SANTA BARBARA COUNTY AIR POLLUTION CONTROL DISTRICT

PROCEDURES FOR PRIORITIZING FACILITIES PURSUANT TO THE AIR TOXICS "HOT SPOTS" INFORMATION AND ASSESSMENT ACT OF 1987

I. What is the Purpose of These Procedures?

The purpose of the prioritization procedures is to identify those facilities which must submit AB 2588 risk assessments. The implementation process for these procedures is discussed below.

The Santa Barbara County Air Pollution Control District (District) will be using these procedures to prioritize and categorize facilities as required by the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588). The AB 2588 risk prioritization requirements are contained in California Health and Safety Code Sections 44360 et seq. A summary of the AB 2588 program requirements is included in Appendix A. Each District must begin prioritizing and categorizing the subject facilities by December 1, 1990.

Through the prioritization procedures, the District will determine which facilities may be causing significant offsite carcinogenic or noncarcinogenic health risks. This will be done by developing "toxic scores" for each facility. These scores will be used by the District to categorize each facility as high, intermediate, or low priority.

High and intermediate priority facilities (and any other facilities designated by the District) will be required to submit a risk assessment to the District to quantify the offsite carcinogenic and noncarcinogenic health risk due to their facility emissions. Facilities in the high and intermediate priority categories are required to submit this risk assessment within 150 days of being designated high or intermediate priority.

The risk assessment will be used by the District to determine which facilities have air toxics emissions which are causing significant health risks. These significant risk sources will be required to provide notices to all exposed persons regarding the results of the risk assessment. In addition, the District will prepare an annual report (commencing July 1, 1991) which ranks and identifies facilities according to the degree of health risk posed by each facility.

II. Which Facilities are Subject to These Procedures?

These procedures will apply to those facilities which are required to submit emission inventory plans and reports to the District. After reviewing and correcting the emission inventory reports, the District will prepare a facility-wide emission inventory of each pollutant listed in Appendix A-I of the AB 2588 Criteria and Guidelines Regulation (CGR Appendix A-I) emitted by the facility. These emissions will be used as input to the District risk prioritization analysis. In addition to the facilities required to submit plans reports, other facilities in the AB 2588 program may be subject to these procedures.

The District will prepare industry-wide emission inventories for certain classes of facilities which emit less than 10 tons per year of criteria air pollutants (oxides of nitrogen, oxides of sulfur, particulate matter or total organic gases). Examples of facilities for which the District will prepare industry-wide inventories include: motor vehicle fueling facilities, dry cleaners, small ethylene oxide sterilizers, small motor vehicle refurbishing facilities (body shops), small fiberglass product manufactures, small surface coating operations and small degreasing operations. These risks prioritization procedures do not apply to the specific sources included in the District's industry-wide program. The District will prepare industry-wide risk assessments for these specific sources through a separate process.

III. How were These Procedures Developed?

The District prioritization procedure is based on the Emissions and Potency Procedure presented in the CAPCOA Air Toxics "Hot Spots" Program Facility Prioritization Guidelines. These Guidelines provide example prioritization procedures which can be used by air district to develop their own specific process. The CAPCOA Guidelines were developed through a state-wide committee consisting of representatives from the air districts, the California Air Resources Board, and the California Department of Health Services. A representative from the Santa Barbara county APCD participated in this state-wide committee.

As required by AB 2588, the District considered the following factors when developing these prioritization procedures:

- The amount of hazardous materials released from the facility
- The potency and toxicity of these materials
- The proximity of the facility to potential receptors
- Any other factors that the District determines may indicate that the facility may pose a significant health risk

IV. Implementation of These Procedures

A. Scoring Facilities for Prioritization

The District prioritization procedures will score each source using annual and peak one-hour facility-wide emission rates of the CGR Appendix A-I listed pollutants emitted by the facility and the potency/toxicity of these compounds. In addition to these two parameters, the toxics score may be adjusted depending on the following considerations:

- The carcinogenic and chronic noncarcinogenic toxics score for multi-pathway pollutants will be multiplied by a factor of 10 to account for non-inhalation exposure. Multi-pathway pollutants affected by this consideration include: arsenic and inorganic arsenic compounds, beryllium, cadmium and cadmium compounds, hexavalent chromium, chlorinated dioxins and furans, lead and lead compounds, mercury and mercury compounds, nitrosamines, and polycyclic aromatic hydrocarbons.

- Facilities which submit source to property boundary and/or source to public access distances will have their total toxics score reduced by a receptor proximity adjustment factor. A receptor proximity adjustment factor of 1 will be applied to all facilities which fail to submit this information to the District. Refer to Appendix F for receptor proximity adjustment factors (as a function of distance from the source), and the methodology used to develop these factors.

Separate scores for cancer and noncancer effects will be calculated for each facility. The approaches the District proposes to use for scoring and categorizing facilities are discussed in greater detail below.

The District has developed computer programs to facilitate the scoring and categorizing process. There are two version of these programs – one is interactive (titled RPI), and the other program runs in batch mode (titled RPB). The output from these two programs is identical. A sample output file generated by RPI and the accompanying sample input/output file pair for/from RPB are attached in Appendix B. Printouts of the FORTRAN codes of the RPI and RPB programs are includes in Appendix D.

Another FORTRAN program, titled SETUP, is used to specify input parameters for programs RPI and RPB. A printout of the SETUP code and the output form SETUP (which specifies the District's input parameters for RPI and RPB) are includes in Appendix E.

Potency and toxicity data contained in the CAPCOA AB 2588 Risk Assessment Guidelines have been summarized as an input file to RPI and RPB. This information will be used by the RPI and RPB programs in calculating the toxics score for each facility. The available potency and toxicity information for all CGR Appendix A-I listed pollutants is included in Appendix C. In addition to the toxicity information obtained from the AB 2588 Risk Assessment Guidelines, the District has added a unit risk value for vinylidene chloride, and acute exposure levels for ethylene oxide and xylene to this file.

1. Carcinogenic Emissions (carcinogen score)

For each facility, a carcinogen score will be calculated by multiplying the total emissions of each CGR appendix A-I listed pollutant emitted by the facility, in pounds per year, by the appropriate unit risk value, a normalization factor and receptor proximity adjustment factor. In addition, each pollutant score is adjusted if it is a multi-pathway pollutant. A separate carcinogen score is calculated for each pollutant, and then a total carcinogen score (TS) for the facility is obtained by summing the score of each pollutant. This approach is summarized below:

$$TS = \sum^{c} (E_c * P_c * 1.7*10^3 * MULTI\_ADJ * RP)$$

where,

TS = total carcinogen score for the facility: the sum of the scores for all CGR Appendix A-I listed carcinogens emitted by the facility for which a unit risk value is available.

c = specific carcinogen

E_c = facility-wide emissions of substance c (in pounds/year)

P_c = unit risk value for substance c (refer to Appendix C)

$1.7*10^3$ = normalization factor (to put the score on a more convenient scale)

MULTI_ADJ = multiplier for multi-pathway pollutants; this value is 10 for multi-pathway pollutants, and is one (1) for inhalation-pathway-only pollutants

RP = receptor proximity adjustments factor

2. Noncarcinogenic Emissions (Noncarcinogen Score)

For each facility, a noncarcinogen score will also be calculated. The approach used to calculate the facility noncarcinogen score is presented in this section.

For each pollutant, a separate chronic noncarginogen score (TSC_t^*) and acute noncarcinogen score (TSA_t^*) will be calculated, and then the maximum of these two values will be saved as the noncarcinogen score for that pollutant (TSM_t^*). After the noncarcinogen score for each pollutant is calculated, a total noncarcinogen score (TS^*) for the facility will be obtained by summing the noncarcinogen score of each pollutant.

a. Chronic noncarcinogen score

For each pollutant, a chronic noncarcinogen score (TSC_t^*) will be calculated by dividing the annual-average emissions of each CGR Appendix A-I listed pollutant emitted by the facility, in pounds per hour, by the acceptable chronic exposure level and then multiplying this quotient by a normalization factor and receptor proximity adjustment factor. In addition, each pollutant score is adjusted if it is a multi-pathway pollutant. This approach is summarized below:

$TSC_t^* = (E_t / AELC_t) * 150 * MULTI\_ADJ * RP$

where,

TSC_t^* = the chronic noncarcinogen score for the specific noncarcinogen (t)

t = specific noncarcinogen

E_t = annual-average facility-wide emissions of substance t (in pounds/hour)

$AELC_t$ = chronic noncarcinogen acceptable exposure level for substance t (refer to Appendix C)

150 = normalization factor (to put the score on a more convenient scale)

MULTI_ADJ = multiplier for multi-pathway pollutants; this value is 10 for multi-pathway pollutants, and is one (1) for inhalation-pathway-only pollutants

RP = receptor proximity adjustment factor.

Note: if an acceptable chronic exposure level is not available for a particular pollutant, the chronic noncarcinogen score for that pollutant will be zero (0).

b. Acute noncarcinogen score

For each pollutant, an acute noncarcinogen score (TSA_t^*) will be calculated by dividing the peak one-hour emissions of each CGR Appendix A-I listed pollutant emitted by the facility, in pounds per hour, by the acceptable acute exposure level and then multiplying this quotient by a normalization factor and receptor proximity adjustment factor. This approach is summarized below:

$TSA_t^* = (E_t / AELA_t) * 1500 * RP$

where,

TSA_t^* = the acute noncarcinogen score for the specific noncarcinogen (t)

t = specific noncarcinogen

E_t = peak one-hour facility-wide emissions of substance t (in pounds/hour)

$AELA_t$ = acute noncarcinogen acceptable exposure level for substance t (refer to Appendix C)

1500 = normalization factor (to put the score on a more convenient scale)

RP = receptor proximity adjustment factor

Note: If an acceptable acute exposure level in not available for a particular pollutant, the acute noncarcinogen score for that pollutant will be zero (0)

c. Noncarcinogen score

After a separate chronic noncarcinogen score (TSC_t^*) and acute noncarcinogen score (TSA_t^*) have been calculated for a pollutant, the maximum of these two values is saved as the noncarcinogen score for that pollutant (TSM_t^*). A total noncarcinogen score (TS^*) for the facility is then obtained by summing the noncarcinogen score of each pollutant. This approach is presented below:

$$TSM_t^* = \text{MAXIMUM OF } (TSC_t^*, TSA_t^*)$$

$$TS^* = \sum_{t} (TSM_t^*)$$

where,

TSM_t^* = the maximum of the chronic and acute noncarcinogen score for each pollutant

TS^* = total noncarcinogen score for the facility: the sum of the maximum of the chronic and acute noncarcinogen score for each CGR Appendix A-I listed pollutant emitted by the facility.

d. Total facility score

The total facility score (TFS) will be obtained by taking the maximum of the facility carcinogen (TS) and noncarcinogen (TS^*) scores. The prioritization of the facility will be based on the total facility score. This can be expressed as follows:

$$TFS = \text{MAXIMUM OF } (TS, TS^*)$$

B. Evaluation of the Facility Scores

Based on the TFS for each facility, the District will rank each facility as either high, intermediate or low priority. The District will use the following approach in designating a priority ranking to each facility.

Total Facility Score	Facility Designation
TFS > 10	High Priority
1 < TFS < 10	Intermediate Priority
TFS < 1	Low Priority

All high and intermediate priority facilities will be required to submit risk assessments to the District. The intent of this requirement is to ensure that virtually all facilities which may be causing an offsite lifetime cancer risk of 10^{-5} or greater, or may be causing exceedances of acceptable noncarcinogen exposure levels, are identified. This is consistent with the mandate of AB 2588 to identify all significant risk air toxics sources. Based on the conservative

modeling scenario used in the CAPCOA Risk Prioritization Guidelines, a TFS of 1 corresponds to a 10^{-5} lifetime cancer risk for carcinogens the acceptable exposure levels for noncarcinogens. Therefore, requiring risk assessments from all facilities with a TFS of 1 or greater (both high and intermediate priority facilities) should ensure that this intent is achieved. The District has the authority to require these risk assessments through the provisions of California Health and Safety Code section 44360. Risk assessments are due to the District within 150 days after priority designation. It should be noted that the 10^{-5} lifetime cancer risk is not to be construed as the District health risk management level for carcinogens.

In addition, the prioritization procedure should be consistent with The Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) requirements for identification of significant risk sources. The Proposition 65 significant risk level for carcinogen is 10^{-5}, which is consistent with the risk level to be identified by the District risk assessment requirements.

It is important to note that high and intermediate priority facilities are not necessarily high risk facilities. Only upon completion of the risk assessments will the risks from high and intermediate priority facilities be accurately characterized. Facilities which are designated as low priority through this evaluation method have a lower probability of causing significant offsite health risks. Characterization of facilities as high, intermediate or low priority may change in the future as new data become available, or as additional criteria are applied.

Facilities which are classified as low priority will be examined to determine whether the facility releases a substantial amount of pollutants which do not have complete toxicity data. If this situation occurs, the District will consult with the California Department of Health Services and the Environmental Protection Agency to determine whether toxicity data for these pollutants are available. If such data are available, the District will reevaluate the total facility score and categorization for the facility(ies) in question.

In addition, low priority facilities may be required to perform risk assessments in future years. This option may be implemented to identify facilities which may be causing a lifetime cancer risk of 10^{-6} or greater, which is the District health risk management level for carcinogens. Before implementing this option, the District will hold a public workshop to discuss this and any other additional risk assessment requirements.

C. Facilities Failing to Report Emissions

Facilities which have submitted incomplete emission inventory reports to the District will be categorized as high priority facilities, regardless of their total facility score. These facilities will be required to submit the missing emission report information and a complete risk assessment to the District within 150 days of being categorized as high priority facility.

V. Additional Information

A. Risk Assessment Notification

As soon as the District has completed the risk prioritization evaluation, those facilities with a total facility score (TFS) of 1 or greater will be notified of their risk assessment requirements. In addition, those facilities that did not submit complete emission inventory reports to the District will be notified of their emissions inventory completion and risk assessment requirements. These facilities will then have 150 days from the date on the notification letter to submit the required information to the District.

B. Risk Assessment Procedures

The District has drafted air toxics dispersion modeling guidelines and a risk assessment model (ACE2588) which performs all requirements of the CAPCOA AB 2588 Risk Assessment Guidelines. The modeling guidelines and the ACE2588 risk assessment model should greatly facilitate the preparation and review of the risk assessments for all affected facilities. The District is considering requiring all facilities in Santa Barbara County to use the District air toxics dispersion modeling guidelines and the ACE2588 model for AB 2588 risk assessments.

The District plans to hold a risk assessment workshop immediately after the notification of high priority facilities has taken place. The modeling guidelines and the ACE2588 model will be discussed at the workshop and will be made available to those facilities in Santa Barbara County required to prepare AB 2588 risk assessments.

APPENDIX A

AB 2588 PROGRAM SUMMARY

APPENDIX B

SAMPLE OUTPUT FILE FROM PROGRAM RPI AND ACCOMPANYING SAMPLE INPUT/OUTPUT FILES FOR/FROM PROGRAM RPB

APPENDIX C

POLLUTANT - SPECIFIC TOXICITY DATA

APPENDIX D

FORTRAN CODE LISTINGS FOR PROGRAMS RPI AND RPB

APPENDIX E

FORTRAN CODE LISTING FOR PROGRAM SETUP AND SETUP - GENERATED OPTIONS FOR RPI AND RPB

APPENDIX F

RECEPTOR PROXIMITY ADJUSTMENT FACTORS

The receptor proximity adjustment factors to be used in the District risk prioritization procedures were developed from annual-average analyses of Santa Barbara County dispersion conditions. The receptor proximity adjustment factors were developed using the following approach:

A typical point source with the following release characteristics was modeled: Stack height = 10. meters; stack gas temperature = 293. Kelvin; volumetric flow = 0.03 meters/second; emission rate = 1.0 grams/second. The point source was modeled with the EPA ISCST dispersion model, version 88384. The location of the point source was 0.0, 0.0 meters (center of the modeling region).

Polar receptor coordinates were generated for 30 degree radials around the compass (a total of 12 radials, in 30 degree increments). Downwind receptors were chosen to calculate concentrations and receptor proximity adjustment factors at a number of downwind distances.

A complete year of meteorological data from the Santa Maria and Santa Barbara airports were used in the analyses. Annual-average concentrations were calculated at each of the receptor points. Using annual-average concentrations and local meteorological data provides an accurate quantification of receptor proximity adjustment factors applicable to Santa Barbara County conditions.

Receptor proximity adjustment factors were calculated for the following distances: less than 100 meters; 100 to 250 meters; 250 to 500 meters; 500 to 1000 meters; 1000 to 1500 meters; 1500 to 2000 meters; and greater than 2000 meters. Distances less than 100 meters are given a receptor proximity adjustment factor of 1.0. The receptor proximity adjustment factor for the 100 to 250 meter range was calculated as the mean of the concentrations at 100 and 250 meters divided by the concentration at 100 meters. Likewise, the receptor proximity adjustment factor for the 250 to 500 meter range was calculated as the mean of the concentrations at 250 and 500 meters divided by the concentration at 100 meters, and so on. Distances greater than 2000 meters are given the receptor proximity adjustment factor for 2000 meters.

Receptor proximity adjustment factors were calculated in this manner for each of the 12 radials. Next, mean receptor proximity adjustment factors were obtained by averaging the values for each of the 12 radials. This results in a set of mean receptor proximity adjustment factors for both the Santa Maria and Santa Barbara sites. The average of the mean receptor proximity adjustment factors for the Santa Maria and Santa Barbara meteorology was then used to obtain a set of values to be used throughout Santa Barbara County. The ISCST modeling results and spreadsheet analyses used to calculate the receptor proximity adjustment factors are included in this attachment.

The Santa Barbara County receptor proximity adjustment factors (RP) are presented below:

0m < R < 100m:	RP = 1.000
100m ≤ R < 250m:	RP = 0.799
250m ≤ R < 500m:	RP = 0.469
500m ≤ R < 1000m:	RP = 0.239
1000m ≤ R < 1500m:	RP = 0.107
1500m ≤ R < 2000m:	RP = 0.063
R ≥ 2000m:	RP = 0.049

Where R is receptor proximity (in meters). For a particular facility, R is the smallest source to receptor-boundary distance present at the facility. In addition, if there are public access roads within the property boundaries, then R is the smallest distance from any source to the public access road.

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ISCST - VERSION 3.4 (DATED 88348)

*** Rec. prox. adj.; SM met; 1. g/s; hs=10.0 m; polar; 10/30/90 ***

CALCULATE (CONCENTRATION=1,DEPOSITION=2)	ISW(1) = 1
RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)	ISW(2) = 2
DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)	ISW(3) = 2
TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)	ISW(4) = 0
CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)	ISW(5) = 0
LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)	ISW(6) = 1
COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)	
WITH THE FOLLOWING TIME PERIODS:	
HOURLY (YES=1,NO=0)	ISW(7) = 0
2-HOUR (YES=1,NO=0)	ISW(8) = 0
3-HOUR (YES=1,NO=0)	ISW(9) = 0
4-HOUR (YES=1,NO=0)	ISW(10) = 0
6-HOUR (YES=1,NO=0)	ISW(11) = 0
8-HOUR (YES=1,NO=0)	ISW(12) = 0
12-HOUR (YES=1,NO=0)	ISW(13) = 0
24-HOUR (YES=1,NO=0)	ISW(14) = 0
PRINT 'N'-DAY TABLE(S) (YES=1,NO=0)	ISW(15) = 1
PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE	
SPECIFIED BY ISW(7) THROUGH ISW(14):	
DAILY TABLES (YES=1,NO=0)	ISW(16) = 0
HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)	ISW(17) = 0
MAXIMUM 50 TABLES (YES=1,NO=0)	ISW(18) = 0
METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)	ISW(19) = 2
RURAL-URBAN OPTION (RU.=0,UR. MODE 1=1,UR. MODE 2=2,UR. MODE 3=3)	ISW(20) = 0
WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(21) = 1
VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(22) = 1
SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES>0)	ISW(23) = 0
PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)	ISW(24) = 2
PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)	ISW(25) = 2
PROGRAM USES BUOYANCY INDUCED DISPERSION (YES=1,NO=2)	ISW(26) = 2
CONCENTRATIONS DURING CALM PERIODS SET = 0 (YES=1,NO=2)	ISW(27) = 2
REG. DEFAULT OPTION CHOSEN (YES=1,NO=2)	ISW(28) = 2
TYPE OF POLLUTANT TO BE MODELLED (1=SO2,2=OTHER)	ISW(29) = 2
DEBUG OPTION CHOSEN (YES=1,NO=2)	ISW(30) = 2
ABOVE GROUND (FLAGPOLE) RECEPTORS USED (YES=1,NO=0)	ISW(31) = 0
NUMBER OF INPUT SOURCES	NSOURC = 1
NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)	NGROUP = 0
TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)	IPERD = 0
NUMBER OF X (RANGE) GRID VALUES	NXPNTS = 6
NUMBER OF Y (THETA) GRID VALUES	NYPNTS = 12
NUMBER OF DISCRETE RECEPTORS	NXWYPT = 0
NUMBER OF HOURS PER DAY IN METEOROLOGICAL DATA	NHOURS = 24
NUMBER OF DAYS OF METEOROLOGICAL DATA	NDAYS = 365
SOURCE EMISSION RATE UNITS CONVERSION FACTOR	TK =.10000E+07
HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED	ZR = 10.00 METERS
LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA	IMET = 5

ALLOCATED DATA STORAGE LIMIT = 43500 WORDS
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN MIMIT = 521 WORDS

1

*** Rec. prox. adj.; SM met; 1. g/s; hs=10.0 m; polar; 10/30/90 ***

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** RANGES OF POLAR GRID SYSTEM ***
(METERS)

100.0, 250.0, 500.0, 1000.0, 1500.0, 2000.0,

*** RADIAL ANGLES OF POLAR GRID SYSTEM ***

(DEGREES)

30.0, 60.0, 90.0, 120.0, 150.0, 180.0, 210.0, 240.0, 270.0, 300.0,
330.0, 360.0,

1

*** Rec. prox. adj.; SM met; 1. g/s; hs=10.0 m; polar; 10/30/90 ***

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS)	EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. LENGTH TYPE=0 (METERS)	BLDG. WIDTH TYPE=0 (METERS)
1	0	0	0	.10000E+01	.0	.0	.0	10.00	293.00	.04	1.00	.00	.00	.00

1 'N'-DAY
365 DAYS
SGROUP# 1

*** Rec. prox. adj.; SM met; 1. g/s; hs=10.0 m; polar; 10/30/90 ***

* 365-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 79.99211 AND OCCURRED AT (100.0, 120.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 100.0	250.0	500.0	1000.0	1500.0	2000.0
360.0 /	7.34379	4.95860	3.12142	1.30689	.73114	.47411
330.0 /	13.14507	9.33767	5.65867	2.31573	1.29092	.83700
300.0 /	17.78932	12.55420	7.94070	3.28221	1.81998	1.17314
270.0 /	13.83872	10.57659	7.42365	3.21516	1.81106	1.17870
240.0 /	11.61718	7.00634	4.29704	1.80402	1.01355	.65997
210.0 /	10.34275	4.60318	2.07208	.75851	.41056	.26220
180.0 /	12.61275	6.14786	2.72085	.97535	.52454	.33370
150.0 /	26.94723	13.53543	6.24784	2.29874	1.24525	.79527
120.0 /	79.99211	38.07287	16.10578	5.66940	3.04261	1.93491
90.0 /	24.26549	11.65519	5.15316	1.84923	.99599	.63446
60.0 /	17.58872	9.53480	4.61191	1.73452	.94900	.61012
30.0 /	9.36405	4.42568	1.90660	.68348	.36913	.23553

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*** Rec. prox. adj.; SB met; 1. G/S; hs=10.0 m; polar; 10/30/90 ***

CALCULATE (CONCENTRATION=1,DEPOSITION=2)	ISW(1) = 1
RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)	ISW(2) = 2
DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)	ISW(3) = 2
TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)	ISW(4) = 0
CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)	ISW(5) = 0
LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)	ISW(6) = 1
COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)	
WITH THE FOLLOWING TIME PERIODS:	
HOURLY (YES=1,NO=0)	ISW(7) = 0
2-HOUR (YES=1,NO=0)	ISW(8) = 0
3-HOUR (YES=1,NO=0)	ISW(9) = 0
4-HOUR (YES=1,NO=0)	ISW(10) = 0
6-HOUR (YES=1,NO=0)	ISW(11) = 0
8-HOUR (YES=1,NO=0)	ISW(12) = 0
12-HOUR (YES=1,NO=0)	ISW(13) = 0
24-HOUR (YES=1,NO=0)	ISW(14) = 0
PRINT 'N'-DAY TABLE(S) (YES=1,NO=0)	ISW(15) = 1
PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE	
SPECIFIED BY ISW(7) THROUGH ISW(14):	
DAILY TABLES (YES=1,NO=0)	ISW(16) = 0
HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)	ISW(17) = 0
MAXIMUM 50 TABLES (YES=1,NO=0)	ISW(18) = 0
METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)	ISW(19) = 2
RURAL-URBAN OPTION (RU.=0,UR. MODE 1=1,UR. MODE 2=2,UR. MODE 3=3)	ISW(20) = 0
WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(21) = 1
VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(22) = 1
SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES>0)	ISW(23) = 0
PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)	ISW(24) = 2
PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)	ISW(25) = 2
PROGRAM USES BUOYANCY INDUCED DISPERSION (YES=1,NO=2)	ISW(26) = 2
CONCENTRATIONS DURING CALM PERIODS SET = 0 (YES=1,NO=2)	ISW(27) = 2
REG. DEFAULT OPTION CHOSEN (YES=1,NO=2)	ISW(28) = 2
TYPE OF POLLUTANT TO BE MODELLED (1=SO2,2=OTHER)	ISW(29) = 2
DEBUG OPTION CHOSEN (YES=1,NO=2)	ISW(30) = 2
ABOVE GROUND (FLAGPOLE) RECEPTORS USED (YES=1,NO=0)	ISW(31) = 0
NUMBER OF INPUT SOURCES	NSOURC = 1
NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)	NGROUP = 0
TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)	IPERD = 0
NUMBER OF X (RANGE) GRID VALUES	NXPNTS = 6
NUMBER OF Y (THETA) GRID VALUES	NYPNTS = 12
NUMBER OF DISCRETE RECEPTORS	NXWYPT = 0
NUMBER OF HOURS PER DAY IN METEOROLOGICAL DATA	NHOURS = 24
NUMBER OF DAYS OF METEOROLOGICAL DATA	NDAYS = 365
SOURCE EMISSION RATE UNITS CONVERSION FACTOR	TK =.10000E+07
HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED	ZR = 10.00 METERS
LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA	IMET = 5

ALLOCATED DATA STORAGE LIMIT = 43500 WORDS
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN MIMIT = 521 WORDS

*** Rec. prox. adj.; SB met; 1. G/S; hs=10.0 m; polar; 10/30/90 ***

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** RANGES OF POLAR GRID SYSTEM ***
(METERS)

100.0, 250.0, 500.0, 1000.0, 1500.0, 2000.0,

*** RADIAL ANGLES OF POLAR GRID SYSTEM ***

(DEGREES)

30.0, 60.0, 90.0, 120.0, 150.0, 180.0, 210.0, 240.0, 270.0, 300.0,
330.0, 360.0,

*** Rec. prox. adj.; SB met; 1. G/S; hs=10.0 m; polar; 10/30/90 ***

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAKE	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS)	EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. LENGTH TYPE=0 (METERS)	BLDG. WIDTH TYPE=0 (METERS)
1	0	0	0	.10000E+01	.0	.0	.0	10.00	293.00	.04	1.00	.00	.00	.00

1

'N'-DAY
365 DAYS
SGROUP# 1

*** Rec. prox. adj.; SB met; 1. G/S; hs=10.0 m; polar; 10/30/90 ***

* 365-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS 54.32450 AND OCCURRED AT (100.0, 60.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 100.0	250.0	500.0	1000.0	1500.0	2000.0
360.0 /	21.33493	8.73947	3.90229	1.41427	.75768	.48039
330.0 /	22.64038	8.48296	3.13068	1.00815	.52075	.32402
300.0 /	19.77944	8.92212	3.69657	1.25698	.65911	.41245
270.0 /	13.98109	9.66718	5.45721	2.17771	1.20637	.77935
240.0 /	13.67308	11.30277	7.49519	3.16228	1.77148	1.15053
210.0 /	17.81611	14.20832	9.00911	3.68992	2.03997	1.31273
180.0 /	9.63691	8.48519	6.53073	2.92792	1.67050	1.09656
150.0 /	3.86742	2.63145	1.68029	.70773	.39736	.25876
120.0 /	7.82788	5.58772	3.50947	1.44494	.79877	.51360
90.0 /	25.01699	17.63456	12.04592	5.25744	2.98111	1.94997
60.0 /	54.32450	31.95373	17.20128	6.77793	3.74334	2.41596
30.0 /	25.27252	9.16992	3.48138	1.13638	.58262	.35909

ISCST ANALYSIS FOR RECEPTOR PROXIMITY ADJUSTMENT
HS = 10. M; YEAR OF SM MET; 10/30/90; RPF10.WK1

CONCENTRATIONS (UG/M3) AS A FUNCTION OF DIRECTION AND DISTANCE

DIRECTION	100	250	500	1000	1500	2000
360	7.344	4.959	3.121	1.307	0.731	0.474
330	13.145	9.338	5.659	2.316	1.291	0.837
300	17.789	12.554	7.941	3.282	1.82	1.173
270	13.839	10.577	7.424	3.215	1.811	1.179
240	11.617	7.006	4.297	1.804	1.014	0.66
210	10.343	4.603	2.072	0.759	0.411	0.262
180	12.613	6.148	2.721	0.975	0.525	0.334
150	26.947	13.535	6.248	2.299	1.245	0.795
120	79.992	38.073	16.106	5.669	3.043	1.935
90	24.265	11.655	5.153	1.849	0.996	0.634
60	17.589	9.535	4.612	1.735	0.949	0.61
30	9.364	4.426	1.907	0.683	0.369	0.236

RATIO OF CONCENTRATIONS AT DOWNWIND DISTANCES TO CHI AT 100 METERS

	100-250	250-500	500-1000	1000-1500	1500-2000	> 2000
360	0.838	0.550	0.301	0.139	0.082	0.065
330	0.855	0.570	0.303	0.137	0.081	0.064
300	0.853	0.576	0.315	0.143	0.084	0.066
270	0.882	0.650	0.384	0.182	0.108	0.085
240	0.802	0.486	0.263	0.121	0.072	0.057
210	0.723	0.323	0.137	0.057	0.033	0.025
180	0.744	0.352	0.147	0.059	0.034	0.026
150	0.751	0.367	0.159	0.066	0.038	0.030
120	0.738	0.339	0.136	0.054	0.031	0.024
90	0.740	0.346	0.144	0.059	0.034	0.026
60	0.771	0.402	0.180	0.076	0.044	0.035
30	0.736	0.338	0.138	0.056	0.032	0.025
MEAN SM:	0.786	0.442	0.217	0.096	0.056	0.044
MEAN SB:	0.812	0.497	0.261	0.118	0.069	0.055
MEAN:	0.799	0.469	0.239	0.107	0.063	0.049

ISCST ANALYSIS FOR RECEPTOR PROXIMITY ADJUSTMENT
HS = 10. M; YEAR OF SB MET; 10/30/90; RPF10.WK1

CONCENTRATIONS (UG/M3) AS A FUNCTION OF DIRECTION AND DISTANCE

DIRECTION	100	250	500	1000	1500	2000
360	21.335	8.74	3.902	1.414	0.758	0.48
330	22.64	8.483	3.131	1.008	0.521	0.324
300	19.78	8.922	3.697	1.257	0.659	0.412
270	13.981	9.667	5.457	2.178	1.206	0.779
240	13.673	11.303	7.495	3.162	1.771	1.151
210	17.816	14.208	9.009	3.69	2.04	1.313
180	9.637	8.485	6.531	2.928	1.67	1.097
150	3.867	2.631	1.68	0.708	0.397	0.259
120	7.828	5.588	3.509	1.445	0.799	0.514
90	25.017	17.635	12.046	5.257	2.981	1.95
60	54.324	31.954	17.201	6.778	3.743	2.416
30	25.273	9.167	3.481	1.136	0.583	0.359

RATIO OF CONCENTRATIONS AT DOWNWIND DISTANCES TO CHI AT 100 METERS

	100-250	250-500	500-1000	1000-1500	1500-2000	> 2000
360	0.705	0.296	0.125	0.051	0.029	0.022
330	0.687	0.256	0.091	0.034	0.019	0.014
300	0.726	0.319	0.125	0.048	0.027	0.021
270	0.846	0.541	0.273	0.121	0.071	0.056
240	0.913	0.687	0.390	0.180	0.107	0.084
210	0.899	0.652	0.356	0.161	0.094	0.074
180	0.940	0.779	0.491	0.239	0.144	0.114
150	0.840	0.557	0.309	0.143	0.085	0.067
120	0.857	0.581	0.316	0.143	0.084	0.066
90	0.852	0.593	0.346	0.165	0.099	0.078
60	0.794	0.452	0.221	0.097	0.057	0.044
30	0.681	0.250	0.091	0.034	0.019	0.014
MEAN SB:	0.812	0.497	0.261	0.118	0.069	0.055
MEAN SM:	0.786	0.442	0.217	0.096	0.056	0.044
MEAN:	0.799	0.469	0.239	0.107	0.063	0.049