  100  100  100  100  100  100
    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0    0
  800  800  800  800  800  800  800  800  800  800  800  800  800  800  800  800
   16   16   16   16   16   16   16   16   16   16   16   16   16   16   16   16
10000100001000010000100001000010000100001000010000100001000010000100001000010000
  200  200  200  200  200  200  200  200  200  200  200  200  200  200  200  200
    3    3    2
SITE BOUNDARY
    1  805    1  966    1 1127
COWS
    1 1931    8 4989   16 4345
RESIDENCES
    1 1931    8 6437
EXIT ONE - CONTINUOUS ELEVATED RELEASE
 10.0  2.0-45.0 40.02000. 45.0  0.0
B    0    0    0
```

```
 1.  10100000100
 2.  XOQDOQ - TEST CASE  #3
 3.       5     7     0     5     3     1     4
 4.    10.0  101.  2.26 -8.0     0
 5.       0     0     4     4     4     4     4
 6.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
 7.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
 8.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
 9.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
10.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
11.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
12.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
13.       0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0     0
14.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
15.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
16.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
17.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
18.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
19.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
20.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
21.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
22.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
23.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
24.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
25.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
26.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
27.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
28.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
29.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
30.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
31.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
32.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
33.       1     0     0     0     0     0     0     2     0     0     0     0     0     0     0     0     1
34.      -1   1.0   2.0   4.0   8.0  16.0
35.     10.   10.   10.   10.   10.   10.   10.   10.   10.   10.   10.   10.   10.   10.   10.   10.
36.     4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
37.   6437  6437  6437  6437  6437  6437  6437  6437  6437  6437  6437  6437  6437  6437  6437  6437
38.     4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.    4.
39.   8047  8047  8047  8047  8047  8047  8047  8047  8047  8047  8047  8047  8047  8047  8047  8047
40.    2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0   2.0
41.  9656.9656.9656.9656.9656.9656.9656.9656.9656.9656.9656.9656.9656.9656.9656.9656.
42.     1.    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.    1.
43.       3     3     2
44.  SITE BOUNDARY
45.       1  805     1  966     1 1127
46.  COWS
47.       1 1931     8 4989    16 4345
48.  RESIDENCES
49.       1 1931     8 6437
50.  EXIT ONE -  ONE-MIXED MODE RELEASE
51.    10.0   2.0 45.0 40.02000. 45.0   0.0
52.  A    0     0      0
```

APPENDIX C

APPENDIX C

Output from test case runs are provided in this appendix.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0   RUN DATE: MONDAY   AUGUST 9, 1982

PRINTOUT OF INPUT CARDS

```
    1      10100 00100 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
    2      XOQDOQ - TEST CASE  #1
    3         5     7     3     5     3     2     0
    4       10.00 101.00   2.26  -8.00   0.0
    5       0.0    0.0    4.000  4.000  4.000  4.000  4.000
    6       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    0.0    0.0
    6       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    0.0    0.0
    6       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    0.0    0.0
    6       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    0.0    0.0
    6       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    0.0    0.0
    6       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    0.0    0.0
    6       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    0.0    0.0
    6       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    0.0    0.0
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
    7         -1.   1.000  2.000  4.000  8.000 16.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
VRDIST,VRCR NOT INPUTTED.
   10        100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.
   11          0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.
   10        800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.
   11         16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.
   10      10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000.
   11        200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.
   12         3     3     2
   13      SITE BOUNDARY
   14        1  805.0  1   966.0   1 1127.0
   13      COWS
   14        1 1931.0  8 4989.0 16 4345.0
   13      RESIDENCES
   14        1 1931.0  8 6437.0
   15      EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
   16       10.000  2.000    45.0    40.0 2000.0    45.0  0.0
   17      A   1   25    4
   15      EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
   16        0.0    0.0      30.0    25.0  900.0    10.0  0.0
   17      B   0    0    0
```

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS A

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	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	0.0	0.0	0.0
2.00	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	0.0	0.0	0.0
4.00	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	0.0	0.0	0.0
8.00	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	0.0	0.0	0.0
16.00	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	0.0	0.0	0.0
TOTAL	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	0.0	0.0	0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS B

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	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	0.0	0.0	0.0
2.00	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	0.0	0.0	0.0
4.00	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	0.0	0.0	0.0
8.00	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	0.0	0.0	0.0
16.00	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	0.0	0.0	0.0
TOTAL	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	0.0	0.0	0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS C

(M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
10	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
10	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS D

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS E

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS F

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS G

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

TOTAL HOURS CONSIDERED ARE 100

WIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	25.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	100.0

?ALL WIND SPEED FREQUENCY

WIND SPEED (M/S):	1.000	2.000	4.000	8.000	16.000
WIND SPEED (M/S):	0.500	1.500	3.000	6.000	12.000
J SPEED FREQUENCY:	20.00	20.00	20.00	20.00	20.00

DISTANCES AND TERRAIN HEIGHTS IN METERS AS FUNCTIONS OF DIRECTION FROM THE SITE:

DIRECTION =	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
DISTANCE	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
ELEVATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DISTANCE	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.
ELEVATION	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
DISTANCE	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.
ELEVATION	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
NO DECAY, UNDEPLETED
CORRECTED USING STANDARD OPEN TERRAIN FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.616E-05	9.857E-06	7.264E-06	5.459E-06	4.084E-06	2.611E-06	1.664E-06	1.164E-06	8.660E-07	6.740E-07	5.431E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	5.233E-05	1.971E-05	1.453E-05	1.092E-05	8.169E-06	5.222E-06	3.328E-06	2.327E-06	1.732E-06	1.348E-06	1.086E-06
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.616E-05	9.857E-06	7.264E-06	5.459E-06	4.084E-06	2.611E-06	1.664E-06	1.164E-06	8.660E-07	6.740E-07	5.431E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	4.499E-07	2.327E-07	1.519E-07	8.856E-08	6.095E-08	4.574E-08	3.624E-08	2.979E-08	2.517E-08	2.170E-08	1.901E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	8.997E-07	4.653E-07	3.039E-07	1.771E-07	1.219E-07	9.149E-08	7.248E-08	5.959E-08	5.033E-08	4.339E-08	3.802E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	4.499E-07	2.327E-07	1.519E-07	8.856E-08	6.095E-08	4.574E-08	3.624E-08	2.979E-08	2.517E-08	2.170E-08	1.901E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
NO DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE .5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	7.038E-06	3.735E-06	1.716E-06	8.779E-07	5.474E-07	2.451E-07	9.038E-08	4.600E-08	2.987E-08	2.173E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.408E-05	7.470E-06	3.433E-06	1.756E-06	1.095E-06	4.901E-07	1.808E-07	9.200E-08	5.975E-08	4.346E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	7.038E-06	3.735E-06	1.716E-06	8.779E-07	5.474E-07	2.451E-07	9.038E-08	4.600E-08	2.987E-08	2.173E-08

RAGE EFFECTIVE STACK HEIGHT IN METERS FOR EACH SEGMENT

ECTION 1 SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	2.845E+01	1.237E+01	3.786E+00	1.098E+00	0.0	0.0	0.0	0.0	0.0	0.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.845E+01	1.237E+01	3.786E+00	1.098E+00	0.0	0.0	0.0	0.0	0.0	0.0
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.845E+01	1.237E+01	3.786E+00	1.098E+00	0.0	0.0	0.0	0.0	0.0	0.0

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
2.260 DAY DECAY, UNDEPLETED
CORRECTED USING STANDARD OPEN TERRAIN FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.616E-05	9.848E-06	7.250E-06	5.443E-06	4.062E-06	2.591E-06	1.648E-06	1.150E-06	8.540E-07	6.634E-07	5.336E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	5.231E-05	1.970E-05	1.450E-05	1.089E-05	8.124E-06	5.182E-06	3.295E-06	2.299E-06	1.708E-06	1.327E-06	1.067E-06
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.616E-05	9.848E-06	7.250E-06	5.443E-06	4.062E-06	2.591E-06	1.648E-06	1.150E-06	8.540E-07	6.634E-07	5.336E-07

'JAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

ECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	4.411E-07	2.260E-07	1.462E-07	8.362E-08	5.649E-08	4.161E-08	3.237E-08	2.613E-08	2.167E-08	1.835E-08	1.580E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	8.822E-07	4.519E-07	2.923E-07	1.672E-07	1.130E-07	8.322E-08	6.473E-08	5.226E-08	4.335E-08	3.671E-08	3.159E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	4.411E-07	2.260E-07	1.462E-07	8.362E-08	5.649E-08	4.161E-08	3.237E-08	2.613E-08	2.167E-08	1.835E-08	1.580E-08

C.7

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)	
ELEVATED	LESS THAN	2.000
MIXED	BETWEEN	2.000 AND 10.000
GROUND LEVEL	ABOVE	10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS			WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS		
ELEVATED	LESS THAN	0.943		LESS THAN	1.373	
MIXED	BETWEEN	0.943 AND	4.714	BETWEEN	1.373 AND	6.866
GROUND LEVEL	ABOVE	4.714		ABOVE	6.866	

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
2.260 DAY DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	7.024E-06	3.715E-06	1.700E-06	8.659E-07	5.378E-07	2.383E-07	8.546E-08	4.188E-08	2.621E-08	1.839E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.405E-05	7.430E-06	3.400E-06	1.732E-06	1.076E-06	4.766E-07	1.709E-07	8.376E-08	5.243E-08	3.678E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	7.024E-06	3.715E-06	1.700E-06	8.659E-07	5.378E-07	2.383E-07	8.546E-08	4.188E-08	2.621E-08	1.839E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
8.000 DAY DECAY, DEPLETED
CORRECTED USING STANDARD OPEN TERRAIN FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.478E-05	9.125E-06	6.756E-06	5.146E-06	3.909E-06	2.461E-06	1.539E-06	1.058E-06	7.748E-07	5.942E-07	4.722E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.956E-05	1.825E-05	1.351E-05	1.029E-05	7.818E-06	4.923E-06	3.077E-06	2.115E-06	1.550E-06	1.188E-06	9.444E-07
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.478E-05	9.125E-06	6.756E-06	5.146E-06	3.909E-06	2.461E-06	1.539E-06	1.058E-06	7.748E-07	5.942E-07	4.722E-07

UAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

ECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	3.861E-07	1.897E-07	1.186E-07	6.434E-08	4.177E-08	2.980E-08	2.256E-08	1.780E-08	1.447E-08	1.203E-08	1.019E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	7.722E-07	3.794E-07	2.371E-07	1.287E-07	8.354E-08	5.960E-08	4.513E-08	3.560E-08	2.894E-08	2.407E-08	2.038E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.861E-07	1.897E-07	1.186E-07	6.434E-08	4.177E-08	2.980E-08	2.256E-08	1.780E-08	1.447E-08	1.203E-08	1.019E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
8.000 DAY DECAY, DEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	6.567E-06	3.541E-06	1.592E-06	7.868E-07	4.764E-07	2.017E-07	6.636E-08	3.010E-08	1.789E-08	1.207E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.313E-05	7.081E-06	3.185E-06	1.574E-06	9.529E-07	4.035E-07	1.327E-07	6.019E-08	3.578E-08	2.414E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	6.567E-06	3.541E-06	1.592E-06	7.868E-07	4.764E-07	2.017E-07	6.636E-08	3.010E-08	1.789E-08	1.207E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
CORRECTED USING STANDARD OPEN TERRAIN FACTORS
********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) AT FIXED POINTS BY DOWNWIND SECTORS **********

DIRECTION FROM SITE	DISTANCES IN MILES 0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
S	2.860E-07	1.105E-07	5.833E-08	2.903E-08	1.518E-08	8.946E-09	5.279E-09	3.480E-09	2.504E-09	1.856E-09	1.430E-09
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	5.721E-07	2.209E-07	1.167E-07	5.806E-08	3.037E-08	1.789E-08	1.056E-08	6.960E-09	5.009E-09	3.712E-09	2.860E-09
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.860E-07	1.105E-07	5.833E-08	2.903E-08	1.518E-08	8.946E-09	5.279E-09	3.480E-09	2.504E-09	1.856E-09	1.430E-09

DIRECTION FROM SITE	DISTANCES IN MILES 5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
S	1.136E-09	5.048E-10	3.058E-10	1.545E-10	9.354E-11	6.272E-11	4.494E-11	3.374E-11	2.624E-11	2.096E-11	1.711E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.272E-09	1.010E-09	6.115E-10	3.091E-10	1.871E-10	1.254E-10	8.988E-11	6.749E-11	5.247E-11	4.192E-11	3.421E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	1.136E-09	5.048E-10	3.058E-10	1.545E-10	9.354E-11	6.272E-11	4.494E-11	3.374E-11	2.624E-11	2.096E-11	1.711E-11

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) BY DOWNWIND SECTORS **********

SEGMENT BOUNDARIES IN MILES

DIRECTION FROM SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	5.689E-08	1.549E-08	5.537E-09	2.536E-09	1.447E-09	5.566E-10	1.610E-10	6.382E-11	3.408E-11	2.110E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.138E-07	3.098E-08	1.107E-08	5.072E-09	2.895E-09	1.113E-09	3.221E-10	1.276E-10	6.817E-11	4.219E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	5.689E-08	1.549E-08	5.537E-09	2.536E-09	1.447E-09	5.566E-10	1.610E-10	6.382E-11	3.408E-11	2.110E-11

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A SITE BOUNDARY DIRECTION: S DISTANCE: 0.50 MILES (805. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

3.453E-05	2.405E-05	2.294E-05	1.943E-05	1.590E-05	1.525E-05	1.301E-05	1.296E-05	1.202E-05	1.187E-05
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
1.018E-05	1.015E-05	1.004E-05	9.082E-06	8.431E-06	7.948E-06	7.474E-06	6.478E-06	5.996E-06	5.074E-06
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
4.420E-06	3.300E-06	2.998E-06	2.263E-06	2.061E-06	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
7.324E-05	1.000
4.215E-05	3.000
3.310E-05	5.000
2.409E-05	10.000
2.002E-05	15.000
1.750E-05	20.000
1.571E-05	25.000
1.430E-05	30.000
1.314E-05	35.000
1.213E-05	40.000
1.123E-05	45.000
1.040E-05	50.000
9.621E-06	55.000
8.865E-06	60.000
8.120E-06	65.000
7.368E-06	70.000
6.593E-06	75.000
5.771E-06	80.000

THE 5TH PERCENTILE IS: 3.31E-05

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A SITE BOUNDARY DIRECTION: S DISTANCE: 0.60 MILES (966. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

2.489E-05	1.842E-05	1.732E-05	1.545E-05	1.289E-05	1.256E-05	1.099E-05	9.972E-06	9.754E-06	9.699E-06
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
9.686E-06	8.662E-06	8.564E-06	7.747E-06	7.601E-06	6.963E-06	6.278E-06	5.761E-06	4.986E-06	4.383E-06
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
4.288E-06	3.800E-06	2.424E-06	2.381E-06	2.144E-06	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
5.253E-05	1.000
3.027E-05	3.000
2.410E-05	5.000
1.815E-05	10.000
1.551E-05	15.000
1.388E-05	20.000
1.269E-05	25.000
1.175E-05	30.000
1.094E-05	35.000
1.022E-05	40.000
9.553E-06	45.000
8.911E-06	50.000
8.280E-06	55.000
7.644E-06	60.000
6.992E-06	65.000
6.310E-06	70.000
5.583E-06	75.000
4.793E-06	80.000

THE 5TH PERCENTILE IS: 2.41E-05

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A SITE BOUNDARY DIRECTION: S DISTANCE: 0.70 MILES (1127. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

1.869E-05	1.539E-05	1.292E-05	1.271E-05	1.174E-05	1.018E-05	9.678E-06	9.618E-06	9.392E-06	8.309E-06
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
8.229E-06	7.959E-06	7.952E-06	6.937E-06	6.464E-06	6.461E-06	5.953E-06	5.090E-06	4.518E-06	3.980E-06
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
3.915E-06	3.221E-06	2.976E-06	1.864E-06	1.610E-06	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
3.527E-05	1.000
2.195E-05	3.000
1.817E-05	5.000
1.445E-05	10.000
1.276E-05	15.000
1.169E-05	20.000
1.088E-05	25.000
1.021E-05	30.000
9.612E-06	35.000
9.056E-06	40.000
8.517E-06	45.000
7.981E-06	50.000
7.435E-06	55.000
6.869E-06	60.000
6.273E-06	65.000
5.638E-06	70.000
4.950E-06	75.000
4.197E-06	80.000

THE 5TH PERCENTILE IS: 1.82E-05

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A COWS DIRECTION: S DISTANCE: 1.20 MILES (1931. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

1.413E-05	1.220E-05	1.175E-05	1.061E-05	1.044E-05	9.690E-06	9.197E-06	8.372E-06	7.415E-06	6.651E-06
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
6.158E-06	6.054E-06	5.925E-06	4.861E-06	3.765E-06	3.533E-06	3.296E-06	3.079E-06	2.529E-06	2.430E-06
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
1.767E-06	1.750E-06	1.265E-06	1.170E-06	5.850E-07	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
1.463E-05	1.000
1.471E-05	3.000
1.430E-05	5.000
1.308E-05	10.000
1.193E-05	15.000
1.087E-05	20.000
9.889E-06	25.000
8.983E-06	30.000
8.137E-06	35.000
7.341E-06	40.000
6.589E-06	45.000
5.875E-06	50.000
5.194E-06	55.000
4.544E-06	60.000
3.920E-06	65.000
3.319E-06	70.000
2.740E-06	75.000
2.179E-06	80.000

THE 5TH PERCENTILE IS: 1.43E-05

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A COWS DIRECTION: NNW DISTANCE: 3.10 MILES (4989. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

8.948E-06	5.576E-06	4.917E-06	3.468E-06	3.336E-06	3.149E-06	3.143E-06	2.288E-06	1.985E-06	1.889E-06
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
1.635E-06	1.489E-06	1.324E-06	1.058E-06	9.445E-07	8.694E-07	8.527E-07	6.620E-07	5.631E-07	5.518E-07
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
4.347E-07	2.883E-07	2.816E-07	1.923E-07	9.617E-08	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
1.844E-05	1.000
1.103E-05	3.000
8.569E-06	5.000
5.909E-06	10.000
4.624E-06	15.000
3.804E-06	20.000
3.212E-06	25.000
2.752E-06	30.000
2.377E-06	35.000
2.062E-06	40.000
1.790E-06	45.000
1.551E-06	50.000
1.337E-06	55.000
1.144E-06	60.000
9.671E-07	65.000
8.042E-07	70.000
6.525E-07	75.000
5.104E-07	80.000

THE 5TH PERCENTILE IS: 8.57E-06

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A COWS DIRECTION: SSE DISTANCE: 2.70 MILES (4345. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

1.082E-05	6.799E-06	5.923E-06	4.264E-06	3.975E-06	3.917E-06	3.830E-06	2.766E-06	2.437E-06	2.243E-06
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
2.038E-06	1.822E-06	1.598E-06	1.378E-06	1.121E-06	1.063E-06	1.062E-06	7.988E-07	7.185E-07	7.000E-07
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
5.316E-07	3.753E-07	3.500E-07	2.503E-07	1.252E-07	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
2.202E-05	1.000
1.337E-05	3.000
1.043E-05	5.000
7.221E-06	10.000
5.656E-06	15.000
4.655E-06	20.000
3.931E-06	25.000
3.370E-06	30.000
2.913E-06	35.000
2.529E-06	40.000
2.198E-06	45.000
1.907E-06	50.000
1.648E-06	55.000
1.414E-06	60.000
1.200E-06	65.000
1.002E-06	70.000
8.181E-07	75.000
6.452E-07	80.000

THE 5TH PERCENTILE IS: 1.04E-05

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A RESIDENCES DIRECTION: S DISTANCE: 1.20 MILES (1931. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

1.413E-05	1.220E-05	1.175E-05	1.061E-05	1.044E-05	9.690E-06	9.197E-06	8.372E-06	7.415E-06	6.651E-06
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
6.158E-06	6.054E-06	5.925E-06	4.861E-06	3.765E-06	3.533E-06	3.296E-06	3.079E-06	2.529E-06	2.430E-06
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
1.767E-06	1.750E-06	1.265E-06	1.170E-06	5.850E-07	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
1.463E-05	1.000
1.471E-05	3.000
1.430E-05	5.000
1.308E-05	10.000
1.193E-05	15.000
1.087E-05	20.000
9.889E-06	25.000
8.983E-06	30.000
8.137E-06	35.000
7.341E-06	40.000
6.589E-06	45.000
5.875E-06	50.000
5.194E-06	55.000
4.544E-06	60.000
3.920E-06	65.000
3.319E-06	70.000
2.740E-06	75.000
2.179E-06	80.000

THE 5TH PERCENTILE IS: 1.43E-05

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQD
SHORT TERM X/Q CALCULATION- MIXED MODE RELEASE
SECTOR SPREAD VALUE CALCULATED

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
ID:A RESIDENCES DIRECTION: NNW DISTANCE: 4.00 MILES (6437. METERS)

BELOW ARE PRINTED THE ORDERED VALUES OF CHI/Q AND THE FREQENCY WITH WHICH THAT VALUE IS REACHED OR EXCEEDED.

6.339E-06	3.888E-06	3.506E-06	2.420E-06	2.380E-06	2.204E-06	2.098E-06	1.617E-06	1.378E-06	1.365E-06
4.000	8.000	12.000	16.000	20.000	24.000	28.000	32.000	36.000	40.000
1.092E-06	1.028E-06	9.384E-07	6.889E-07	6.504E-07	6.014E-07	5.698E-07	4.692E-07	3.774E-07	3.391E-07
44.000	48.000	52.000	56.000	60.000	64.000	68.000	72.000	76.000	80.000
3.007E-07	1.887E-07	1.772E-07	1.183E-07	5.913E-08	0.0	0.0	0.0	0.0	0.0
84.000	88.000	92.000	96.000	100.000	0.0	0.0	0.0	0.0	0.0

LEAST SQUARES FIT:

CHI/Q SEC/METER CUBED	PERCENT OF TIME REACHED OR EXCEEDED
1.237E-05	1.000
7.489E-06	3.000
5.833E-06	5.000
4.017E-06	10.000
3.133E-06	15.000
2.569E-06	20.000
2.161E-06	25.000
1.845E-06	30.000
1.589E-06	35.000
1.374E-06	40.000
1.189E-06	45.000
1.028E-06	50.000
8.838E-07	55.000
7.544E-07	60.000
6.367E-07	65.000
5.286E-07	70.000
4.285E-07	75.000
3.351E-07	80.000

THE 5TH PERCENTILE IS: 5.83E-06

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT ONE - MIXED MODE RELEASE - WITH PURGE RELEASES
INTERMITTENT RELEASE CALCULATIONS
CORRECTED USING STANDARD OPEN TERRAIN FACTORS
SPECIFIC POINTS OF INTEREST

RELEASE ID	TYPE OF LOCATION	DIRECTION FROM SITE	DISTANCE (MILES)	DISTANCE (METERS)	X/Q (SEC/CUB.METER) NO DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 2.260 DAY DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 8.000 DAY DECAY DEPLETED	D/Q (PER SQ.METER)
A	SITE BOUNDARY	S	0.50	805.	1.8E-05	1.8E-05	1.7E-05	2.0E-07
A	SITE BOUNDARY	S	0.60	966.	1.4E-05	1.4E-05	1.3E-05	1.4E-07
A	SITE BOUNDARY	S	0.70	1127.	1.2E-05	1.2E-05	1.1E-05	1.0E-07
A	COWS	S	1.20	1931.	8.3E-06	8.2E-06	7.9E-06	3.1E-08
A	COWS	NNW	3.10	4989.	4.3E-06	4.2E-06	3.9E-06	1.3E-08
A	COWS	SSE	2.70	4345.	3.8E-06	3.8E-06	3.5E-06	1.2E-08
A	RESIDENCES	S	1.20	1931.	8.3E-06	8.2E-06	7.9E-06	3.1E-08
A	RESIDENCES	NNW	4.00	6437.	2.8E-06	2.7E-06	2.4E-06	7.6E-09

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

T RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

TOTAL NUMBER OF PURGES: 25
HOURS PER PURGE: 4

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
NO DECAY, UNDEPLETED
CORRECTED USING STANDARD OPEN TERRAIN FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.447E-04	8.110E-05	4.366E-05	2.180E-05	8.571E-06	4.601E-06	2.906E-06	2.026E-06	1.509E-06	1.177E-06	9.517E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.893E-04	1.622E-04	8.733E-05	4.361E-05	1.714E-05	9.202E-06	5.812E-06	4.052E-06	3.017E-06	2.355E-06	1.903E-06
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.447E-04	8.110E-05	4.366E-05	2.180E-05	8.571E-06	4.601E-06	2.906E-06	2.026E-06	1.509E-06	1.177E-06	9.517E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	7.903E-07	4.122E-07	2.706E-07	1.586E-07	1.094E-07	8.229E-08	6.528E-08	5.373E-08	4.542E-08	3.919E-08	3.436E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.581E-06	8.244E-07	5.411E-07	3.172E-07	2.189E-07	1.646E-07	1.306E-07	1.075E-07	9.084E-08	7.838E-08	6.871E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	7.903E-07	4.122E-07	2.706E-07	1.586E-07	1.094E-07	8.229E-08	6.528E-08	5.373E-08	4.542E-08	3.919E-08	3.436E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	30.00	REP. WIND HEIGHT	(METERS)	10.0
DIAMETER	(METERS)	0.0	BUILDING HEIGHT	(METERS)	25.0
EXIT VELOCITY	(METERS)	0.0	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	900.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL GROUND LEVEL RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
NO DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	4.227E-05	9.748E-06	3.006E-06	1.530E-06	9.588E-07	4.333E-07	1.616E-07	8.273E-08	5.386E-08	3.925E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	8.454E-05	1.950E-05	6.012E-06	3.060E-06	1.918E-06	8.665E-07	3.233E-07	1.655E-07	1.077E-07	7.849E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	4.227E-05	9.748E-06	3.006E-06	1.530E-06	9.588E-07	4.333E-07	1.616E-07	8.273E-08	5.386E-08	3.925E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
2.260 DAY DECAY, UNDEPLETED
CORRECTED USING STANDARD OPEN TERRAIN FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.442E-04	8.077E-05	4.340E-05	2.163E-05	8.469E-06	4.528E-06	2.848E-06	1.978E-06	1.467E-06	1.140E-06	9.179E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.883E-04	1.615E-04	8.680E-05	4.326E-05	1.694E-05	9.056E-06	5.696E-06	3.955E-06	2.933E-06	2.280E-06	1.836E-06
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.442E-04	8.077E-05	4.340E-05	2.163E-05	8.469E-06	4.528E-06	2.848E-06	1.978E-06	1.467E-06	1.140E-06	9.179E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	7.592E-07	3.882E-07	2.498E-07	1.408E-07	9.349E-08	6.766E-08	5.169E-08	4.099E-08	3.340E-08	2.779E-08	2.351E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.518E-06	7.764E-07	4.996E-07	2.817E-07	1.870E-07	1.353E-07	1.034E-07	8.198E-08	6.681E-08	5.559E-08	4.702E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	7.592E-07	3.882E-07	2.498E-07	1.408E-07	9.349E-08	6.766E-08	5.169E-08	4.099E-08	3.340E-08	2.779E-08	2.351E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	30.00	REP. WIND HEIGHT	(METERS)	10.0
DIAMETER	(METERS)	0.0	BUILDING HEIGHT	(METERS)	25.0
EXIT VELOCITY	(METERS)	0.0	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	900.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL GROUND LEVEL RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
2.260 DAY DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	4.203E-05	9.642E-06	2.948E-06	1.488E-06	9.250E-07	4.091E-07	1.440E-07	6.816E-08	4.116E-08	2.787E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	8.406E-05	1.928E-05	5.896E-06	2.977E-06	1.850E-06	8.183E-07	2.880E-07	1.363E-07	8.231E-08	5.574E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	4.203E-05	9.642E-06	2.948E-06	1.488E-06	9.250E-07	4.091E-07	1.440E-07	6.816E-08	4.116E-08	2.787E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
8.000 DAY DECAY, DEPLETED
CORRECTED USING STANDARD OPEN TERRAIN FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.314E-04	7.398E-05	3.884E-05	1.904E-05	7.255E-06	3.793E-06	2.341E-06	1.598E-06	1.168E-06	8.957E-07	7.122E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.628E-04	1.480E-04	7.769E-05	3.809E-05	1.451E-05	7.585E-06	4.681E-06	3.196E-06	2.336E-06	1.791E-06	1.424E-06
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.314E-04	7.398E-05	3.884E-05	1.904E-05	7.255E-06	3.793E-06	2.341E-06	1.598E-06	1.168E-06	8.957E-07	7.122E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	5.824E-07	2.857E-07	1.777E-07	9.533E-08	6.109E-08	4.303E-08	3.218E-08	2.507E-08	2.013E-08	1.654E-08	1.384E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.165E-06	5.714E-07	3.554E-07	1.907E-07	1.222E-07	8.607E-08	6.435E-08	5.014E-08	4.026E-08	3.308E-08	2.768E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	5.824E-07	2.857E-07	1.777E-07	9.533E-08	6.109E-08	4.303E-08	3.218E-08	2.507E-08	2.013E-08	1.654E-08	1.384E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	30.00	REP. WIND HEIGHT	(METERS)	10.0
DIAMETER	(METERS)	0.0	BUILDING HEIGHT	(METERS)	25.0
EXIT VELOCITY	(METERS)	0.0	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	900.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL GROUND LEVEL RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
8.000 DAY DECAY, DEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	3.785E-05	8.336E-06	2.431E-06	1.187E-06	7.185E-07	3.036E-07	9.841E-08	4.351E-08	2.522E-08	1.661E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	7.570E-05	1.667E-05	4.862E-06	2.374E-06	1.437E-06	6.072E-07	1.968E-07	8.701E-08	5.044E-08	3.321E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.785E-05	8.336E-06	2.431E-06	1.187E-06	7.185E-07	3.036E-07	9.841E-08	4.351E-08	2.522E-08	1.661E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
CORRECTED USING STANDARD OPEN TERRAIN FACTORS
********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) AT FIXED POINTS BY DOWNWIND SECTORS **********

DIRECTION FROM SITE	DISTANCES IN MILES 0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
S	5.790E-07	1.958E-07	1.005E-07	4.779E-08	1.717E-08	8.514E-09	5.013E-09	3.283E-09	2.310E-09	1.712E-09	1.319E-09
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.158E-06	3.916E-07	2.011E-07	9.559E-08	3.434E-08	1.703E-08	1.003E-08	6.565E-09	4.619E-09	3.423E-09	2.638E-09
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	5.790E-07	1.958E-07	1.005E-07	4.779E-08	1.717E-08	8.514E-09	5.013E-09	3.283E-09	2.310E-09	1.712E-09	1.319E-09

DIRECTION FROM SITE	DISTANCES IN MILES 5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
S	1.048E-09	4.655E-10	2.820E-10	1.425E-10	8.627E-11	5.784E-11	4.145E-11	3.112E-11	2.420E-11	1.933E-11	1.578E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.096E-09	9.311E-10	5.640E-10	2.851E-10	1.725E-10	1.157E-10	8.289E-11	6.224E-11	4.840E-11	3.866E-11	3.155E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	1.048E-09	4.655E-10	2.820E-10	1.425E-10	8.627E-11	5.784E-11	4.145E-11	3.112E-11	2.420E-11	1.933E-11	1.578E-11

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) BY DOWNWIND SECTORS **********

SEGMENT BOUNDARIES IN MILES

DIRECTION FROM SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	9.826E-08	2.013E-08	5.254E-09	2.360E-09	1.335E-09	5.134E-10	1.485E-10	5.886E-11	3.143E-11	1.946E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.965E-07	4.025E-08	1.051E-08	4.720E-09	2.670E-09	1.027E-09	2.970E-10	1.177E-10	6.287E-11	3.891E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	9.826E-08	2.013E-08	5.254E-09	2.360E-09	1.335E-09	5.134E-10	1.485E-10	5.886E-11	3.143E-11	1.946E-11

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	30.00	REP. WIND HEIGHT	(METERS)	10.0
DIAMETER	(METERS)	0.0	BUILDING HEIGHT	(METERS)	25.0
EXIT VELOCITY	(METERS)	0.0	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	900.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL GROUND LEVEL RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: MONDAY AUGUST 9, 1982

XOQDOQ - TEST CASE #1

EXIT TWO - GROUND LEVEL RELEASE - NO PURGE RELEASES
CORRECTED USING STANDARD OPEN TERRAIN FACTORS
SPECIFIC POINTS OF INTEREST

RELEASE ID	TYPE OF LOCATION	DIRECTION FROM SITE	DISTANCE (MILES)	DISTANCE (METERS)	X/Q (SEC/CUB.METER) NO DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 2.260 DAY DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 8.000 DAY DECAY DEPLETED	D/Q (PER SQ.METER)
B	SITE BOUNDARY	S	0.50	805.	8.1E-05	8.1E-05	7.4E-05	2.0E-07
B	SITE BOUNDARY	S	0.60	966.	6.2E-05	6.1E-05	5.6E-05	1.5E-07
B	SITE BOUNDARY	S	0.70	1127.	4.9E-05	4.8E-05	4.3E-05	1.1E-07
B	COWS	S	1.20	1931.	1.4E-05	1.4E-05	1.2E-05	3.0E-08
B	COWS	NNW	3.10	4989.	3.8E-06	3.7E-06	3.0E-06	6.1E-09
B	COWS	SSE	2.70	4345.	2.5E-06	2.4E-06	2.0E-06	4.2E-09
B	RESIDENCES	S	1.20	1931.	1.4E-05	1.4E-05	1.2E-05	3.0E-08
B	RESIDENCES	NNW	4.00	6437.	2.4E-06	2.3E-06	1.8E-06	3.4E-09

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	30.00	REP. WIND HEIGHT	(METERS)	10.0
DIAMETER	(METERS)	0.0	BUILDING HEIGHT	(METERS)	25.0
EXIT VELOCITY	(METERS)	0.0	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	900.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL GROUND LEVEL RELEASES.

PRINTOUT OF INPUT CARDS

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   1      10100 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
   2      XOQDOQ - TEST CASE  #2
   3         5     7     3     5     3     1     0
   4        10.00 101.00   2.26  -8.00   0.0
   5        0.0    0.0    4.000  4.000  4.000  4.000  4.000
   6        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    0.0    0.0
   6        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    0.0    0.0
   6        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    0.0    0.0
   6        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    0.0    0.0
   6        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    0.0    0.0
   6        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    0.0    0.0
   6        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    0.0    0.0
   6        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    0.0    0.0
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6        1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   7          -1.   1.000  2.000  4.000  8.000 16.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
VRDIST,VRCR NOT INPUTTED.
  10        100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.   100.
  11          0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.     0.
  10        800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.   800.
  11         16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.    16.
  10      10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000. 10000.
  11        200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.   200.
  12         3     3     2
  13      SITE BOUNDARY
  14        1  805.0  1  966.0  1 1127.0
  13      COWS
  14        1 1931.0  8 4989.0 16 4345.0
  13      RESIDENCES
  14        1 1931.0  8 6437.0
  15      EXIT ONE - CONTINUOUS ELEVATED RELEASE
  16       10.000  2.000  -45.0   40.0 2000.0   45.0  0.0
  17      B    0     0     0
```

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS A

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	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	0.0	0.0	0.0
2.00	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	0.0	0.0	0.0
4.00	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	0.0	0.0	0.0
8.00	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	0.0	0.0	0.0
16.00	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	0.0	0.0	0.0
TOTAL	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	0.0	0.0	0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS B

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	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	0.0	0.0	0.0
2.00	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	0.0	0.0	0.0
4.00	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	0.0	0.0	0.0
8.00	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	0.0	0.0	0.0
16.00	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	0.0	0.0	0.0
TOTAL	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	0.0	0.0	0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS C

X (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS D

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS E

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS F

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS G

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

TOTAL HOURS CONSIDERED ARE 100

WIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	25.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	100.0

OVERALL WIND SPEED FREQUENCY

WIND SPEED (M/S):	1.000	2.000	4.000	8.000	16.000
WIND SPEED (M/S):	0.500	1.500	3.000	6.000	12.000
WIND SPEED FREQUENCY:	20.00	20.00	20.00	20.00	20.00

DISTANCES AND TERRAIN HEIGHTS IN METERS AS FUNCTIONS OF DIRECTION FROM THE SITE:

DIRECTION =	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
DISTANCE	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
ELEVATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DISTANCE	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.	800.
ELEVATION	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.	16.
DISTANCE	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.	10000.
ELEVATION	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.	200.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 ..UN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE
NO DECAY, UNDEPLETED

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.372E-07	6.713E-07	1.045E-06	1.377E-06	1.670E-06	1.322E-06	9.637E-07	7.438E-07	5.969E-07	4.929E-07	4.166E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.744E-07	1.343E-06	2.090E-06	2.754E-06	3.340E-06	2.643E-06	1.927E-06	1.488E-06	1.194E-06	9.858E-07	8.331E-07
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.372E-07	6.713E-07	1.045E-06	1.377E-06	1.670E-06	1.322E-06	9.637E-07	7.438E-07	5.969E-07	4.929E-07	4.166E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	3.588E-07	2.037E-07	1.374E-07	7.982E-08	5.484E-08	4.111E-08	3.254E-08	2.673E-08	2.257E-08	1.945E-08	1.703E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	7.175E-07	4.074E-07	2.748E-07	1.596E-07	1.097E-07	8.221E-08	6.507E-08	5.346E-08	4.513E-08	3.889E-08	3.406E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.588E-07	2.037E-07	1.374E-07	7.982E-08	5.484E-08	4.111E-08	3.254E-08	2.673E-08	2.257E-08	1.945E-08	1.703E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL ELEVATED RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE
NO DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE .5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	1.109E-06	1.450E-06	9.712E-07	5.993E-07	4.178E-07	2.087E-07	8.151E-08	4.134E-08	2.680E-08	1.948E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.219E-06	2.900E-06	1.942E-06	1.199E-06	8.356E-07	4.174E-07	1.630E-07	8.268E-08	5.361E-08	3.895E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	1.109E-06	1.450E-06	9.712E-07	5.993E-07	4.178E-07	2.087E-07	8.151E-08	4.134E-08	2.680E-08	1.948E-08

AVERAGE EFFECTIVE STACK HEIGHT IN METERS FOR EACH SEGMENT

ECTION M SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	3.392E+01	1.314E+01	3.786E+00	1.093E+00	0.0	0.0	0.0	0.0	0.0	0.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	3.392E+01	1.314E+01	3.786E+00	1.093E+00	0.0	0.0	0.0	0.0	0.0	0.0
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.392E+01	1.314E+01	3.786E+00	1.093E+00	0.0	0.0	0.0	0.0	0.0	0.0

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE
2.260 DAY DECAY, UNDEPLETED

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.371E-07	6.706E-07	1.043E-06	1.372E-06	1.661E-06	1.311E-06	9.539E-07	7.347E-07	5.884E-07	4.849E-07	4.090E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.743E-07	1.341E-06	2.085E-06	2.745E-06	3.322E-06	2.622E-06	1.908E-06	1.469E-06	1.177E-06	9.698E-07	8.179E-07
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.371E-07	6.706E-07	1.043E-06	1.372E-06	1.661E-06	1.311E-06	9.539E-07	7.347E-07	5.884E-07	4.849E-07	4.090E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	3.515E-07	1.976E-07	1.320E-07	7.518E-08	5.065E-08	3.724E-08	2.891E-08	2.331E-08	1.930E-08	1.632E-08	1.403E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	7.030E-07	3.952E-07	2.639E-07	1.504E-07	1.013E-07	7.448E-08	5.783E-08	4.661E-08	3.861E-08	3.265E-08	2.806E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.515E-07	1.976E-07	1.320E-07	7.518E-08	5.065E-08	3.724E-08	2.891E-08	2.331E-08	1.930E-08	1.632E-08	1.403E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL ELEVATED RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE
2.260 DAY DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE .5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	1.107E-06	1.441E-06	9.615E-07	5.908E-07	4.102E-07	2.026E-07	7.690E-08	3.748E-08	2.338E-08	1.636E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.213E-06	2.882E-06	1.923E-06	1.182E-06	8.204E-07	4.053E-07	1.538E-07	7.497E-08	4.677E-08	3.272E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	1.107E-06	1.441E-06	9.615E-07	5.908E-07	4.102E-07	2.026E-07	7.690E-08	3.748E-08	2.338E-08	1.636E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE
8.000 DAY DECAY, DEPLETED

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.336E-07	6.595E-07	1.029E-06	1.357E-06	1.643E-06	1.277E-06	9.140E-07	6.939E-07	5.485E-07	4.466E-07	3.724E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.673E-07	1.319E-06	2.057E-06	2.715E-06	3.286E-06	2.553E-06	1.828E-06	1.388E-06	1.097E-06	8.931E-07	7.449E-07
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.336E-07	6.595E-07	1.029E-06	1.357E-06	1.643E-06	1.277E-06	9.140E-07	6.939E-07	5.485E-07	4.466E-07	3.724E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	3.168E-07	1.713E-07	1.107E-07	6.008E-08	3.901E-08	2.785E-08	2.111E-08	1.666E-08	1.356E-08	1.129E-08	9.565E-09
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	6.336E-07	3.426E-07	2.215E-07	1.202E-07	7.803E-08	5.570E-08	4.221E-08	3.333E-08	2.712E-08	2.257E-08	1.913E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.168E-07	1.713E-07	1.107E-07	6.008E-08	3.901E-08	2.785E-08	2.111E-08	1.666E-08	1.356E-08	1.129E-08	9.565E-09

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL ELEVATED RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE
8.000 DAY DECAY, DEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	1.093E-06	1.417E-06	9.226E-07	5.512E-07	3.738E-07	1.767E-07	6.198E-08	2.813E-08	1.675E-08	1.132E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.185E-06	2.833E-06	1.845E-06	1.102E-06	7.476E-07	3.534E-07	1.240E-07	5.626E-08	3.350E-08	2.264E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	1.093E-06	1.417E-06	9.226E-07	5.512E-07	3.738E-07	1.767E-07	6.198E-08	2.813E-08	1.675E-08	1.132E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) AT FIXED POINTS BY DOWNWIND SECTORS **********

DIRECTION FROM SITE	DISTANCES IN MILES 0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
S	2.385E-08	1.270E-08	6.974E-09	9.129E-09	7.167E-09	5.125E-09	3.472E-09	2.532E-09	1.968E-09	1.550E-09	1.255E-09
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.769E-08	2.539E-08	1.395E-08	1.826E-08	1.433E-08	1.025E-08	6.945E-09	5.065E-09	3.935E-09	3.100E-09	2.510E-09
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.385E-08	1.270E-08	6.974E-09	9.129E-09	7.167E-09	5.125E-09	3.472E-09	2.532E-09	1.968E-09	1.550E-09	1.255E-09

DIRECTION FROM SITE	DISTANCES IN MILES 5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
S	1.038E-09	5.087E-10	3.192E-10	1.613E-10	9.764E-11	6.547E-11	4.691E-11	3.522E-11	2.739E-11	2.188E-11	1.786E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.076E-09	1.017E-09	6.383E-10	3.227E-10	1.953E-10	1.309E-10	9.382E-11	7.045E-11	5.478E-11	4.376E-11	3.571E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	1.038E-09	5.087E-10	3.192E-10	1.613E-10	9.764E-11	6.547E-11	4.691E-11	3.522E-11	2.739E-11	2.188E-11	1.786E-11

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) BY DOWNWIND SECTORS **********

SEGMENT BOUNDARIES IN MILES

DIRECTION FROM SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	9.204E-09	6.696E-09	3.537E-09	1.970E-09	1.262E-09	5.421E-10	1.681E-10	6.662E-11	3.558E-11	2.202E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.841E-08	1.339E-08	7.074E-09	3.940E-09	2.524E-09	1.084E-09	3.362E-10	1.332E-10	7.116E-11	4.404E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	9.204E-09	6.696E-09	3.537E-09	1.970E-09	1.262E-09	5.421E-10	1.681E-10	6.662E-11	3.558E-11	2.202E-11

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL ELEVATED RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #2

EXIT ONE - CONTINUOUS ELEVATED RELEASE
SPECIFIC POINTS OF INTEREST

RELEASE ID	TYPE OF LOCATION	DIRECTION FROM SITE	DISTANCE (MILES)	DISTANCE (METERS)	X/Q (SEC/CUB.METER) NO DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 2.260 DAY DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 8.000 DAY DECAY DEPLETED	D/Q (PER SQ.METER)
B	SITE BOUNDARY	S	0.50	805.	6.7E-07	6.7E-07	6.6E-07	1.3E-08
B	SITE BOUNDARY	S	0.60	966.	8.2E-07	8.2E-07	8.1E-07	9.8E-09
B	SITE BOUNDARY	S	0.70	1127.	9.7E-07	9.7E-07	9.6E-07	7.8E-09
B	COWS	S	1.20	1931.	1.6E-06	1.6E-06	1.6E-06	6.9E-09
B	COWS	NNW	3.10	4989.	1.4E-06	1.4E-06	1.3E-06	4.8E-09
B	COWS	SSE	2.70	4345.	8.6E-07	8.5E-07	8.1E-07	3.1E-09
B	RESIDENCES	S	1.20	1931.	1.6E-06	1.6E-06	1.6E-06	6.9E-09
B	RESIDENCES	NNW	4.00	6437.	9.9E-07	9.7E-07	8.9E-07	3.1E-09
B	MAXIMUM CHI/Q	S	1.50	2414.	1.7E-06	1.7E-06	1.6E-06	7.2E-09
B	MAXIMUM CHI/Q	SSW	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	SW	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	WSW	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	W	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	WNW	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	NW	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	NNW	1.50	2414.	3.3E-06	3.3E-06	3.3E-06	1.4E-08
B	MAXIMUM CHI/Q	N	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	NNE	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	NE	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	ENE	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	E	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	ESE	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	SE	50.00	80467.	0.0	0.0	0.0	0.0
B	MAXIMUM CHI/Q	SSE	1.50	2414.	1.7E-06	1.7E-06	1.6E-06	7.2E-09

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

ALL ELEVATED RELEASES.

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

PRINTOUT OF INPUT CARDS

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   1      10100 00010 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
   2      XOQDOQ - TEST CASE  #3
   3         5      7      0      5      3      1     4
   4       10.00 101.00   2.26  -8.00    0.0
   5       0.0    0.0    4.000  4.000  4.000  4.000  4.000
   6       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    0.0    0.0
   6       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    0.0    0.0
   6       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    0.0    0.0
   6       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    0.0    0.0
   6       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    0.0    0.0
   6       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    0.0    0.0
   6       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    0.0    0.0
   6       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    0.0    0.0
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   6       1.000  0.0    0.0    0.0    0.0    0.0    0.0    2.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    1.000
   7         -1.  1.000  2.000  4.000  8.000 16.000  0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
   8         10.    10.    10.    10.    10.    10.    10.    10.    10.    10.    10.    10.    10.    10.    10.    10.
   9       4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000
   8       6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.  6437.
   9       4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000  4.000
   8       8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.  8047.
   9       2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000  2.000
   8       9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.  9656.
   9       1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000  1.000
NO TERRAIN DATA INPUTTED.
  12           3      3      2
  13      SITE BOUNDARY
  14         1  805.0  1   966.0  1 1127.0
  13      COWS
  14         1 1931.0  8 4989.0 16 4345.0
  13      RESIDENCES
  14         1 1931.0  8 6437.0
  15      EXIT ONE -  ONE-MIXED MODE RELEASE
  16       10.000  2.000   45.0   40.0 2000.0   45.0  0.0
  17      A    0      0      0
```

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS A

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	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	0.0	0.0	0.0
2.00	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	0.0	0.0	0.0
4.00	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	0.0	0.0	0.0
8.00	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	0.0	0.0	0.0
16.00	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	0.0	0.0	0.0
TOTAL	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	0.0	0.0	0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS B

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	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	0.0	0.0	0.0
2.00	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	0.0	0.0	0.0
4.00	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	0.0	0.0	0.0
8.00	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	0.0	0.0	0.0
16.00	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	0.0	0.0	0.0
TOTAL	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	0.0	0.0	0.0

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS C

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS D

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS E

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS F

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION ATMOSPHERIC STABILITY CLASS G

UMAX (M/S)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
1.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
2.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
4.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
8.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
16.00	1.000	0.0	0.0	0.0	0.0	0.0	0.0	2.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.000	4.000
TOTAL	5.00	0.0	0.0	0.0	0.0	0.0	0.0	10.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.00	20.00

TOTAL HOURS CONSIDERED ARE 100

WIND MEASURED AT 10.0 METERS.

OVERALL WIND DIRECTION FREQUENCY

WIND DIRECTION:	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
FREQUENCY:	25.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	100.0

OVERALL WIND SPEED FREQUENCY

WIND SPEED (M/S):	1.000	2.000	4.000	8.000	16.000
WIND SPEED (M/S):	0.500	1.500	3.000	6.000	12.000
WIND SPEED FREQUENCY:	20.00	20.00	20.00	20.00	20.00

DISTANCES AND TERRAIN HEIGHTS IN METERS AS FUNCTIONS OF DIRECTION FROM THE SITE:

DIRECTION =	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
DISTANCE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ELEVATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

DISTANCES AND SITE-SPECIFIC CORRECTION FACTORS AS FUNCTIONS OF DIRECTION FROM THE SITE:

DIRECTION =	S	SSW	SW	WSW	W	WNW	NW	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE
DISTANCE	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
FACTOR	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DISTANCE	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.	6437.
FACTOR	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
DISTANCE	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.	8047.
FACTOR	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
DISTANCE	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.	9656.
FACTOR	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
NO DECAY, UNDEPLETED
CORRECTED USING SITE-SPECIFIC FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.596E-05	8.917E-06	5.286E-06	3.885E-06	2.584E-06	1.934E-06	1.539E-06	1.272E-06	1.081E-06	9.361E-07	5.715E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	5.192E-05	1.783E-05	1.057E-05	7.769E-06	5.168E-06	3.867E-06	3.077E-06	2.544E-06	2.161E-06	1.872E-06	1.143E-06
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.596E-05	8.917E-06	5.286E-06	3.885E-06	2.584E-06	1.934E-06	1.539E-06	1.272E-06	1.081E-06	9.361E-07	5.715E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	3.672E-07	1.169E-07	8.431E-08	5.311E-08	3.836E-08	2.976E-08	2.416E-08	2.024E-08	1.736E-08	1.517E-08	1.343E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	7.343E-07	2.337E-07	1.686E-07	1.062E-07	7.673E-08	5.951E-08	4.831E-08	4.049E-08	3.473E-08	3.033E-08	2.687E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.672E-07	1.169E-07	8.431E-08	5.311E-08	3.836E-08	2.976E-08	2.416E-08	2.024E-08	1.736E-08	1.517E-08	1.343E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS
ELEVATED	LESS THAN 0.943
MIXED	BETWEEN 0.943 AND 4.714
GROUND LEVEL	ABOVE 4.714

WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS	
LESS THAN	1.373
BETWEEN	1.373 AND 6.866
ABOVE	6.866

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
NO DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE .5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	5.470E-06	2.584E-06	1.537E-06	1.080E-06	6.039E-07	1.580E-07	5.349E-08	2.981E-08	2.026E-08	1.518E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.094E-05	5.168E-06	3.075E-06	2.161E-06	1.208E-06	3.160E-07	1.070E-07	5.962E-08	4.053E-08	3.035E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	5.470E-06	2.584E-06	1.537E-06	1.080E-06	6.039E-07	1.580E-07	5.349E-08	2.981E-08	2.026E-08	1.518E-08

AVERAGE EFFECTIVE STACK HEIGHT IN METERS FOR EACH SEGMENT

ECTION 1 SITE	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01	4.608E+01

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
2.260 DAY DECAY, UNDEPLETED
CORRECTED USING SITE-SPECIFIC FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.595E-05	8.909E-06	5.279E-06	3.876E-06	2.574E-06	1.923E-06	1.527E-06	1.260E-06	1.069E-06	9.241E-07	5.631E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	5.190E-05	1.782E-05	1.056E-05	7.752E-06	5.148E-06	3.845E-06	3.054E-06	2.521E-06	2.137E-06	1.848E-06	1.126E-06
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.595E-05	8.909E-06	5.279E-06	3.876E-06	2.574E-06	1.923E-06	1.527E-06	1.260E-06	1.069E-06	9.241E-07	5.631E-07

UAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

ECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	3.611E-07	1.139E-07	8.146E-08	5.042E-08	3.578E-08	2.727E-08	2.176E-08	1.792E-08	1.511E-08	1.297E-08	1.130E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	7.223E-07	2.278E-07	1.629E-07	1.008E-07	7.156E-08	5.454E-08	4.351E-08	3.584E-08	3.022E-08	2.594E-08	2.259E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.611E-07	1.139E-07	8.146E-08	5.042E-08	3.578E-08	2.727E-08	2.176E-08	1.792E-08	1.511E-08	1.297E-08	1.130E-08

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
2.260 DAY DECAY, UNDEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	5.462E-06	2.574E-06	1.526E-06	1.068E-06	5.953E-07	1.544E-07	5.081E-08	2.733E-08	1.794E-08	1.298E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.092E-05	5.148E-06	3.052E-06	2.137E-06	1.191E-06	3.089E-07	1.016E-07	5.467E-08	3.589E-08	2.597E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	5.462E-06	2.574E-06	1.526E-06	1.068E-06	5.953E-07	1.544E-07	5.081E-08	2.733E-08	1.794E-08	1.298E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
8.000 DAY DECAY, DEPLETED
CORRECTED USING SITE-SPECIFIC FACTORS

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	0.250	0.500	0.750	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
S	2.458E-05	8.197E-06	4.799E-06	3.506E-06	2.313E-06	1.721E-06	1.363E-06	1.121E-06	9.484E-07	8.183E-07	4.976E-07
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	4.915E-05	1.639E-05	9.598E-06	7.012E-06	4.627E-06	3.442E-06	2.725E-06	2.243E-06	1.897E-06	1.637E-06	9.952E-07
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.458E-05	8.197E-06	4.799E-06	3.506E-06	2.313E-06	1.721E-06	1.363E-06	1.121E-06	9.484E-07	8.183E-07	4.976E-07

ANNUAL AVERAGE CHI/Q (SEC/METER CUBED) DISTANCE IN MILES FROM THE SITE

SECTOR	5.000	7.500	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000
S	3.185E-07	9.994E-08	7.118E-08	4.391E-08	3.114E-08	2.377E-08	1.902E-08	1.572E-08	1.325E-08	1.140E-08	9.930E-09
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	6.371E-07	1.999E-07	1.424E-07	8.781E-08	6.228E-08	4.754E-08	3.804E-08	3.144E-08	2.651E-08	2.280E-08	1.986E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	3.185E-07	9.994E-08	7.118E-08	4.391E-08	3.114E-08	2.377E-08	1.902E-08	1.572E-08	1.325E-08	1.140E-08	9.930E-09

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
8.000 DAY DECAY, DEPLETED

CHI/Q (SEC/METER CUBED) FOR EACH SEGMENT

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES FROM THE SITE									
	.5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	4.979E-06	2.315E-06	1.362E-06	9.482E-07	5.263E-07	1.357E-07	4.429E-08	2.384E-08	1.572E-08	1.140E-08
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	9.959E-06	4.630E-06	2.723E-06	1.896E-06	1.053E-06	2.715E-07	8.859E-08	4.767E-08	3.145E-08	2.281E-08
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	4.979E-06	2.315E-06	1.362E-06	9.482E-07	5.263E-07	1.357E-07	4.429E-08	2.384E-08	1.572E-08	1.140E-08

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
CORRECTED USING SITE-SPECIFIC FACTORS

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) AT FIXED POINTS BY DOWNWIND SECTORS **********

DIRECTION FROM SITE	DISTANCES IN MILES 0.25	0.50	0.75	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
S	2.811E-07	1.039E-07	5.560E-08	3.519E-08	1.813E-08	1.123E-08	7.707E-09	5.650E-09	4.336E-09	3.441E-09	1.944E-09
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	5.622E-07	2.078E-07	1.112E-07	7.038E-08	3.625E-08	2.246E-08	1.541E-08	1.130E-08	8.673E-09	6.883E-09	3.889E-09
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	2.811E-07	1.039E-07	5.560E-08	3.519E-08	1.813E-08	1.123E-08	7.707E-09	5.650E-09	4.336E-09	3.441E-09	1.944E-09

DIRECTION FROM SITE	DISTANCES IN MILES 5.00	7.50	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
S	1.166E-09	2.896E-10	1.817E-10	9.317E-11	5.772E-11	4.013E-11	3.000E-11	2.359E-11	1.927E-11	1.613E-11	1.385E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	2.331E-09	5.792E-10	3.633E-10	1.863E-10	1.154E-10	8.025E-11	5.999E-11	4.717E-11	3.854E-11	3.226E-11	2.770E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	1.166E-09	2.896E-10	1.817E-10	9.317E-11	5.772E-11	4.013E-11	3.000E-11	2.359E-11	1.927E-11	1.613E-11	1.385E-11

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE

********** RELATIVE DEPOSITION PER UNIT AREA (M**-2) BY DOWNWIND SECTORS **********

DIRECTION FROM SITE	SEGMENT BOUNDARIES IN MILES .5-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50
S	5.726E-08	1.885E-08	7.824E-09	4.371E-09	2.100E-09	4.363E-10	9.708E-11	4.077E-11	2.377E-11	1.622E-11
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	1.145E-07	3.771E-08	1.565E-08	8.742E-09	4.199E-09	8.725E-10	1.942E-10	8.154E-11	4.755E-11	3.243E-11
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	5.726E-08	1.885E-08	7.824E-09	4.371E-09	2.100E-09	4.363E-10	9.708E-11	4.077E-11	2.377E-11	1.622E-11

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

USNRC COMPUTER CODE - XOQDOQ, VERSION 2.0 RUN DATE: TUESDAY JULY 13, 1982

XOQDOQ - TEST CASE #3

EXIT ONE - ONE-MIXED MODE RELEASE
CORRECTED USING SITE-SPECIFIC FACTORS
SPECIFIC POINTS OF INTEREST

RELEASE ID	TYPE OF LOCATION	DIRECTION FROM SITE	DISTANCE (MILES)	DISTANCE (METERS)	X/Q (SEC/CUB.METER) NO DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 2.260 DAY DECAY UNDEPLETED	X/Q (SEC/CUB.METER) 8.000 DAY DECAY DEPLETED	D/Q (PER SQ.METER)
A	SITE BOUNDARY	S	0.50	805.	8.9E-06	8.9E-06	8.2E-06	1.0E-07
A	SITE BOUNDARY	S	0.60	966.	7.0E-06	7.0E-06	6.4E-06	7.9E-08
A	SITE BOUNDARY	S	0.70	1127.	5.7E-06	5.7E-06	5.2E-06	6.2E-08
A	COWS	S	1.20	1931.	3.2E-06	3.2E-06	2.9E-06	2.6E-08
A	COWS	NNW	3.10	4989.	2.5E-06	2.4E-06	2.2E-06	1.1E-08
A	COWS	SSE	2.70	4345.	1.4E-06	1.4E-06	1.3E-06	6.8E-09
A	RESIDENCES	S	1.20	1931.	3.2E-06	3.2E-06	2.9E-06	2.6E-08
A	RESIDENCES	NNW	4.00	6437.	1.9E-06	1.8E-06	1.6E-06	6.9E-09

VENT AND BUILDING PARAMETERS:

RELEASE HEIGHT	(METERS)	45.00	REP. WIND HEIGHT	(METERS)	45.0
DIAMETER	(METERS)	2.00	BUILDING HEIGHT	(METERS)	40.0
EXIT VELOCITY	(METERS)	10.00	BLDG.MIN.CRS.SEC.AREA	(SQ.METERS)	2000.0
			HEAT EMISSION RATE	(CAL/SEC)	0.0

AT THE RELEASE HEIGHT:

VENT RELEASE MODE	WIND SPEED (METERS/SEC)
ELEVATED	LESS THAN 2.000
MIXED	BETWEEN 2.000 AND 10.000
GROUND LEVEL	ABOVE 10.000

AT THE MEASURED WIND HEIGHT (10.0 METERS):

VENT RELEASE MODE	WIND SPEED (METERS/SEC) STABLE CONDITIONS	WIND SPEED (METERS/SEC) UNSTABLE/NEUTRAL CONDITIONS
ELEVATED	LESS THAN 0.943	LESS THAN 1.373
MIXED	BETWEEN 0.943 AND 4.714	BETWEEN 1.373 AND 6.866
GROUND LEVEL	ABOVE 4.714	ABOVE 6.866

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Provided is a user's guide for the U. S. Nuclear Regulatory Commissions's (NRC) computer program XOQDOQ which implements Regulatory Guide 1.111. This NUREG supercedes NUREG-0324 which was published as a draft in September 1977. This program is used by the NRC meteorology staff in their independent meteorological evaluation of routine or anticipated intermittent releases at nuclear power stations. It operates in a batch input mode and has various options a user may select. Relative atmospheric dispersion and deposition factors are computed for 22 specific distances out to 50 miles from the site for each directional sector. From these results, values for 10 distance segments are computed. The user may also select other locations for which atmospheric dispersion deposition factors are computed. Program features, including required input data and output results, are described. A program listing and test case data input and resulting output are provided.

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