Computer Models for Predicting the Probability of Violating CO Air Quality Standards — The Model SIMCO —

by

William A. Carpenter
Former Senior Scientist

Ronald L. Heisler
Systems Analyst

and

Samuel F. Curling
Environmental Specialist

(The opinions, findings, and conclusions expressed in this report are those of the authors and not necessarily those of the sponsoring agencies.)

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ABSTRACT

This report presents the user instructions and data requirements for SIMCO, a combined simulation and probability computer model developed to quantify and evaluate carbon monoxide in roadside environments. The model permits direct determinations of the probability of violating the one- and eight-hour National Ambient Air Quality Standards for carbon monoxide. It also provides information on the magnitude and frequency of carbon monoxide concentrations.

The probability of violating an air quality standard is a function of the random influences of meteorology, traffic volumes, emission patterns, and background pollution levels. SIMCO simulates carbon monoxide concentrations based on these parameters. Generally ten years of hourly concentrations are simulated for each analysis. The input data required by SIMCO are the source and receptor coordinates, representative historical meteorological records, temporal vehicle traffic volume and emission patterns, and representative background pollutant statistics.

The model can be used to provide a comprehensive microscale analysis for highway environmental impact studies and state implementation plan hot spot analyses, and for monitor-siting studies to determine the attainment and maintenance of the standards for carbon monoxide.

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In this report the input requirements and some details of the use of SIMCO are discussed. The reader should refer to a report by Carpenter, Hudson, and White (1980) for the details of predicting P(V) using simulation.

INPUT DATA

The Appendix contains the computer listing for SIMCO and study examples. The input data for SIMCO fall into five categories; geometric, traffic, background, temporal, and meteorological. The data requirements and data sources in each of these categories are discussed below.

Geometric Data

The geometric data required by SIMCO are the number of the highway line sources emitting CO, their locations, and the location of the receptor. SIMCO analyzes only highway line sources. Point sources are not presently addressed by SIMCO. Area sources are addressed as background CO. SIMCO is capable of analyzing up to 13 highway line sources.

A line source is assumed to be a single highway traffic lane having a spatially homogeneous (or nearly homogeneous) CO emission strength. All line sources are of finite length. They may cross over each other and they may connect end to end. Thus, for example, a single traffic lane having two or more distinct traffic density segments may be decomposed into two or more line sources connected end to end. Also, for example, a single lane having two or more different speed zones may be decomposed into two or more end to end line sources.*

The coordinate system used to locate the sources and receptors is oriented with the +X direction as East, the +Y direction as North, and the origin being an arbitrarily fixed point. The line source locations are specified by giving the (East, North) coordinates of the end points of the ground-level line sources. The receptor location is specified by giving the (East, North) coordinates of the receptor and the receptor'e elevation above ground level. The (East, North) coordinates used to specify source and receptor locations are easily determined from the Universal Transverse Mercator (UTM) coordinates found on U. S. Geological Survey topographic maps. Since UTM coordinates are expressed in metres, the metre is the unit of measure used for specifying the source and receptor locations in SIMCO. In general, more detailed maps than U.S.G.S. topographic maps will be necessary. Overlay gridding systems can be used over construction plans to determine geometric inputs, with the metre always being used as the unit of measure for coordinate inputs.

Traffic Data

The traffic data required by SIMCO are the speed-capacity relationship and the traffic data necessary to specify the expected traffic volume for each hour of a year. SIMCO employs the normal approximation to the Poisson distribution to obtain simulated hourly traffic volumes and speeds from the expected hourly traffic volumes. Specifically, SIMCO requires the following data for each line source: the slope of the speed-capacity relationship in mph/vehicle; the posted speed limit in mph; the annual average hourly traffic volume in vehicles/hour; the annual average vehicle type percentages; the annual average hot and cold start (catalyst) operating condition percentages; and the monthly, day-of-week, and hour-of-day factors for the vehicle type percentages and vehicle operating condition percentages. It also requires the average ratio of cold start non-catalyst operation to cold start catalyst operation.

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*For less detailed modeling, the line source could be modeled by lane groupings (i.e., modeling three northbound and three southbound lanes as one northbound lane and one southbound lane. However, this method is not recommended by the authors since it tends to artificially concentrate pollutants.

In the simulation process SIMCO computes simulated hourly traffic volumes from average hourly traffic volumes at each hour in a year using the Poisson assumption. Under the Poisson assumption (Baerwald 1976; Highway Research Board 1965), traffic volumes will have a Poisson distribution with a single parameter given by the average volume. Since the average volume for any interesting site will generally be of an order of magnitude greater than 50 vehicles/hour, the Poisson distribution can be approximated by a normal distribution having the mean and variance equal to the average volume (Myer 1965).

It should be noted that the traffic data factors for SIMCO have the following properties:

> The sum of the monthly factors for any item, (such as percentage of diesel trucks) equals 12.
>
> The sum of the day-of-week factors for any item equals 7.
>
> The sum of the hour-of-day factors for any item equals 24.

There are many sources of traffic data and sources of information describing methods for collecting traffic data. Shirley and Benson (1980) discuss the traffic data requirements relative to air quality analyses and examine methods of collecting such data. Chaves (1980) also discusses some of the needs and problems associated with obtaining traffic data for air quality analyses. Pollack et al. (1979) examine some of the traffic data requirements for air quality analyses and present some typical data on the relationship between traffic data and hour of day. Box and Oppenlander (1976) discuss the variations of traffic parameters with time throughout a year and present graphs of typical hourly, day-of-week, and monthly variations in traffic volumes. DeMarrais (1977) presents the results of an empirical study relating the diurnal variation of traffic flow to the diurnal pattern of observed CO concentrations at several locations. Tittemore et al. (1972) present an empirical study of urban area travel relative to time of day. Graphical relationships between traffic and time of day for several study areas are included in the report. Buszek (1979) has analyzed extensive data relating traffic volumes to season and hour of day and categorized by the geographical region of the continental United States and local population. He also discusses trending patterns in the data and supports his arguments using historical data. The bulk of the data analyzed by Buszek were from national control stations maintained by the Department of

Transportation, Federal Highway Administration (FHWA). The Highway Statistics Division of the FHWA obtains these data from participating state departments of transportation in the form of hourly volume records for continuous automatic traffic recording stations. Additional data are available in state reports such as "Automatic Traffic Recorder Data " and "Average Daily Traffic Volumes on Interstate, Arterial, and Primary Routes," which are published by the Virginia Department of Highways and Transportation. Finally, state departments of transportation generally have traffic engineering sections that collect, analyze, and project traffic data for use in air quality analyses. The traffic engineering methods employed in these activities are contained in works such as those of the Highway Research Board (1965) and Baerwald (1976). The Highway Research Board (1965) reference contains graphs from which the slope of the speed versus volume to capacity ratios can be determined.

Background Data

SIMCO requires as input the geometric means and geometric standard deviations of background CO. These parameters are used with the lognormal distribution (Larsen 1971) to simulate hourly background CO concentrations. The principal source of background pollution data is the EPA's Storage and Retrieval of Aerometric Data system maintained by its National Aerometric Data Bank at Research Triangle Park, North Carolina. Under the SAROAD system, published volumes of Air Quality Annual Statistics are available from the EPA, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711. From these annual statistics one can find the annual geometric mean and geometric standard deviation of background CO at locations throughout the United States. Since there are significant fluctuations of CO with month and hour of day, SIMCO uses the hourly and monthly geometric mean CO concentrations as input. These data are not readily available in the SAROAD system and must be determined or estimated using other data. (Since hourly and monthly data are difficult to obtain, the geometric standard deviations are assumed to be constants.) State air quality departments may be able to supply hourly and monthly geometric mean data for given locations. Otherwise, one might use the annual geometric mean at one location as a scaling factor to scale monthly and hourly geometric means from another location expected to have similar background fluctuations. Dimitriades (1976) presents some data on the fluctuations of background contaminants which may be helpful. If no information about the hourly and monthly variation of CO is available, the user must resort to using the annual geometric mean for each month and hour of day.

The terms "geometric mean" and "geometric standard deviation" are defined by Hunt (1972). A characteristic of the geometric mean is that if y is the pollution variable in units of, say, ppm, and Y_g is the geometric mean of y in ppm, and if x is the pollution variable in units of, say, gm/m^3, and x_g is the geometric mean of x in gm/m^3, and y = ax where a is the conversion factor from gm/m^3 to ppm, then it is also true that

$$Y_g = a \times x_g . \quad \text{... (1)}$$

Using the same notation and allowing σ_{gx} and σ_{gy} to indicate the geometric standard deviations of x and y, respectively, one can show from Hunt's definitions that

$$\sigma_{gx} = \sigma_{gy} . \quad \text{... (2)}$$

SIMCO requires that the geometric means and geometric standard deviations of CO be specified based on units of ppm. Equation (1) states that if the available geometric mean data are based on units other than ppm, then a simple linear conversion will suffice to convert to geometric means based on units of ppm. Equation (2) states that the units upon which available data are based are of no consequence in specifying the geometric standard deviation, since the geometric standard deviation is independent of the units used to measure concentrations.

Temporal Data

Computer models that employ meteorological data collected by the National Weather Service are often based on a standard time clock and are, therefore, often confusing to the user who thinks in terms of a standard/daylight saving time clock. SIMCO attempts to avoid this confusion by having all user-supplied inputs specified in terms of the standard/daylight saving time clock. In this manner, for instance, the morning rush hour will be from, say, 7:00 a.m. to 9:00 a.m. every day of the year. The user simply specifies all inputs in terms of the actual clock time (be it standard time or daylight saving time) in effect during the month for which the input is to apply. To automatically handle the clock parameter, SIMCO requires that the user specify the first and last months (to the nearest month) of daylight saving time. SIMCO then internally converts the meteorological data, which are supplied in standard time, to the proper clock time depending on the month. All computations performed by SIMCO are then executed relative to the actual clock time in effect for each month of the year.

Meteorological Data

SIMCO requires as input a historical record of hourly meteorological conditions. This input is supplied to SIMCO as the output file of the program PWCLASS created by Carpenter, Heisler, and Curling (1979). Each record of the meteorological input file contains the year, month, day, and hour of the observation, the wind direction and speed, the temperature, and the atmospheric stability class. SIMCO uses the temporal data on the meteorological file to control the hourly simulation process and uses the windspeed, wind direction, temperature, and stability class data to estimate the hourly CO concentration for each simulated hour.

NOTES ON SIMCO

SIMCO evaluates the probability of violating a CO standard based on maximum allowable one- and eight-hour CO concentrations supplied by the user as two of the SIMCO inputs. This feature of SIMCO allows the user to find the probability of exceeding any chosen CO concentration more than once per year.

In addition to predicting the probability of violation based on CO contributed from background and highway sources, SIMCO predicts the probability of violation assuming that the only source is the background. The violation probability obtained by considering only background CO, denoted by P [V(B)], informs the user of the degree (relative to the specified CO standard) to which the background air is polluted without the effects of any additional sources.

For comparison and testing purposes, SIMCO also performs three probability analyses in addition to the maximum likelihood analysis discussed by Carpenter, Hudson, and White (1980) and the analyses described above. These analyses are the Larsen analysis, binomial analysis, and the annual average analysis.

Using the lognormal probability model presented by Larsen (1971), SIMCO predicts the expected annual maximum and expected annual second-maximum CO concentrations. The model also outputs the mean and standard deviation of the natural logarithms of the simulated CO concentrations. Using these statistical outputs and a table of normal probabilities, one can estimate the Larsen probability of violation; that is estimate the violation probability, assuming that sequential pollution levels are independent, identically distributed lognormal random variables.

Using the binomial assumption, SIMCO makes a maximum likelihood estimate of the probability of violation conditioned on a calendar year starting time based on calendar year meteorological data. In order to predict this condition probability, SIMCO assigns values of $y_i = 1$ for each simulated calendar year (year = i) in which the standard is exceeded twice or more, and assigns values of $y_i = 0$ otherwise. Under the assumption that a time lag of one year is sufficient to ensure independence, SIMCO estimates $P_{\tau=0}(V)$ and Var $[P_{\tau=0}(V)]$, the maximum likelihood estimate and variance of the maximum likelihood estimate of the calendar year conditioned probability of violation, from the following formulations given by Myer (1975):

$$P_{\tau=0}(V) = (\sum_{i=1}^{N} y_i)/N, \text{ and} \qquad \ldots (3)$$

$$Var[P_{\tau=0}(V)] = P_{\tau=0}(V)\ [1-P_{\tau=0}(V)]/N, \qquad \ldots (4)$$

where N is the total number of simulated years.

Using the Central Limit Theorem, SIMCO outputs the average and the standard deviation of the calendar-year averages of hourly average CO concentrations (both with and without the highway sources). Since there are 8,760 hours in a year, the Central Limit Theorem (Myer 1975) states that the yearly average hourly CO concentration should be approximately distributed. (Note: The yearly average concentration is not the same as the hourly average concentration. In particular, hourly average concentrations are not normally distributed.) Thus one can use the average and standard deviation of the calendar-year averages of hourly average CO concentrations with a table of normal probabilities to determine P[V(μ)] and P[V(YB)], the probabilities of violating any yearly average CO standard where μ and YB are the calendar-year averages of hourly average CO concentrations with and without the highway sources, respectively.

In the next section the input variables for SIMCO are defined.

GLOSSARY OF INPUT VARIABLES FOR SIMCO

AHT REAL ARRAY -- DIMENSION 13 -- INPUT.
THE ANNUAL AVERAGE TRAFFIC VOLUME IN VEHICLES/HOUR INDEXED BY SOURCE.

APCS REAL ARRAY -- DIMENSION 13 -- INPUT.
ANNUAL AVERAGE PERCENT COLD STARTS INDEXED BY SOURCE.

APDT REAL ARRAY -- DIMENSION 13 -- INPUT.
ANNUAL AVERAGE PERCENT DIESEL TRUCKS INDEXED BY SOURCE.

APGT REAL ARRAY -- DIMENSION 13 -- INPUT.
ANNUAL AVERAGE PERCENT GAS TRUCKS INDEXED BY SOURCE.

APHS REAL ARRAY -- DIMENSION 13 -- INPUT.
ANNUAL AVERAGE PERCENT HOT STARTS INDEXED BY SOURCE.

APLT REAL ARRAY -- DIMENSION 13 -- INPUT.
ANNUAL AVERAGE PERCENT LIGHT TRUCKS INDEXED BY SOURCE.

DSTMI INTEGER SCALAR -- INPUT.
THE FIRST MONTH OF DAYLIGHT SAVING TIME.

DSTM2 INTEGER SCALAR -- INPUT.
THE LAST MONTH OF DAYLIGHT SAVING TIME.

F REAL SCALAR -- INPUT.
THE RATIO OF COLD START NON-CATALYST OPERATION TO COLD START CATALYST OPERATION.

FCSD REAL ARRAY -- DIMENSION 13.7 -- INPUT.
DAY-OF-WEEK PERCENT COLD START FACTORS INDEXED BY SOURCE AND DAY. FCSD (I,D)*FCSM(I,M)*APCS(I) IS THE AVERAGE HOURLY PERCENT COLD STARTS FOR DAY-OF-WEEK D, MONTH M, AND SOURCE I.

FCSH REAL ARRAY -- DIMENSION 13.25 -- INPUT.
HOUR-OF-DAY PERCENT COLD START FACTORS INDEXED BY SOURCE AND HOUR. FCSH (I,H)*FCSD(I,D)*FCSM(I,M)*APCS(I) IS THE AVERAGE HOURLY PERCENT COLD STARTS FOR HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I.
NOTE, FCSH(I,25) IS SET EQUAL TO FCSH(I,L) INTERNALLY TO HANDLE THE DAYLIGHT SAVING TIME CONDITION. FCSH IS INPUT RELATIVE TO "CLOCK" TIME. FOR INSTANCE, FCSH(I,9) WOULD BE THE FACTOR FOR 9 AM STANDARD TIME FOR NOVEMBER THROUGH APRIL, AND FCSH(I,9) WOULD BE THE COLD START FACTOR FOR 9 AM DAYLIGHT SAVING TIME FOR MAY THROUGH OCTOBER. SO THE TIME REFERENCE FOR FCSH (AND FOR ALL INPUT TERMS WHICH ARE RELATIVE TO "CLOCK" TIME) IS THAT TIME WHICH WE WOULD HEAD ON THE CLOCK. ANOTHER WAY

TO EXPRESS THIS NOTION IS THAT "CLOCK" TIME REFERENCES ARE EITHER ST OR DST WHICHEVER IS APPLICABLE TO THE MONTH UNDER CONSIDERATION.

FCSM — REAL ARRAY -- DIMENSION 13,12 -- INPUT.
MONTHLY PERCENT COLD START FACTORS INDEXED BY SOURCE AND MONTH. FCSM (I,M)*APCS(I) IS THE AVERAGE HOURLY PERCENT COLD STARTS FOR MONTH M AND SOURCE I.

FDTD — REAL ARRAY -- DIMENSION 13.7 -- INPUT.
DAY-OF-WEEK PERCENT DIESEL TRUCK FACTORS INDEXED BY SOURCE AND DAY. FDTD(I,D)*FDTM(I,M)*APDT(I) IS THE AVERAGE HOURLY PERCENT DIESEL TRUCKS FOR DAY-OF-WEEK D, MONTH M, AND SOURCE I.

FDTH — REAL ARRAY -- DIMENSION 13,25 -- INPUT.
HOUR-OF-DAY PERCENT DIESEL TRUCK FACTORS INDEXED BY SOURCE AND HOUR. FDTH (I,M)*FDTD(I,D)*FDTM(I,M)*APDT(I) IS THE AVERAGE HOURLY PERCENT DIESEL TRUCKS FOR HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I. SEE NOTE UNDER FCSH.

FDTM — REAL ARRAY -- DIMENSION 13, 2 -- INPUT.
MONTHLY PERCENT DIESEL TRUCK FACTORS INDEXED BY SOURCE AND MONTH. FDTM(I,M)*APDT(I) IS THE AVERAGE HOURLY PERCENT DIESEL TRUCKS FOR MONTH M AND SOURCE I.

FGTD — REAL ARRAY -- DIMENSION 13,7 -- INPUT.
DAY-OF-WEEK PERCENT GAS TRUCK FACTORS INDEXED BY SOURCE AND DAY. FGTD(I,D)*FGTM(I,M)*APGT(I) IS THE AVERAGE HOURLY PERCENT GAS TRUCKS FOR DAY-OF-WEEK D, MONTH M, AND SOURCE I.

FGTH — REAL ARRAY -- DIMENSION 13,25 -- INPUT.
HOUR-OF-DAY PERCENT GAS TRUCK FACTORS INDEXED BY SOURCE AND HOUR. FGTH(I,H)*FGTD(I,D)*FGTM(I,M)*APGT(I) IS THE AVERAGE HOURLY PERCENT GAS TRUCKS FOR HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I. SEE NOTE UNDER FCSH.

FGTM — REAL ARRAY -- DIMENSION 13,12 -- INPUT.
MONTHLY PERCENT GAS TRUCK FACTORS INDEXED BY SOURCE AND MONTH. FGTM(I,M)*APGT(I) IS THE AVERAGE HOURLY PERCENT GAS TRUCKS FOR MONTH M AND SOURCE I.

FHSD — REAL ARRAY -- DIMENSION 13,7 -- INPUT.
DAY-OF-WEEK PERCENT HOT START FACTORS INDEXED BY SOURCE AND DAY. FHSD (I,D)*FHSM(I,M)*APSH(I) IS THE AVERAGE HOURLY PERCENT HOT STARTS FOR DAY-OF-WEEK D, MONTH M, AND SOURCE I.

FHSH — REAL ARRAY -- DIMENSION 13,25 -- INPUT.
HOUR-OF-DAY PERCENT HOT START FACTORS INDEXED BY SOURCE AND HOUR. FHSH(I,H)*FHSD(I,D)*FHSM(I,M)*APHS(I) IS THE AVERAGE HOURLY PERCENT HOT STARTS FOR HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I. SEE NOTE UNDER FCSH.

FHSM

REAL ARRAY -- DIMENSION 13,12 -- INPUT.
MONTHLY PERCENT HOT START FACTORS INDEXED BY SOURCE AND MONTH. FHSM (I,M)*APHS(I) IS THE AVERAGE HOURLY PERCENT HOT STARTS FOR MONTH M AND SOURCE I.

FLTD

REAL ARRAY -- DIMENSION 13,7 -- INPUT.
DAY-OF-WEEK PERCENT LIGHT TRUCK FACTORS INDEXED BY SOURCE AND DAY. FLTD(I,D)*FLTM(I,M)*APLT(I) IS THE AVERAGE HOURLY PERCENT LIGHT TRUCKS FOR DAY-OF-WEEK D, MONTH M, AND SOURCE I.

FLTH

REAL ARRAY -- DIMENSION 13,25 -- INPUT.
HOUR-OF-DAY PERCENT LIGHT TRUCK FACTORS INDEXED BY SOURCE AND HOUR. FLTH(I,H)*FLTD(I,D)*FLTM(I,M)*APLT(I) IS THE AVERAGE HOURLY PERCENT LIGHT TRUCKS FOR HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I. SEE NOTE UNDER FCSH.

FLTM

REAL ARRAY -- DIMENSION 13,12 -- INPUT.
MONTHLY PERCENT LIGHT TRUCK FACTORS INDEXED BY SOURCE AND MONTH. FLTM(I,M)*APLT(I) IS THE AVERAGE HOURLY PERCENT LIGHT TRUCKS FOR MONTH M AND SOURCE I.

FTVD

REAL ARRAY -- DIMENSION 13,7 -- INPUT.
DAY-OF-WEEK TOTAL VEHICLE TRAFFIC VOLUME FACTORS INDEXED BY SOURCE AND DAY. FTVD(I,D)*FTVM(I,M)*AHT(I) IS THE AVERAGE HOURLY TRAFFIC VOLUME FOR DAY-OF-WEEK D, MONTH M, AND SOURCE I IN VEHICLES/HOUR.

FTVH

REAL ARRAY -- DIMENSION 13,25 -- INPUT.
HOUR-OF-DAY TOTAL VEHICLE TRAFFIC VOLUME FACTORS INDEXED BY SOURCE AND HOUR. FTVH (I,H)*FTVD(I,D)*FTVM(I,M)*AHT(I) IS THE AVERAGE HOURLY TRAFFIC VOLUME FOR HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I IN VEHICLES/HOUR. SEE NOTE UNDER FCSH.

FTVM

REAL ARRAY -- DIMENSION 13,12 -- INPUT.
MONTHLY TOTAL VEHICLE TRAFFIC VOLUME FACTORS INDEXED BY SOURCE AND MONTH. FTVM (I,M)*AHT(I) IS THE AVERAGE HOURLY TRAFFIC VOLUME FOR MONTH M AND SOURCE I IN VEHICLES/HOUR.

HGCO

REAL ARRAY -- DIMENSION 25,12 -- INPUT.
THE GEOMETRIC MEAN OF THE PPM CO BACKGROUND INDEXED BY HOUR AND MONTH. MGCO IS CONVERTED TO THE MEAN OF THE LN(CO)BEFORE USE. NOTE THAT MGCO(25,J) IS SET TO MGCO(I,J) INTERNALLY TO HANDLE THE DAYLIGHT SAVING TIME CONDITION. MGCO IS INPUT RELATIVE TO "CLOCK" (SEE FCSH)TIME. NOTE THAT MGCO IS VERY NEARLY APPROXIMATED BY THE ARITHMETIC MEAN. THUS, IF GEOMETRIC MEANS ARE UNAVAILABLE, THE ARITHMETIC MEANS MAY BE USED.

NOMYR	INTEGER SCALAR -- INPUT. THE NOMINAL YEAR FOR THE ANALYSIS.
NS	INTEGER SCALAR -- INPUT. THE NUMBER OF SOURCES (ROADWAYS) USED IN THE ANALYSES.
OX,OY,OZ	REAL SCALARS -- INPUTS. THE X, Y, AND Z COORDINATES OF THE RECEPTOR LOCATION IN METRES.
SGCO	REAL ARRAY -- DIMENSION 12 -- INPUT. THE GEOMETRIC STANDARD DEVIATION OF THE BACKGROUND CO INDEXED BY MONTH FOR CO IN PPM. SGCO IS CONVERTED TO THE STANDARD DEVIATION OF LN(CO) BEFORE USE.
STAND	REAL SCALAR -- INPUT. THE CO LEVEL IN PPM NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.
STAND8	REAL SCALAR -- INPUT. THE EIGHT HOUR CO STANDARD IN PPM NOT TO BE EXCEEDED MOR THAN ONCE PER YEAR. THIS PROGRAM ASSUMES A COUNTING SCHEME FOR THE EIGHT HOUR STANDARD WHICH SKIPS AHEAD EIGHT HOURS WHENEVER AN EIGHT HOUR AVERAGED CO LEVEL EXCEEDING STAND8 IS FOUND.
TEST	LOGICAL SCALAR -- INPUT. IF TEST . EQ. . TRUE. THEN THE PROGRAM WILL OUTPUT AUXILIARY INFORMATION FROM THE SIMULATION.
TS	REAL ARRAY -- DIMENSION 13 -- INPUT. THE SLOPE OF THE SPEED VOLUME RELATIONSHIP IN MPH/(VEH/HR) INDEXED BY SOURCE.
TSPD	REAL ARRAY -- DIMENSION 13 -- INPUT. THE POSTED SPEED LIMIT IN MPH INDEXED BY SOURCE.
X1,Y1	REAL SCALARS -- INPUTS. THE X AND Y COORDINATES OF THE WEST-MOST END POINT OF A ROADWAY, IN METRES.
X2,Y2	REAL SCALARS -- INPUTS. THE X AND Y COORDINATES OF THE EAST-MOST END POINT OF A ROADWAY IN METRES.

The next section details the specific input card sequence and format requirements for SIMCO.

CARD SEQUENCE AND FORMAT

Input Data Requirements

Card 1, Format (12): NOMYR

Column 1: The nominal year of the analysis.

Card 2, Format (2(F5.0, 1X), L1): STAND, STAND8, TEST

Column 1: Maximum allowable one hour CO concentration in ppm.

Column 7: Maximum allowable eight hour CO concentration in ppm.

Column 13: In general use an "F". A value of "T" will generate additional histogram results. (see listing.)

Card 3, Format (3(Fg.0, 1X)): OX,OY,OZ

Column 1: The X coordinate of the receptor in metres.

Column 8: The Y coordinate of the receptor in metres.

Column 15: The Z coordinate of the receptor in metres.

Card 4, Format (I2): NS

Column 1: The number of line sources, (NS<13):

Let K = 4:

For I - 1 to NS (for each value of I, input the following card).

Card K + I, Format (4(F6.0,1X), F2.0,1X, F7.4):
X1,Y1,X2,Y2,TSPD(I),TS(I)

Column 1: The X coordinate in metres of the West-most end of line source I.

Column 8: The Y coordinate in metres of the West-most end of line source I.

Column 15: The X coordinate in metres of the East-most end of line source I.

Column 22: The Y coordinate in metres of the East-most end of line source I.

Column 29: The posted speed limit in mph for line source I.

Column 32: The slope in mph/veh of the speed capacity relationship for line source I.

Let K = 4+NS+1:

Let Card K, Format (F6.0): F

Column 1: The ratio of cold start non-catalyst operation to cold start catalyst operation.

Let K=K+1:

Card K, Format (13F6.0): (AHT(I), I=1, NS)

Column (6×I)-5: The annual average hourly traffic volume in veh/hr for source I, I-1 to NS.

Let K=K+1:

Card K, Format (13F6.0): (APGT(I),I=1, NS)

Column (6×I)-5: The annual average heavy duty gas truck percentage for source I, I-1 to NS.

Let K=K+1:

Card K, Format (13F6.0): (APDT(I), I=1,NS)

Column (6×I)-5: The annual average diesel truck percentage for source I,I-1 to NS.

Let K=K+1:

Card K, Format (13F6.0): (APLT(I), I=1, NS)

Column (6×I)-5: The annual average light truck percentage for source I,I=1 to NS.

Let K=K+1:

Card K, Format (13F6.0); (APHS (I), I=1, NS)

Column (6×I)-5: The annual average hot start percentage for source I,I=1 to NS.

Let K=K+1:

Card K, Format (13F6.0): (APCS(I),I=L,NS)

Column (6×I)-5: The annual average cold start (catalyst) percentage for source I, I-1 to NS.

For M = 1 to 12 (For each value of M, input the following group of six cards.)

Card K+L+(M-1)×6, Format (13F6.0) = (FTVM(I,M), 1-1,NS)

Column (6×I)-5: The monthly factor for the total hourly traffic volume for month M and source I, I-1 to NS.

Card K+2+(M-1)×6, Format (13F6.0): (FGTM(I,M), I-1,NS)

Column (6×I)-5: The monthly factor for the heavy duty gas truck percentage for month M and source I, I=1 to NS

Card K=3+(M-1)×6, Format (13F6.0): (FDTM (I,M),I=1, NS)

Column (6×I)-5: The monthly factor for the diesel truck percentage for month M and source I, I=1 to NS.

Card K+4+(M-1)×6, Format (13F6.0): (FLTM (I,M), I=1, NS)

Column (6×I)-5: The monthly factor for the light truck percentage for month M and source I, I=1 to NS.

Card K+5+(M-1)×6, Format (13F6.0): (FHSM (I,M), I=1, NS)

Column (6×I)-5: The monthly factor for the hot start percentage for month M and source I, I=1 to NS.

Card K+6+(M-1)×6, Format (13F6.0): (FCSM (I,M), I=1, NS)

Column (6×I)-5: The monthly factor for the cold start (catalyst) percentage for month M and source I, I=1 to NS.

Next M:

Let K = K+72

For D = 1 to 7 (For each value of D, input the following group of six cards.)

Card K+1+(D-1)×6, Format (13F6.0): (FTVD (I,D), I=1, NS)

Column (6×I)-5: The day-of-week factor for the total hourly traffic volume for day D and source I, I=1 to NS.

Card K+2+(D-1)×6, Format (13F6.0): (FGTD (I,D), I=1, NS)

Column (6×I)-5: The day-of-week factor for the heavy duty gas truck percentage for day D and source I, I-1 to NS.

Card K+3+(D-1)×6, Format (13F6.0): (FDTD (I,D), I=1, NS)

Column (6×I)-5: The day-of-week factor for the diesel truck percentage for day D and source I, I=1 to NS.

Card K+4+(D-1)×6, Format (13F6.0): (FLTD (I,D), I=1, NS)

Column (6×I)-5: The day-of-week factor for the light truck percentage for day D and source I, I=1 to NS.

Card K+5+(D-1)×6, Format (13F6.0): (FHSD (I,D), I=1, NS)

Column (6×I)-5: The day-of-week factor for the hot start percentage for day D and source I, I=1 to NS.

Card K+6+(D-1)×6, Format (13F6.0): (FCSD (I,D), I=1, NS)

Column (6×I)-5: The day-of-week factor for the cold start (catalyst) percentage for day D and source I, I=1, to NS.

Next D:

Let K = K+42:

For H = 1 to 24 (For each value of H, input the following group of six cards.)

Card K+1+(H-1)×6, Format (13F6.0): (FTVH (I,H), I=1, NS)

Column (6×I)-5: The hour-of-day factor for the total hourly traffic volume for hour H and source I, I=1 to NS.

Card K+2(H-1)×6, Format (13F6.0): (FGTH (I,H), I=1, NS)

Column (6×I)-5: The hour-of-day factor for the heavy duty gas truck percentage for hour H and source I, I=1 to NS.

Card K+3+(H-1)×6, Format (13F6.0): (FDTH (I,H), I=1, NS)

Column (6×I)-5: The hour-of-day factor for the diesel truck percentage for hour H and source I, I=1 to NS.

Card K+4+(H-1)×6, Format (13F6.0): (FLTH (I,H), I=1, NS)

Column (6×I)-5: The hour-of-day factor for the light truck percentage for hour H and source I, I=1 to NS.

Card K+5+(H-1)×6, Format (13F6.0): (FHSH (I,H), I=1, NS)

Column (6×I)-5: The hour-of-day factor for the hot start percentage for hour H and source I, I=1 to NS.

Card K+6+(H-1)×6, Format (13F6.0): (FCSH (I,H), I=1, NS)

Column (6×I)-5: The hour-of-day factor for the cold start (catalyst) percentage for hour H and source I, I=1 to NS.

Next H:

Let K = K+144+1:

Card K, Format (12F6.0): (SGCO (M), M=1, 12)

Column (6×M)-5: The geometric standard deviation of CO concentration (relative to ppm CO) for month M, M=1 to 12.

Let K = K+1:

For H = 1 to 24 (For each value of H, input the following card.)

Card K+H, Format (12F6.0): (MGCO (H,M), M=1, 12)

Column (6×M)-5: The geometric mean of CO concentration relative to ppm CO for hour-of-day H and month X, M=1 to 12.

Next H:

Let K = K+24+1:

Card K, Format (12, 1×, 12): DSTM1. DSTM2

Column 1: The first month of daylight saving time.

Column 4: The last month of daylight saving time.

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APPENDIX

EXAMPLE APPLICATIONS

AND

PROGRAM LISTING

EXAMPLE APPLICATIONS

Overview

In this section, three study examples are presented. Unlike worst-case modeling, SIMCO simulates concentrations using historically derived input data for each one-hour time period in a year and then evaluates the simulated concentrations statistically to provide direct comparison to the NAAQS's. The model requires input for all hours in a year. Even if only one air quality event is of concern, it must be evaluated in perspective with all other such events in a year. It is essential to input appropriate source-emission data, background CO data (CO which would exist even if the highways were not present), and a representative meteorological record of statistically valid duration (e.g., ten years). Proper site selection is also necessary to obtain informative results. When a study site is analyzed with SIMCO, the reception is assumed to receive continuous year-round exposure (similar to that for a continuously monitored site). Although the sites and their associated geometry provided in the examples are hypothetical, efforts were taken to represent realistic study conditions.

For the examples, data inputs were obtained using Virginia-specific information with the exception of hot and cold operating condition estimates. These were derived from <u>The Determination of Vehicular Cold and Hot Operating Fractions for Estimating Highway Emissions</u>, September, 1978, by George Ellis et al., US DOT, FHWA. Data representative of background CO (which would exist even without the modeled highways) were obtained from monitoring records of a local air pollution agency. A ten-year meteorological record was obtained from a National Weather Service tape of data from a local airport.

Care was taken to assure that the hypothetical sites were located in microscale regimes. References on siting criteria should be consulted to determine proper application of the model. The receptor site coordinates in the examples identify the analyses as either hot spot or Environmental Impact Statement studies. The height of two metres represents approximate breathing height (over 1.5 metres). Monitor-siting guides would have dictated an elevation near three metres. SIMCO models all line sources as at-grade with surrounding terrain. Although receptor height is a variable input, it is relative to the same ground elevation as the source(s). Appropriate center of lane to receptor set-back distance will vary according to siting criteria guidelines. What is considered reasonable (or practical) can vary based on the objective, the type of study, and particular circumstances at a site. It should be recognized that SIMCO assumes year-round exposure at a receptor.

The probability of whether an actual receptor occupies a site on less frequent periodic intervals is not accounted for in the model. A site should, at a minimum, represent a location where the potential to violate the NAAQS's is high and where a member of the general public would have continuous year-round access (i.e., exposure).

As previously stated in this report, SIMCO computes the probability of violation based on a maximum likelihood analysis and provides additional information pertaining to the magnitudes and frequencies of carbon monoxide concentrations. The results of the maximum likelihood analysis are the preferred evaluative statistics as discussed by Carpenter in A Procedure for Estimating the Frequency Distribution of CO Levels in the Micro-Region of a Highway, June 1979, Virginia Highway and Transportation Research Council. Additional information is provided by SIMCO for research and comparison purposes.

The maximum likelihood analyses are based on a simulated history of CO concentrations. The output item P1 is the probability of any random one-hour concentration being greater than the specified standard. The output item P01 is the probability of any random one-hour concentration less than the standard being followed by a one-hour concentration greater than the standard. The eight-hour maximum likelihood analysis is similar to the one-hour analysis. The only major difference is that the eight-hour analysis is based on overlapping eight-hour average concentrations.

In the lognormal (Larsen 1971) analysis performed by SIMCO, pollution levels are assumed to be identically distributed, sequentially independent random variables from a lognormal distribution. (An assumption which is not generally accepted.) SIMCO produces estimates of the maximum and second maximum concentration estimates based on the geometric mean and standard geometric deviation of the simulated levels. Using the mean and standard deviations of the natural logarithms from the example printout, and a normal cumulative distribution table, the Larsen one-hour probability of violating the NAAQS can be determined by first examining the area of probability (P_t, or $1-F(\chi)$) defined above the test point of Z standard deviations where

$$Z = \frac{\ell n \text{ (X ppm)} - \text{(Mean of the } \ell n \text{ of the concentrations)}}{\text{(Standard deviation of the } \ell n \text{ of the concentrations}}$$

and X = the specified standard. The probability (P_t) corresponding to the test point Z may be translated to the probability of exceeding the specified standard twice or more in any random year by substituting the value (P_t) into the equation

Probability of Violation =

$$1 - [1 - (P_t)]^{8,760} - 8760\,(P_t)\,[1 - (P_t)]^{8,759}$$

In the binomial calendar year analysis performed by SIMCO, each simulated calendar year is tested for two or more one-hour concentrations exceeding the standard. Assuming independence between successive calendar years, the fraction of calendar years having two or more concentrations above the standard is the probability of violation.

The yearly average analysis performed by SIMCO provides the averages and standard deviations of the calendar-year average hour concentrations with and without the modeled highway sources. These statistics are similar to those traditionally found in monitoring summaries. The probability of violating a yearly-average hourly standard may be determined from these parameters by first determining Z as

$$Z = \frac{\begin{bmatrix}\text{Yearly Average Average} \\ \text{Standard Concentration}\end{bmatrix} - \begin{bmatrix}\text{Yearly Hourly} \\ \text{Average Concentration}\end{bmatrix}}{\text{Standard Deviation of the Yearly Hourly Average Concentration}}$$

and then finding the probability of exceeding Z.

Examples

The specific scenarios and analysis results for each example are discussed below. Dimensional illustrations of the site geometry and computer output for each example are also provided for reference. Data inputs prepared as described in the main text are provided on the computer output of each example.

Example A

General Description

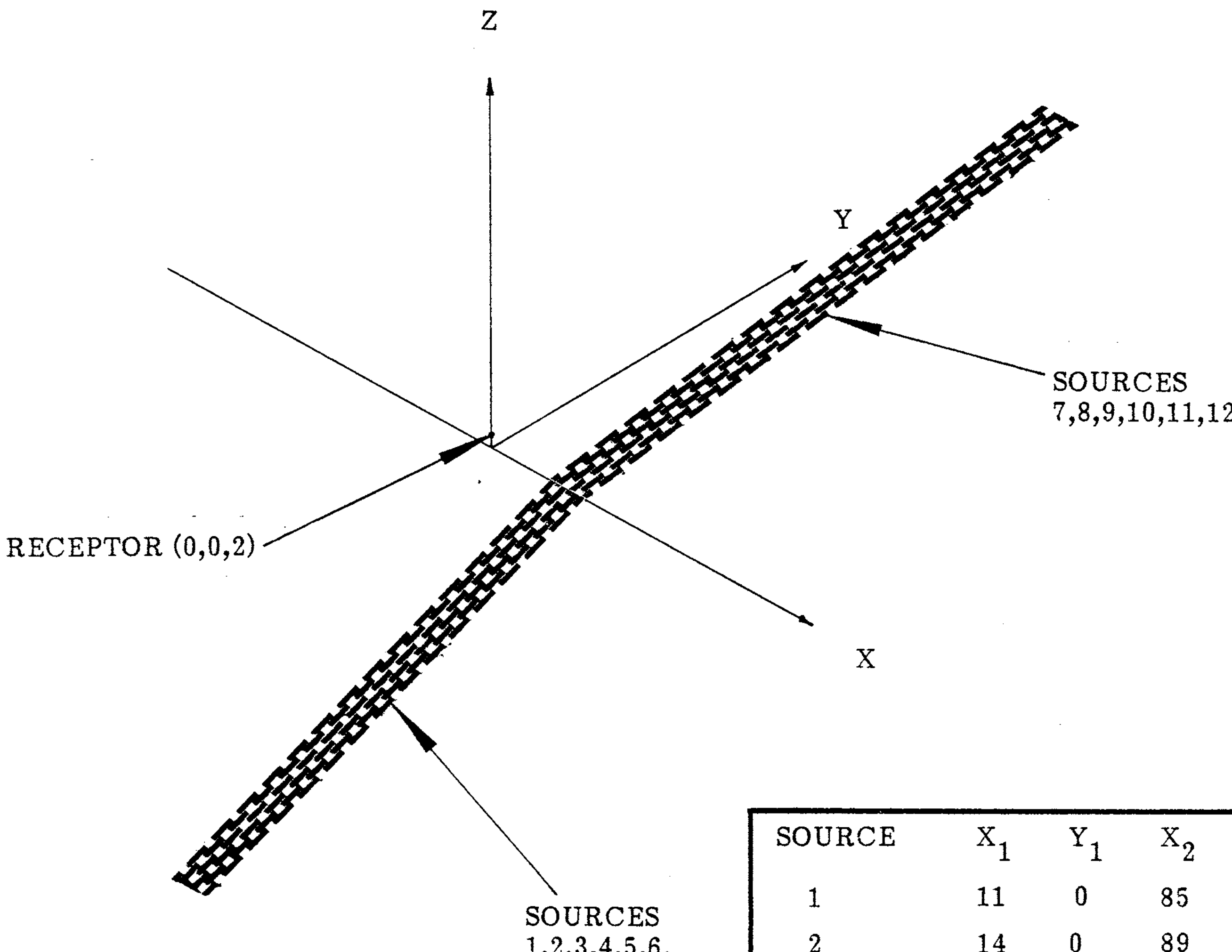
In this example a study site adjacent to a six-lane, limited access highway is examined. The receptor is approximately eleven metres west of the center of the nearest lane. The highway is aligned in a north-south direction and carries bi-directional traffic of moderate volume (refer to Figure A-1 and the computer output sheets for example A). Northbound traffic is heaviest in the morning. Southbound traffic is heaviest in evening. Hot and cold vehicle operation modes vary by hour, but not by direction of travel. Monthly and day of week traffic and emission patterns do not vary appreciably. Average vehicle speed (posted speed) is 35 miles per hour (56.3 km/hr) and decreases approximately four miles per hour per thousand vehicles per hour per lane. The background CO (without the highway) is low to moderate (this fact is not readily apparent from the input). The data describe conditions for a nominal year of 1980. Ten years of hourly CO concentrations are simulated using ten years of meteorological data.

Analysis of Results

The maximum likelihood analysis shows that for this example the probability of violating the one-hour NAAQS is zero. The probability of violating the one-hour NAAQS with only CO background is, logically, also zero. The probability of violation assuming a lognormal fit of the simulated concentrations is also zero. This estimate was calculated using a test point, Z, of 4.93, which corresponds to a P_t below 0.000001. The binomial calendar year analysis also shows zero as the one-hour probability of violation.

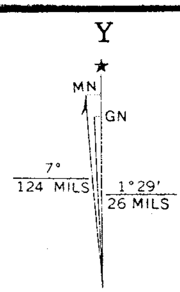
The maximum one-hour simulated total concentration given in the output histogram is in the 19 to 20 ppm range and is higher than the 15 ppm maximum estimate based on the lognormal fit of the simulated concentrations. The maximum likelihood analysis eight-hour probability of violation is zero. In view of these statistics the facility, as modeled for the nominal year, would not result in a violation of the NAAQS's at the hypothetical site.

Figure A-1. Example A.



SOURCE	X_1	Y_1	X_2	Y_2
1	11	0	85	-427
2	14	0	89	-427
3	18	0	93	-427
4	27	0	101	-427
5	30	0	105	-427
6	34	0	109	-427
7	-49	488	11	0
8	-45	488	14	0
9	-41	488	18	0
10	-33	488	27	0
11	-29	488	30	0
12	-26	488	34	0

NOT TO SCALE



True North Adjustment

THE NOMINAL CALENDAR YEAR OF THIS ANALYSIS IS 1980

RECEPTOR DX, DY, DZ 0. 0. 2.

SOURCE 1	X1, Y1, X2, Y2, SPEED, SLOPE	11.	0.	85.	-427.	35.	-0.0040
SOURCE 2	X1, Y1, X2, Y2, SPEED, SLOPE	14.	0.	89.	-427.	35.	-0.0040
SOURCE 3	X1, Y1, X2, Y2, SPEED, SLOPE	18.	0.	93.	-427.	35.	-0.0040
SOURCE 4	X1, Y1, X2, Y2, SPEED, SLOPE	27.	0.	101.	-427.	35.	-0.0040
SOURCE 5	X1, Y1, X2, Y2, SPEED, SLOPE	30.	0.	105.	-427.	35.	-0.0040
SOURCE 6	X1, Y1, X2, Y2, SPEED, SLOPE	34.	0.	109.	-427.	35.	-0.0040
SOURCE 7	X1, Y1, X2, Y2, SPEED, SLOPE	-49.	488.	11.	0.	35.	-0.0040
SOURCE 8	X1, Y1, X2, Y2, SPEED, SLOPE	-45.	488.	14.	0.	35.	-0.0040
SOURCE 9	X1, Y1, X2, Y2, SPEED, SLOPE	-41.	488.	18.	0.	35.	-0.0040
SOURCE 10	X1, Y1, X2, Y2, SPEED, SLOPE	-33.	488.	27.	0.	35.	-0.0040
SOURCE 11	X1, Y1, X2, Y2, SPEED, SLOPE	-29.	488.	30.	0.	35.	-0.0040
SOURCE 12	X1, Y1, X2, Y2, SPEED, SLOPE	-26.	488.	34.	0.	35.	-0.0040

RATIO OF CSNC TO CSC 1.00

AHT BY SOURCE 231. 231. 231. 231. 231. 231. 231. 231. 231. 231. 231. 231.

ANNUAL AVERAGE PERCENT HEAVY DUTY GAS TRUCKS BY SOURCE

2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0

ANNUAL AVERAGE PERCENT DIESEL TRUCKS BY SOURCE

1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5

ANNUAL AVERAGE PERCENT LIGHT TRUCKS BY SOURCE

6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0

ANNUAL AVERAGE PERCENT HOT START OPERATION BY SOURCE

12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0

ANNUAL AVERAGE PERCENT COLD START OPERATION BY SOURCE

16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9

TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR

MONTH 1 TV	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
MONTH 1 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 TV	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000

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MONTH 2 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 TV	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
MONTH 3 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 TV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 TV	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
MONTH 5 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 TV	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
MONTH 6 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 TV	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
MONTH 7 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 TV	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800
MONTH 8 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 TV	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300
MONTH 9 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 TV	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600
MONTH 10 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 TV	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100
MONTH 11 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 TV	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
MONTH 12 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

DAY 1 TV	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
DAY 1 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 TV	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
DAY 2 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 TV	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
DAY 3 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 TV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 TV	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
DAY 5 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 TV	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500
DAY 6 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 TV	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
DAY 7 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR

HOUR 1 TV	0.3600	0.3600	0.3600	0.2700	0.2700	0.2700	0.3600	0.3600	0.3600	0.2700	0.2700	0.2700
HOUR 1 GT	0.0700	0.0700	0.0700	0.1400	0.1400	0.1400	0.0700	0.0700	0.0700	0.1400	0.1400	0.1400
HOUR 1 DT	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
HOUR 1 LT	0.1700	0.1700	0.1700	0.2200	0.2200	0.2200	0.1700	0.1700	0.1700	0.2200	0.2200	0.2200
HOUR 1 HS	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200
HOUR 1 CS	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400
HOUR 2 TV	0.2200	0.2200	0.2200	0.1100	0.1100	0.1100	0.2200	0.2200	0.2200	0.1100	0.1100	0.1100
HOUR 2 GT	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700
HOUR 2 DT	0.0	0.0	0.0	0.1000	0.1000	0.1000	0.0	0.0	0.0	0.1000	0.1000	0.1000
HOUR 2 LT	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700
HOUR 2 HS	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200
HOUR 2 CS	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000
HOUR 3 TV	0.1500	0.1500	0.1500	0.1100	0.1100	0.1100	0.1500	0.1500	0.1500	0.1100	0.1100	0.1100
HOUR 3 GT	0.0	0.0	0.0	0.0700	0.0700	0.0700	0.0	0.0	0.0	0.0700	0.0700	0.0700
HOUR 3 DT	0.0	0.0	0.0	0.1000	0.1000	0.1000	0.0	0.0	0.0	0.1000	0.1000	0.1000
HOUR 3 LT	0.0700	0.0700	0.0700	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700	0.1000	0.1000	0.1000
HOUR 3 HS	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200

GEOMETRIC MEANS OF PPM CO BACKGROUND BY MONTH AND HOUR

HOUR 1	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 2	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 3	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 4	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 5	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 6	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 7	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 8	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 9	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 10	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 11	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 12	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 13	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 14	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 15	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 16	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 17	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 18	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 19	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 20	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 21	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 22	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 23	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 24	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300

FIRST AND LAST MONTHS OF DAYLIGHT SAVING TIME 5 10

HOUR 4 GT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 4 DT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 4 LT	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
HOUR 4 HS	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
HOUR 4 CS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 5 TV	0.1100	0.1000	0.1000	0.0900	0.0900	0.0900	0.1000	0.1000	0.1000	0.0900	0.0900	0.0900
HOUR 5 GT	0.0	0.0	0.0	0.0700	0.0700	0.0700	0.0	0.0	0.0	0.0700	0.0700	0.0700
HOUR 5 DT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 5 LT	0.0500	0.0500	0.0500	0.0700	0.0700	0.0700	0.0500	0.0500	0.0500	0.0700	0.0700	0.0700
HOUR 5 HS	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
HOUR 5 CS	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800
HOUR 6 TV	0.1500	0.1500	0.1500	0.4600	0.4600	0.4600	0.1500	0.1500	0.1500	0.4600	0.4600	0.4600
HOUR 6 GT	0.0	0.0	0.0	0.2200	0.2200	0.2200	0.0	0.0	0.0	0.2200	0.2200	0.2200
HOUR 6 DT	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900
HOUR 6 LT	0.0700	0.0700	0.0700	0.3600	0.3600	0.3600	0.0700	0.0700	0.0700	0.3600	0.3600	0.3600
HOUR 6 HS	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900
HOUR 6 CS	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000
HOUR 7 TV	0.5300	0.5300	0.5300	1.9700	1.9700	1.9700	0.5300	0.5300	0.5300	1.9700	1.9700	1.9700
HOUR 7 GT	1.0100	1.0100	1.0100	1.3000	1.3000	1.3000	1.0100	1.0100	1.0100	1.3000	1.3000	1.3000
HOUR 7 DT	1.6500	1.6500	1.6500	1.6300	1.6300	1.6300	1.6500	1.6500	1.6500	1.6300	1.6300	1.6300
HOUR 7 LT	1.2800	1.2800	1.2800	1.2300	1.2300	1.2300	1.2800	1.2800	1.2800	1.2300	1.2300	1.2300
HOUR 7 HS	0.8500	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
HOUR 7 CS	1.0800	1.0800	1.0800	1.0800	1.0800	1.0900	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800
HOUR 8 TV	0.9000	0.9000	0.9000	2.7900	2.7900	2.7900	0.9000	0.9000	0.9000	2.7900	2.7900	2.7900
HOUR 8 GT	2.6700	2.6700	2.6700	2.3100	2.3100	2.3100	2.6700	2.6700	2.6700	2.3100	2.3100	2.3100
HOUR 8 DT	2.6300	2.6300	2.6300	2.0200	2.0200	2.0200	2.6300	2.6300	2.6300	2.0200	2.0200	2.0200
HOUR 8 LT	1.4000	1.4000	1.4000	1.2300	1.2300	1.2300	1.4000	1.4000	1.4000	1.2300	1.2300	1.2300
HOUR 8 HS	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
HOUR 8 CS	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
HOUR 9 TV	1.1500	1.1500	1.1500	2.3800	2.3800	2.3800	1.1500	1.1500	1.1500	2.3800	2.3800	2.3800
HOUR 9 GT	2.4600	2.4600	2.4600	2.3900	2.3900	2.3900	2.4600	2.4600	2.4600	2.3900	2.3900	2.3900
HOUR 9 DT	3.4000	3.4000	3.4000	2.9600	2.9600	2.9600	3.4000	3.4000	3.4000	2.9600	2.9600	2.9600
HOUR 9 LT	1.8300	1.8300	1.8300	1.7100	1.7100	1.7100	1.8300	1.8300	1.8300	1.7100	1.7100	1.7100
HOUR 9 HS	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300
HOUR 9 CS	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
HOUR 10 TV	1.2500	1.2500	1.2500	1.4800	1.4800	1.4800	1.2500	1.2500	1.2500	1.4800	1.4800	1.4800
HOUR 10 GT	2.7600	2.7600	2.7600	2.6000	2.6000	2.6000	2.7600	2.7600	2.7600	2.6000	2.6000	2.6000
HOUR 10 DT	2.7300	2.7300	2.7300	2.4900	2.4900	2.4900	2.7300	2.7300	2.7300	2.4900	2.4900	2.4900
HOUR 10 LT	2.1200	2.1200	2.1200	1.8300	1.8300	1.8300	2.1200	2.1200	2.1200	1.8300	1.8300	1.8300
HOUR 10 HS	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800
HOUR 10 CS	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
HOUR 11 TV	1.3100	1.3100	1.3100	1.3600	1.3600	1.3600	1.3100	1.3100	1.3100	1.3600	1.3600	1.3600
HOUR 11 GT	2.8200	2.8200	2.8200	2.6000	2.6000	2.6000	2.8200	2.8200	2.8200	2.6000	2.6000	2.6000
HOUR 11 DT	2.5400	2.5400	2.5400	1.7300	1.7300	1.7300	2.5400	2.5400	2.5400	1.7300	1.7300	1.7300
HOUR 11 LT	2.2500	2.2500	2.2500	1.8300	1.8300	1.8300	2.2500	2.2500	2.2500	1.8300	1.8300	1.8300
HOUR 11 HS	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900
HOUR 11 CS	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
HOUR 12 TV	1.6400	1.6400	1.6400	1.3800	1.3800	1.3800	1.6400	1.6400	1.6400	1.3800	1.3800	1.3800
HOUR 12 GT	2.5300	2.5300	2.5300	2.3900	2.3900	2.3900	2.5300	2.5300	2.5300	2.3900	2.3900	2.3900
HOUR 12 DT	2.2400	2.2400	2.2400	2.0200	2.0200	2.0200	2.2400	2.2400	2.2400	2.0200	2.0200	2.0200
HOUR 12 LT	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600
HOUR 12 HS	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100
HOUR 12 CS	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
HOUR 13 TV	1.5200	1.5100	1.5100	1.5000	1.5000	1.5000	1.5100	1.5100	1.5100	1.5000	1.5000	1.5000
HOUR 13 GT	2.4600	2.4600	2.4600	2.2400	2.2400	2.2400	2.4600	2.4600	2.4600	2.2400	2.2400	2.2400
HOUR 13 DT	2.5400	2.5400	2.5400	2.3000	2.3000	2.3000	2.5400	2.5400	2.5400	2.3000	2.3000	2.3000
HOUR 13 LT	1.9500	1.9500	1.9500	1.6200	1.6200	1.6200	1.9500	1.9500	1.9500	1.6200	1.6200	1.6200
HOUR 13 HS	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100
HOUR 13 CS	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600
HOUR 14 TV	1.3300	1.3300	1.3300	1.3800	1.3800	1.3800	1.3300	1.3300	1.3300	1.3800	1.3800	1.3800
HOUR 14 GT	2.3900	2.3900	2.3900	1.8800	1.8800	1.8800	2.3900	2.3900	2.3900	1.8800	1.8800	1.8800
HOUR 14 DT	1.4600	1.4600	1.4600	2.1100	2.1100	2.1100	1.4600	1.4600	1.4600	2.1100	2.1100	2.1100
HOUR 14 LT	2.0000	2.0000	2.0000	2.0800	2.0800	2.0800	2.0000	2.0000	2.0000	2.0800	2.0800	2.0800
HOUR 14 HS	1.3300	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800

HOUR 14 CS	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300
HOUR 15 TV	1.5400	1.5400	1.5400	1.2300	1.2300	1.2300	1.5400	1.5400	1.5400	1.2300	1.2300	1.2300
HOUR 15 GT	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600
HOUR 15 DT	1.5600	1.5600	1.5600	1.4400	1.4400	1.4400	1.5600	1.5600	1.5600	1.4400	1.4400	1.4400
HOUR 15 LT	2.3100	2.3100	2.3100	1.9300	1.9300	1.9300	2.3100	2.3100	2.3100	1.9300	1.9300	1.9300
HOUR 15 HS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 15 CS	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.3500	0.8500	0.8500	0.8500	0.8500
HOUR 16 TV	2.0100	2.0100	2.0100	1.3400	1.3400	1.3400	2.0100	2.0100	2.0100	1.3400	1.3400	1.3400
HOUR 16 GT	1.3700	1.3700	1.3700	1.2300	1.2300	1.2300	1.3700	1.3700	1.3700	1.2300	1.2300	1.2300
HOUR 16 DT	1.3700	1.3700	1.3700	1.5400	1.5400	1.5400	1.3700	1.3700	1.3700	1.5400	1.5400	1.5400
HOUR 16 LT	2.0200	2.0200	2.0200	2.2800	2.2800	2.2800	2.0200	2.0200	2.0200	2.2800	2.2800	2.2800
HOUR 16 HS	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100
HOUR 16 CS	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9300	0.9800	0.9800	0.9800
HOUR 17 TV	2.2800	2.2400	2.2400	1.1000	1.1000	1.1000	2.2400	2.2400	2.2400	1.1000	1.1000	1.1000
HOUR 17 GT	0.5100	0.5100	0.5100	0.8700	0.8700	0.8700	0.5100	0.5100	0.5100	0.3700	0.8700	0.8700
HOUR 17 DT	0.6300	0.6800	0.6800	0.7700	0.7700	0.7700	0.6800	0.6800	0.6800	0.7700	0.7700	0.7700
HOUR 17 LT	1.2000	1.2000	1.2000	1.4500	1.4500	1.4500	1.2000	1.2000	1.2000	1.4500	1.4500	1.4500
HOUR 17 HS	0.9800	0.9800	0.9300	0.9800	0.9800	0.9800	0.9800	0.9800	0.9300	0.9800	0.9800	0.9800
HOUR 17 CS	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
HOUR 18 TV	2.0300	2.0400	2.0400	1.1100	1.1100	1.1100	2.0400	2.0400	2.0400	1.1100	1.1100	1.1100
HOUR 18 GT	0.2200	0.2200	0.2200	0.2900	0.2900	0.2900	0.2200	0.2200	0.2200	0.2900	0.2900	0.2900
HOUR 18 DT	0.2000	0.2000	0.2000	0.5800	0.5800	0.5800	0.2000	0.2000	0.2000	0.5800	0.5800	0.5800
HOUR 18 LT	0.8000	0.8000	0.8000	1.2300	1.2300	1.2300	0.8000	0.8000	0.8000	1.2300	1.2300	1.2300
HOUR 18 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 18 CS	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
HOUR 19 TV	1.5900	1.5900	1.5900	0.9200	C.9200	0.9200	1.5900	1.5900	1.5900	0.9200	0.9200	0.9200
HOUR 19 GT	0.2900	0.2900	0.2900	0.3600	0.3600	0.3600	0.2900	0.2900	0.2900	0.3600	0.3600	0.3600
HOUR 19 DT	0.2000	0.2000	0.2000	0.4800	0.4800	0.4800	0.2000	0.2000	0.2000	0.4800	0.4800	0.4800
HOUR 19 LT	0.7700	0.7700	0.7700	0.7200	0.7200	0.7200	0.7700	0.7700	0.7700	0.7200	0.7200	0.7200
HOUR 19 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 19 CS	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.3300	0.8300	0.8300
HOUR 20 TV	1.0800	1.0800	1.0800	0.7800	0.7800	0.7800	1.0800	1.0800	1.0800	0.7800	0.7800	0.7800
HOUR 20 GT	0.2200	0.2200	0.2200	0.3600	0.3600	0.3600	0.2200	0.2200	0.2200	0.3600	0.3600	0.3600
HOUR 20 DT	0.2000	0.2000	0.2000	0.3800	0.3800	0.3800	0.2000	0.2000	0.2000	0.3300	0.3800	0.3800
HOUR 20 LT	0.5300	0.5300	0.5300	0.6300	0.6300	0.6300	0.5300	0.5300	0.5300	0.6300	0.6300	0.6300
HOUR 20 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 20 CS	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100
HOUR 21 TV	0.8300	0.8300	0.8300	0.6200	0.6200	0.6200	0.8300	0.8300	0.8300	0.6200	0.6200	0.6200
HOUR 21 GT	0.1400	0.1400	0.1400	0.2900	0.2900	0.2900	0.1400	0.1400	0.1400	0.2900	0.2900	0.2900
HOUR 21 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 21 LT	0.4100	0.4100	0.4100	0.4800	0.4800	0.4800	0.4100	0.4100	0.4100	0.4800	0.4800	0.4800
HOUR 21 HS	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
HOUR 21 CS	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
HOUR 22 TV	0.7100	0.7100	0.7100	0.5600	0.5600	0.5600	0.7100	0.7100	0.7100	0.5600	0.5600	0.5600
HOUR 22 GT	0.1400	0.1400	0.1400	0.2200	0.2200	0.2200	0.1400	0.1400	0.1400	0.2200	0.2200	0.2200
HOUR 22 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 22 LT	0.3400	0.3400	0.3400	0.4300	0.4300	0.4300	0.3400	0.3400	0.3400	0.4300	0.4300	0.4300
HOUR 22 HS	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200
HOUR 22 CS	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500
HOUR 23 TV	0.6000	0.6900	0.6900	0.5500	0.5500	0.5500	0.6900	0.6900	0.6900	0.5500	0.5500	0.5500
HOUR 23 GT	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200
HOUR 23 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 23 LT	0.2900	0.2900	0.2900	0.4300	0.4300	0.4300	0.2900	0.2900	0.2900	0.4300	0.4300	0.4300
HOUR 23 HS	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
HOUR 23 CS	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400
HOUR 24 TV	0.6000	0.6000	0.6000	0.4700	0.4700	0.4700	0.6000	0.6000	0.6000	0.4700	0.4700	0.4700
HOUR 24 GT	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200
HOUR 24 DT	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900
HOUR 24 LT	0.2900	0.2900	0.2900	0.3900	0.3900	0.3900	0.2900	0.2900	0.2900	0.3900	0.3900	0.3900
HOUR 24 HS	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600
HOUR 24 CS	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800

GEOMETRIC STANDARD DEVIATIONS OF BACKGROUND CO BY MONTH FOR CO IN PPM

[illegible]	1.9600	1.7200	1.6900	1.5000	1.5000	1.6900	1.7400	1.7700	1.9900	1.9800	1.9600

FROM THE MAXIMUM LIKELYHOOD ANALYSIS WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF P1 IS 0.0 WITH A STANDARD ERROR OF 0.0

THE ESTIMATE OF P01 IS 0.0 WITH A STANDARD ERROR OF 0.0

WHICH YIELD A PROBABILITY OF VIOLATING THE CO STANDARD OF 0.0 O/O WITH A STANDARD ERROR OF 0.0 O/O

AUXILIARY RESULTS OBTAINED UNDER VARIOUS ASSUMPTIONS ARE INCLUDED ON THE FOLLOWING PAGE.

**** AUXILIARY RESULTS ***

FROM THE LOGNORMAL ASSUMPTION (10 YEAR SIMULATION)

```
COMAX  =   15.0667
COMAX2 =   12.4785
MEANLN = -0.159936E 00
STDLN  =  0.753918E 00
```

FROM THE BINOMIAL ASSUMPTION (10 YEAR SIMULATION) WITH A STANDARD OF 35.00 PPM

```
PROB   =   0.0  O/O
SPROB  =   0.0  O/O
```

ASSUMING THAT THE ONLY SOURCE OF CO IS THE BACKGROUND CO WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF P1 IS 0.0 WITH A STANDARD ERROR OF 0.0

THE ESTIMATE OF P01 IS 0.0 WITH A STANDARD ERROR OF 0.0

WHICH YIELD A PROBABILITY OF VIOLATING THE CO STANDARD OF 0.0 O/O WITH A STANDARD ERROR OF 0.0 O/O

FOR THE PREDICTED CO CONCENTRATION (NO ASSUMPTIONS) WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF YEARLY AVERAGE CONCENTRATION IS 0.113885E 01 PPM

THE STANDARD DEVIATION OF YEARLY AVERAGE CONCENTRATION IS 0.337444E-01 PPM

ASSUMING THAT THE ONLY SOURCE OF CO IS THE BACKGROUND CO WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF YEARLY AVERAGE CONCENTRATION IS 0.640954E 00 PPM

THE STANDARD DEVIATION OF YEARLY AVERAGE CONCENTRATION IS 0.326638E-02 PPM

SIMULATION HISTOGRAM

CO RANGE, PPM	NO. HOURS .EQ.	NO. HOURS .GE.
0.0 .LT. X .LE. 1.0	50264	87647
1.0 .LT. X .LE. 2.0	26433	37383
2.0 .LT. X .LE. 3.0	7043	10950
3.0 .LT. X .LE. 4.0	2127	3907
4.0 .LT. X .LE. 5.0	810	1780
5.0 .LT. X .LE. 6.0	283	970
6.0 .LT. X .LE. 7.0	206	587
7.0 .LT. X .LE. 8.0	114	381
8.0 .LT. X .LE. 9.0	78	267
9.0 .LT. X .LE. 10.0	55	189
10.0 .LT. X .LE. 11.0	45	134
11.0 .LT. X .LE. 12.0	22	89
12.0 .LT. X .LE. 13.0	16	67
13.0 .LT. X .LE. 14.0	16	51
14.0 .LT. X .LE. 15.0	11	35
15.0 .LT. X .LE. 16.0	8	24
16.0 .LT. X .LE. 17.0	12	16
17.0 .LT. X .LE. 18.0	1	4
18.0 .LT. X .LE. 19.0	1	3
19.0 .LT. X .LE. 20.0	2	2
20.0 .LT. X .LE. 21.0	0	0
21.0 .LT. X .LE. 22.0	0	0
22.0 .LT. X .LE. 23.0	0	0
23.0 .LT. X .LE. 24.0	0	0
24.0 .LT. X .LE. 25.0	0	0
25.0 .LT. X .LE. 26.0	0	0
26.0 .LT. X .LE. 27.0	0	0
27.0 .LT. X .LE. 28.0	0	0
28.0 .LT. X .LE. 29.0	0	0
29.0 .LT. X .LE. 30.0	0	0
30.0 .LT. X .LE. 31.0	0	0
31.0 .LT. X .LE. 32.0	0	0
32.0 .LT. X .LE. 33.0	0	0
33.0 .LT. X .LE. 34.0	0	0
34.0 .LT. X .LE. 35.0	0	0
35.0 .LT. X .LE. 36.0	0	0
36.0 .LT. X .LE. 37.0	0	0
37.0 .LT. X .LE. 38.0	0	0
38.0 .LT. X .LE. 39.0	0	0
39.0 .LT. X .LE. 40.0	0	0
40.0 .LT. X .LE. 41.0	0	0
41.0 .LT. X .LE. 42.0	0	0
42.0 .LT. X .LE. 43.0	0	0
43.0 .LT. X .LE. 44.0	0	0
44.0 .LT. X .LE. 45.0	0	0
45.0 .LT. X .LE. 46.0	0	0
46.0 .LT. X .LE. 47.0	0	0
47.0 .LT. X .LE. 48.0	0	0
48.0 .LT. X .LE. 49.0	0	0
49.0 .LT. X .LE. 50.0	0	0
50.0 .LT. X .LE. 51.0	0	0

FROM THE ANALYSIS OF 10 YEARS OF SIMULATION DATA WITH AN EIGHT HOUR STANDARD OF 9.00 PPM

PROBB = 0.0 0/0
SPROBB = 0.0 0/0

1

Example B

General Description

In this example a study site located northeast of an intersection with three road approaches is examined. Each road approach consists of four lanes. The receptor, at its minimum distance from the sources, is east of the northernmost road section approximately five metres from the center of the nearest lane. (Refer to Figure A-2 and computer output sheets for example B). At this point, the receptor is unusually close to the road. The highways carry bi-directional traffic of moderate to heavy volume. Traffic is heaviest in the evening for southbound and westbound lanes. Northbound and eastbound volumes are heaviest in the morning. Hot and cold operation modes vary by time of day, although not by direction. Typical monthly and day-of-week volumes vary only a little. The speeds for the northern and southern road legs are 25 miles per hour (40.2 km/hr) and decrease by four miles per hour per thousand vehicles per hour per lane. The speed for the eastern leg is below the normal posted speed. All vehicles must perform a 90-degree turning movement, which decreases the operating speed for this leg near the intersection. The average speed is 20 miles per hour (32.2 km/hr) and decreases at a rate of six miles per hour per thousand vehicles per hour per lane. The data describe conditions for the nominal year 1980. The same background CO and ten-year meteorological record used in example A were used in this example.

Analysis of Results

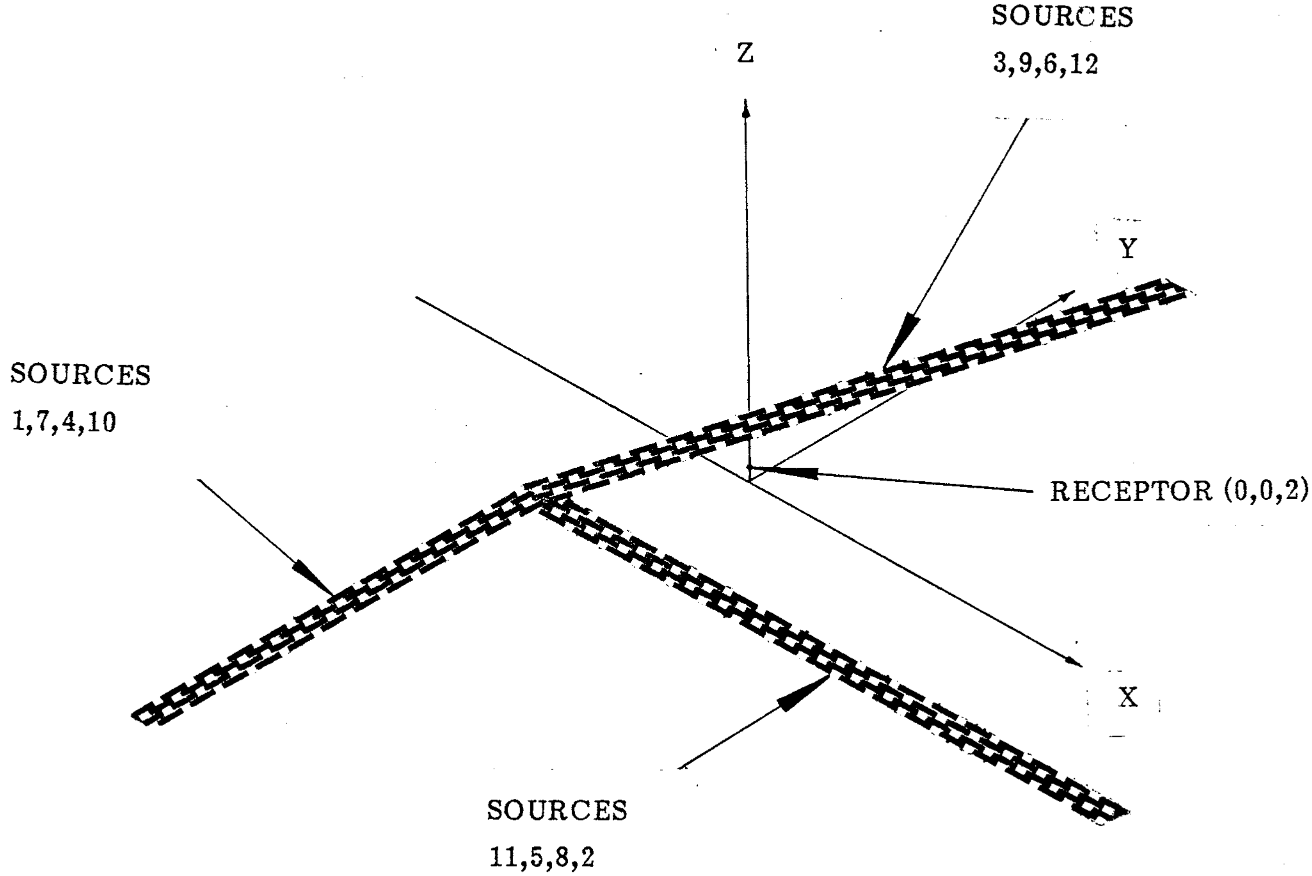
The maximum likelihood analysis shows that the probability of violating the one-hour NAAQS is 59.41 percent. This means that the likelihood of exceeding 35 ppm twice or more in any random one-year period would be 59.41 percent. The probability of violating the one-hour NAAQS with only background CO is zero. This implies that the highways are the major contributors to the high CO concentrations. To determine the probability of violation assuming the lognormal fit, the test point Z is first calculated using 0.297424 and 0.774572, respectively, as the mean and standard deviation of the logarithms of the simulated concentrations. The resultant Z = 4.21 corresponds to a probability of violation of about 0.4 percent. The binomial calendar year analysis provides a probability of violation of 60 percent. The output histogram shows that out of ten years of simulated one-hour concentrations (87,647 hours), 20 one-hour concentrations exceeded 35 ppm. The Larsen lognormal fit estimate of the CO maximum is 25.8 ppm, assuming lognormality of the simulated levels. (Note that the output histogram shows 68 CO levels occurred in excess of 26 ppm.)

The eight-hour probability of violation from the maximum likelihood analysis is 11.11 percent. This is the likelihood of continuous eight-hour average concentrations being greater than 9 ppm twice or more in any random one-year period where overlapping periods in which the standard is exceeded are counted as a single occurrence.

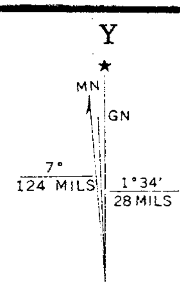
In view of the proximity of the receptor to the road, this conclusion is not surprising. The likelihood of violating the eight-hour NAAQS may seem surprisingly low (11.11 percent) in view of the one-hour results. However, as indicated earlier, the background CO is low and adverse source-emission and meteorological conditions must persist for periods up to eight hours to yield high eight-hour concentrations. The likelihood of violating the eight-hour NAAQS in any random one-year period is only 11 percent and should not be a primary concern. When analysis results (such as those given in this example for the one-hour probability of violation) are borderline between violating and not violating the standards, the modeler should reexamine his initial assumptions and consider whether his input data could be detailed further.

EXAMPLES B & C

Figure B-1. Examples B & C.



NOT TO SCALE



True North Adjustment

SOURCE	X_1	Y_1	X_2	Y_2
1	-19	-25	-14	-500
2	- 9	-20	300	- 20
3	-19	-25	80	-500
4	-13	-25	- 8	-500
5	-10	-26	300	- 26
6	-13	-25	92	500
7	-16	-25	-11	-500
8	-10	-23	300	- 23
9	-16	-25	89	500
10	-10	-25	- 5	-500
11	-10	-29	300	- 29
12	-10	-25	95	500

INPUT DATA LISTING

THE NOMINAL CALENDAR YEAR OF THIS ANALYSIS IS 1980

RECEPTOR DX, DY, DZ 0. 0. 2.

SOURCE	1	X1, Y1, X2, Y2, SPEED, SLOPE	-19.	-25.	-14.	-500.	25.	-0.0040
SOURCE	2	X1, Y1, X2, Y2, SPEED, SLOPE	-9.	-20.	300.	-20.	20.	-0.0060
SOURCE	3	X1, Y1, X2, Y2, SPEED, SLOPE	-19.	-25.	80.	500.	25.	-0.0040
SOURCE	4	X1, Y1, X2, Y2, SPEED, SLOPE	-13.	-25.	-8.	-500.	25.	-0.0040
SOURCE	5	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-26.	300.	-26.	20.	-0.0060
SOURCE	6	X1, Y1, X2, Y2, SPEED, SLOPE	-13.	-25.	92.	500.	25.	-0.0040
SOURCE	7	X1, Y1, X2, Y2, SPEED, SLOPE	-16.	-25.	-11.	-500.	25.	-0.0040
SOURCE	8	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-23.	300.	-23.	20.	-0.0060
SOURCE	9	X1, Y1, X2, Y2, SPEED, SLOPE	-16.	-25.	89.	500.	25.	-0.0040
SOURCE	10	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-25.	-5.	-500.	25.	-0.0040
SOURCE	11	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-29.	300.	-29.	20.	-0.0060
SOURCE	12	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-25.	95.	500.	25.	-0.0040

RATIO OF CSNC TO CSC 1.00

AHT BY SOURCE	333.	200.	354.	333.	200.	354.	333.	200.	354.	333.	200.	354.

ANNUAL AVERAGE PERCENT HEAVY DUTY GAS TRUCKS BY SOURCE

2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0

ANNUAL AVERAGE PERCENT DIESEL TRUCKS BY SOURCE

1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5

ANNUAL AVERAGE PERCENT LIGHT TRUCKS BY SOURCE

6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0

ANNUAL AVERAGE PERCENT HOT START OPERATION BY SOURCE

12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0

ANNUAL AVERAGE PERCENT COLD START OPERATION BY SOURCE

16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9

TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR

MONTH 1 TV	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
MONTH 1 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 TV	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000

MONTH 2 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 TV	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
MONTH 3 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 TV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 TV	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
MONTH 5 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 TV	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
MONTH 6 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 TV	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
MONTH 7 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 TV	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800
MONTH 8 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 TV	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300
MONTH 9 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 TV	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600
MONTH 10 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 TV	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100
MONTH 11 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 TV	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
MONTH 12 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

DAY 1 TV	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
DAY 1 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 TV	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
DAY 2 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 TV	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
DAY 3 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 TV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 TV	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
DAY 5 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 TV	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500
DAY 6 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 TV	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
DAY 7 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR

HOUR 1 TV	0.3600	0.3600	0.3600	0.2700	0.2700	0.2700	0.3600	0.3600	0.3600	0.2700	0.2700	0.2700
HOUR 1 GT	0.0700	0.0700	0.0700	0.1400	0.1400	0.1400	0.0700	0.0700	0.0700	0.1400	0.1400	0.1400
HOUR 1 DT	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
HOUR 1 LT	0.1700	0.1700	0.1700	0.2200	0.2200	0.2200	0.1700	0.1700	0.1700	0.2200	0.2200	0.2200
HOUR 1 HS	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200
HOUR 1 CS	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400
HOUR 2 TV	0.2200	0.2200	0.2200	0.1100	0.1100	0.1100	0.2200	0.2200	0.2200	0.1100	0.1100	0.1100
HOUR 2 GT	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700
HOUR 2 DT	0.0	0.0	0.0	0.1000	0.1000	0.1000	0.0	0.0	0.0	0.1000	0.1000	0.1000
HOUR 2 LT	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700
HOUR 2 HS	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200
HOUR 2 CS	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000
HOUR 3 TV	0.1500	0.1500	0.1500	0.1100	0.1100	0.1100	0.1500	0.1500	0.1500	0.1100	0.1100	0.1100
HOUR 3 GT	0.0	0.0	0.0	0.0700	0.0700	0.0700	0.0	0.0	0.0	0.0700	0.0700	0.0700
HOUR 3 DT	0.0	0.0	0.0	0.1000	0.1000	0.1000	0.0	0.0	0.0	0.1000	0.1000	0.1000
HOUR 3 LT	0.0700	0.0700	0.0700	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700	0.1000	0.1000	0.1000
HOUR 3 HS	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200	0.6200

HOUR 3 CS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 4 TV	0.0700	0.0700	0.0700	0.0400	0.0400	0.0400	0.0700	0.0700	0.0700	0.0400	0.0400	0.0400
HOUR 4 GT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 4 DT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 4 LT	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
HOUR 4 HS	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
HOUR 4 CS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 5 TV	0.1000	0.1000	0.1000	0.0900	0.0900	0.0900	0.1000	0.1000	0.1000	0.0900	0.0900	0.0900
HOUR 5 GT	0.0	0.0	0.0	0.0700	0.0700	0.0700	0.0	0.0	0.0	0.0700	0.0700	0.0700
HOUR 5 DT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 5 LT	0.0500	0.0500	0.0500	0.0700	0.0700	0.0700	0.0500	0.0500	0.0500	0.0700	0.0700	0.0700
HOUR 5 HS	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
HOUR 5 CS	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800
HOUR 6 TV	0.1500	0.1500	0.1500	0.4600	0.4600	0.4600	0.1500	0.1500	0.1500	0.4600	0.4600	0.4600
HOUR 6 GT	0.0	0.0	0.0	0.2200	0.2200	0.2200	0.0	0.0	0.0	0.2200	0.2200	0.2200
HOUR 6 DT	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900
HOUR 6 LT	0.0700	0.0700	0.0700	0.3600	0.3600	0.3600	0.0700	0.0700	0.0700	0.3600	0.3600	0.3600
HOUR 6 HS	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900
HOUR 6 CS	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000
HOUR 7 TV	0.5300	0.5300	0.5300	1.9700	1.9700	1.9700	0.5300	0.5300	0.5300	1.9700	1.9700	1.9700
HOUR 7 GT	1.0100	1.0100	1.0100	1.3000	1.3000	1.3000	1.0100	1.0100	1.0100	1.3000	1.3000	1.3000
HOUR 7 DT	1.6500	1.6500	1.6500	1.6300	1.6300	1.6300	1.6500	1.6500	1.6500	1.6300	1.6300	1.6300
HOUR 7 LT	1.2800	1.2800	1.2800	1.2300	1.2300	1.2300	1.2800	1.2800	1.2800	1.2300	1.2300	1.2300
HOUR 7 HS	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
HOUR 7 CS	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800
HOUR 8 TV	0.9000	0.9000	0.9000	2.7900	2.7900	2.7900	0.9000	0.9000	0.9000	2.7900	2.7900	2.7900
HOUR 8 GT	2.6700	2.6700	2.6700	2.3100	2.3100	2.3100	2.6700	2.6700	2.6700	2.3100	2.3100	2.3100
HOUR 8 DT	2.6300	2.6300	2.6300	2.0200	2.0200	2.0200	2.6300	2.6300	2.6300	2.0200	2.0200	2.0200
HOUR 8 LT	1.4000	1.4000	1.4000	1.2300	1.2300	1.2300	1.4000	1.4000	1.4000	1.2300	1.2300	1.2300
HOUR 8 HS	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
HOUR 8 CS	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
HOUR 9 TV	1.1500	1.1500	1.1500	2.3800	2.3800	2.3800	1.1500	1.1500	1.1500	2.3800	2.3800	2.3800
HOUR 9 GT	2.4600	2.4600	2.4600	2.3900	2.3900	2.3900	2.4600	2.4600	2.4600	2.3900	2.3900	2.3900
HOUR 9 DT	3.4000	3.4000	3.4000	2.9600	2.9600	2.9600	3.4000	3.4000	3.4000	2.9600	2.9600	2.9600
HOUR 9 LT	1.8300	1.8300	1.8300	1.7100	1.7100	1.7100	1.8300	1.8300	1.8300	1.7100	1.7100	1.7100
HOUR 9 HS	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300
HOUR 9 CS	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
HOUR 10 TV	1.2500	1.2500	1.2500	1.4800	1.4800	1.4800	1.2500	1.2500	1.2500	1.4800	1.4800	1.4800
HOUR 10 GT	2.7600	2.7600	2.7600	2.6000	2.6000	2.6000	2.7600	2.7600	2.7600	2.6000	2.6000	2.6000
HOUR 10 DT	2.7300	2.7300	2.7300	2.4900	2.4900	2.4900	2.7300	2.7300	2.7300	2.4900	2.4900	2.4900
HOUR 10 LT	2.1200	2.1200	2.1200	1.8300	1.8300	1.8300	2.1200	2.1200	2.1200	1.8300	1.8300	1.8300
HOUR 10 HS	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800
HOUR 10 CS	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
HOUR 11 TV	1.3100	1.3100	1.3100	1.3600	1.3600	1.3600	1.3100	1.3100	1.3100	1.3600	1.3600	1.3600
HOUR 11 GT	2.8200	2.8200	2.8200	2.6000	2.6000	2.6000	2.8200	2.8200	2.8200	2.6000	2.6000	2.6000
HOUR 11 DT	2.5400	2.5400	2.5400	1.7300	1.7300	1.7300	2.5400	2.5400	2.5400	1.7300	1.7300	1.7300
HOUR 11 LT	2.2500	2.2500	2.2500	1.8300	1.8300	1.8300	2.2500	2.2500	2.2500	1.8300	1.8300	1.8300
HOUR 11 HS	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900
HOUR 11 CS	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
HOUR 12 TV	1.6400	1.6400	1.6400	1.3800	1.3800	1.3800	1.6400	1.6400	1.6400	1.3800	1.3800	1.3800
HOUR 12 GT	2.5300	2.5300	2.5300	2.3900	2.3900	2.3900	2.5300	2.5300	2.5300	2.3900	2.3900	2.3900
HOUR 12 DT	2.2400	2.2400	2.2400	2.0200	2.0200	2.0200	2.2400	2.2400	2.2400	2.0200	2.0200	2.0200
HOUR 12 LT	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600
HOUR 12 HS	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100
HOUR 12 CS	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
HOUR 13 TV	1.5200	1.5100	1.5100	1.5000	1.5000	1.5000	1.5100	1.5100	1.5100	1.5000	1.5000	1.5000
HOUR 13 GT	2.4600	2.4600	2.4600	2.2400	2.2400	2.2400	2.4600	2.4600	2.4600	2.2400	2.2400	2.2400
HOUR 13 DT	2.5400	2.5400	2.5400	2.3000	2.3000	2.3000	2.5400	2.5400	2.5400	2.3000	2.3000	2.3000
HOUR 13 LT	1.9500	1.9500	1.9500	1.6200	1.6200	1.6200	1.9500	1.9500	1.9500	1.6200	1.6200	1.6200
HOUR 13 HS	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100
HOUR 13 CS	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600
HOUR 14 TV	1.3300	1.3300	1.3300	1.3800	1.3800	1.3800	1.3300	1.3300	1.3300	1.3800	1.3800	1.3800
HOUR 14 GT	2.3900	2.3900	2.3900	1.8800	1.8800	1.8800	2.3900	2.3900	2.3900	1.8800	1.8800	1.8800
HOUR 14 DT	1.4600	1.4600	1.4600	2.1100	2.1100	2.1100	1.4600	1.4600	1.4600	2.1100	2.1100	2.1100
HOUR 14 LT	2.0000	2.0000	2.0000	2.0800	2.0800	2.0800	2.0000	2.0000	2.0000	2.0800	2.0800	2.0800
HOUR 14 HS	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800

HOUR 15 GT	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600
HOUR 15 DT	1.5600	1.5600	1.5600	1.4400	1.4400	1.4400	1.5600	1.5600	1.5600	1.4400	1.4400	1.4400
HOUR 15 LT	2.3100	2.3100	2.3100	1.9300	1.9300	1.9300	2.3100	2.3100	2.3100	1.9300	1.9300	1.9300
HOUR 15 HS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 15 CS	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
HOUR 16 TV	2.0100	2.0100	2.0100	1.3400	1.3400	1.3400	2.0100	2.0100	2.0100	1.3400	1.3400	1.3400
HOUR 16 GT	1.3700	1.3700	1.3700	1.2300	1.2300	1.2300	1.3700	1.3700	1.3700	1.2300	1.2300	1.2300
HOUR 16 DT	1.3700	1.3700	1.3700	1.5400	1.5400	1.5400	1.3700	1.3700	1.3700	1.5400	1.5400	1.5400
HOUR 16 LT	2.0200	2.0200	2.0200	2.2800	2.2800	2.2800	2.0200	2.0200	2.0200	2.2800	2.2800	2.2800
HOUR 16 HS	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100
HOUR 16 CS	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
HOUR 17 TV	2.2800	2.2400	2.2400	1.1000	1.1000	1.1000	2.2400	2.2400	2.2400	1.1000	1.1000	1.1000
HOUR 17 GT	0.5100	0.5100	0.5100	0.8700	0.8700	0.8700	0.5100	0.5100	0.5100	0.8700	0.8700	0.8700
HOUR 17 DT	0.6800	0.6800	0.6800	0.7700	0.7700	0.7700	0.6800	0.6800	0.6800	0.7700	0.7700	0.7700
HOUR 17 LT	1.2000	1.2000	1.2000	1.4500	1.4500	1.4500	1.2000	1.2000	1.2000	1.4500	1.4500	1.4500
HOUR 17 HS	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
HOUR 17 CS	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
HOUR 18 TV	2.0800	2.0400	2.0400	1.1100	1.1100	1.1100	2.0400	2.0400	2.0400	1.1100	1.1100	1.1100
HOUR 18 GT	0.2200	0.2200	0.2200	0.2900	0.2900	0.2900	0.2200	0.2200	0.2200	0.2900	0.2900	0.2900
HOUR 18 DT	0.2000	0.2000	0.2000	0.5800	0.5800	0.5800	0.2000	0.2000	0.2000	0.5800	0.5800	0.5800
HOUR 18 LT	0.8000	0.8000	0.8000	1.2300	1.2300	1.2300	0.8000	0.8000	0.8000	1.2300	1.2300	1.2300
HOUR 18 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 18 CS	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
HOUR 19 TV	1.5900	1.5900	1.5900	0.9200	0.9200	0.9200	1.5900	1.5900	1.5900	0.9200	0.9200	0.9200
HOUR 19 GT	0.2900	0.2900	0.2900	0.3600	0.3600	0.3600	0.2900	0.2900	0.2900	0.3600	0.3600	0.3600
HOUR 19 DT	0.2000	0.2000	0.2000	0.4800	0.4800	0.4800	0.2000	0.2000	0.2000	0.4800	0.4800	0.4800
HOUR 19 LT	0.7700	0.7700	0.7700	0.7200	0.7200	0.7200	0.7700	0.7700	0.7700	0.7200	0.7200	0.7200
HOUR 19 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 19 CS	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
HOUR 20 TV	1.0800	1.0800	1.0800	0.7800	0.7800	0.7800	1.0800	1.0800	1.0800	0.7800	0.7800	0.7800
HOUR 20 GT	0.2200	0.2200	0.2200	0.3600	0.3600	0.3600	0.2200	0.2200	0.2200	0.3600	0.3600	0.3600
HOUR 20 DT	0.2000	0.2000	0.2000	0.3800	0.3800	0.3800	0.2000	0.2000	0.2000	0.3800	0.3800	0.3800
HOUR 20 LT	0.5300	0.5300	0.5300	0.6300	0.6300	0.6300	0.5300	0.5300	0.5300	0.6300	0.6300	0.6300
HOUR 20 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 20 CS	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100
HOUR 21 TV	0.8300	0.8300	0.8300	0.6200	0.6200	0.6200	0.8300	0.8300	0.8300	0.6200	0.6200	0.6200
HOUR 21 GT	0.1400	0.1400	0.1400	0.2900	0.2900	0.2900	0.1400	0.1400	0.1400	0.2900	0.2900	0.2900
HOUR 21 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 21 LT	0.4100	0.4100	0.4100	0.4800	0.4800	0.4800	0.4100	0.4100	0.4100	0.4800	0.4800	0.4800
HOUR 21 HS	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
HOUR 21 CS	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
HOUR 22 TV	0.7100	0.7100	0.7100	0.5600	0.5600	0.5600	0.7100	0.7100	0.7100	0.5600	0.5600	0.5600
HOUR 22 GT	0.1400	0.1400	0.1400	0.2200	0.2200	0.2200	0.1400	0.1400	0.1400	0.2200	0.2200	0.2200
HOUR 22 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 22 LT	0.3400	0.3400	0.3400	0.4300	0.4300	0.4300	0.3400	0.3400	0.3400	0.4300	0.4300	0.4300
HOUR 22 HS	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200
HOUR 22 CS	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500
HOUR 23 TV	0.6000	0.6900	0.6900	0.5500	0.5500	0.5500	0.6900	0.6900	0.6900	0.5500	0.5500	0.5500
HOUR 23 GT	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200
HOUR 23 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 23 LT	0.2900	0.2900	0.2900	0.4300	0.4300	0.4300	0.2900	0.2900	0.2900	0.4300	0.4300	0.4300
HOUR 23 HS	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
HOUR 23 CS	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400
HOUR 24 TV	0.6000	0.6000	0.6000	0.4700	0.4700	0.4700	0.6000	0.6000	0.6000	0.4700	0.4700	0.4700
HOUR 24 GT	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200
HOUR 24 DT	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900
HOUR 24 LT	0.2900	0.2900	0.2900	0.3900	0.3900	0.3900	0.2900	0.2900	0.2900	0.3900	0.3900	0.3900
HOUR 24 HS	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600
HOUR 24 CS	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800

GEOMETRIC STANDARD DEVIATIONS OF BACKGROUND CO BY MONTH FOR CO IN PPM

1.8200	1.9400	1.7000	1.6900	1.5000	1.5000	1.6900	1.7400	1.7700	1.9900	1.9800	1.9600

GEOMETRIC MEANS OF PPM CO BACKGROUND BY MONTH AND HOUR

HOUR 1	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 2	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 3	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 4	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 5	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 6	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 7	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 8	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 9	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 10	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 11	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 12	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 13	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 14	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 15	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 16	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 17	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 18	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 19	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 20	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 21	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 22	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 23	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300
HOUR 24	0.4700	0.5200	0.4000	0.5000	0.4200	0.4200	0.5300	0.6000	0.6000	0.6300	0.6300	0.7300

FIRST AND LAST MONTHS OF DAYLIGHT SAVING TIME 5 10

FROM THE MAXIMUM LIKELYHOOD ANALYSIS WITH A STANDARD OF 35.CO PPM

THE ESTIMATE OF P1 IS 0.228188E-03 WITH A STANDARD ERROR OF 0.510186E-C4

THE ESTIMATE OF P01 IS 0.228240E-03 WITH A STANDARD ERRCR OF 0.510305E-04

WHICH YIELD A PROBABILITY OF VIOLATING THE CO STANDARD OF 59.41 O/O WITH A STANDARD ERROR OF 8.56 O/O

AUXILIARY RESULTS OBTAINED UNDER VARIOUS ASSUMPTIONS ARE INCLUDED ON THE FOLLOWING PAGE.

"*** AUXILIARY RESULTS ***

FROM THE LOGNORMAL ASSUMPTION (10 YEAR SIMULATION)

```
COMAX  =   25.7528
COMAX2 =   21.2190
MEANLN =  0.297424E 00
STDLN  =  0.774572E 00
```

FROM THE BINOMIAL ASSUMPTION (10 YEAR SIMULATION) WITH A STANDARD OF 35.00 PPM

```
PROB   =  60.00 O/O
SPROB  =  15.49 O/O
```

ASSUMING THAT THE ONLY SOURCE OF CO IS THE BACKGROUND CO WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF P1 IS 0.0 WITH A STANDARD ERROR OF 0.0

THE ESTIMATE OF P01 IS 0.0 WITH A STANDARD ERROR OF 0.0

WHICH YIELD A PROBABILITY OF VIOLATING THE CO STANDARD OF 0.0 O/O WITH A STANDARD ERROR OF 0.0 O/O

FOR THE PREDICTED CO CONCENTRATION (NO ASSUMPTIONS) WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF YEARLY AVERAGE CONCENTRATION IS 0.185800E 01 PPM

THE STANDARD DEVIATION OF YEARLY AVERAGE CONCENTRATION IS 0.977148E-01 PPM

ASSUMING THAT THE ONLY SOURCE OF CO IS THE BACKGROUND CO WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF YEARLY AVERAGE CONCENTRATION IS 0.640854E 00 PPM

THE STANDARD DEVIATION OF YEARLY AVERAGE CONCENTRATION IS 0.326638E-02 PPM

SIMULATION HISTOGRAM

CO RANGE, PPM	NO. HOURS .EQ.	NO. HOURS .GE.
0.0 .LT. X .LE. 1.0	30081	87647
1.0 .LT. X .LE. 2.0	32249	57566
2.0 .LT. X .LE. 3.0	13125	25317
3.0 .LT. X .LE. 4.0	5357	12192
4.0 .LT. X .LE. 5.0	2504	6835
5.0 .LT. X .LE. 6.0	1411	4331
6.0 .LT. X .LE. 7.0	882	2920
7.0 .LT. X .LE. 8.0	575	2038
8.0 .LT. X .LE. 9.0	404	1463
9.0 .LT. X .LE. 10.0	263	1059
10.0 .LT. X .LE. 11.0	193	796
11.0 .LT. X .LE. 12.0	108	603
12.0 .LT. X .LE. 13.0	111	495
13.0 .LT. X .LE. 14.0	82	384
14.0 .LT. X .LE. 15.0	47	302
15.0 .LT. X .LE. 16.0	39	255
16.0 .LT. X .LE. 17.0	15	216
17.0 .LT. X .LE. 18.0	16	201
18.0 .LT. X .LE. 19.0	20	185
19.0 .LT. X .LE. 20.0	17	165
20.0 .LT. X .LE. 21.0	20	148
21.0 .LT. X .LE. 22.0	16	128
22.0 .LT. X .LE. 23.0	12	112
23.0 .LT. X .LE. 24.0	10	100
24.0 .LT. X .LE. 25.0	15	90
25.0 .LT. X .LE. 26.0	7	75
26.0 .LT. X .LE. 27.0	5	68
27.0 .LT. X .LE. 28.0	6	63
28.0 .LT. X .LE. 29.0	2	57
29.0 .LT. X .LE. 30.0	8	55
30.0 .LT. X .LE. 31.0	9	47
31.0 .LT. X .LE. 32.0	7	38
32.0 .LT. X .LE. 33.0	3	31
33.0 .LT. X .LE. 34.0	4	28
34.0 .LT. X .LE. 35.0	4	24
35.0 .LT. X .LE. 36.0	3	20
36.0 .LT. X .LE. 37.0	2	17
37.0 .LT. X .LE. 38.0	3	15
38.0 .LT. X .LE. 39.0	2	12
39.0 .LT. X .LE. 40.0	0	10
40.0 .LT. X .LE. 41.0	0	10
41.0 .LT. X .LE. 42.0	4	10
42.0 .LT. X .LE. 43.0	1	6
43.0 .LT. X .LE. 44.0	2	5
44.0 .LT. X .LE. 45.0	0	3
45.0 .LT. X .LE. 46.0	0	3
46.0 .LT. X .LE. 47.0	0	3
47.0 .LT. X .LE. 48.0	0	3
48.0 .LT. X .LE. 49.0	0	3
49.0 .LT. X .LE. 50.0	0	3
50.0 .LT. X .LE. 51.0	3	3

FROM THE ANALYSIS OF 10 YEARS OF SIMULATION DATA WITH AN EIGHT HOUR STANDARD OF 9.00 PPM

PROB8 = 11.11 0/0
SPROB8 = 9.93 0/0

Example C

General Description

In the previous example, the background CO geometric means varied by month, but not by hour. In almost all cases background CO will usually vary from hour to hour. To illustrate the effect of having more detailed data, the same inputs used in example B were used in this example, except that the monthly and hourly geometric means for the background CO were adjusted to reflect differences for each hour of day (refer to computer output sheets for example C).

Analysis of Results

Comparison of the results from this example with those of example B shows that, with the exception of the mean of the logarithms of the simulated concentrations and the one-hour probability violation with only the background, all statistics are increased for example C. The probability of violating the one-hour NAAQS, assuming the lognormal fit, is 3.65 percent for this example. This was calculated with the test point Z = 3.96 based on the mean and standard deviation of the logarithms for the simulated concentrations and a corresponding P_t of 0.00034. The lognormal projection for the maximum CO concentration is 30.96 ppm. The histogram, however, shows that 42 one-hour concentrations exceeded 31 ppm out of the 87,647 simulated hours. The maximum likelihood analysis results show a one-hour probability of violation of 66.91 percent. The binomial calendar year analysis shows a one-hour probability of violation of 70 percent. The maximum likelihood eight-hour probability of violation is increased to 18.9 percent.

INPUT DATA LISTING

THE NOMINAL CALENDAR YEAR OF THIS ANALYSIS IS 1980

RECEPTOR CX, CY, CZ 0. 0. 2.

SOURCE 1	X1, Y1, X2, Y2, SPEED, SLOPE	-19.	-25.	-14.	-500.	25.	-0.0040
SOURCE 2	X1, Y1, X2, Y2, SPEED, SLOPE	-9.	-20.	300.	-20.	20.	-0.0060
SOURCE 3	X1, Y1, X2, Y2, SPEED, SLOPE	-19.	-25.	80.	500.	25.	-0.0040
SOURCE 4	X1, Y1, X2, Y2, SPEED, SLOPE	-13.	-25.	-8.	-500.	25.	-0.0040
SOURCE 5	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-26.	300.	-26.	20.	-0.0060
SOURCE 6	X1, Y1, X2, Y2, SPEED, SLOPE	-13.	-25.	92.	500.	25.	-0.0040
SOURCE 7	X1, Y1, X2, Y2, SPEED, SLOPE	-16.	-25.	-11.	-500.	25.	-0.0040
SOURCE 8	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-23.	300.	-23.	20.	-0.0060
SOURCE 9	X1, Y1, X2, Y2, SPEED, SLOPE	-16.	-25.	89.	500.	25.	-0.0040
SOURCE 10	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-25.	-5.	-500.	25.	-0.0040
SOURCE 11	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-29.	300.	-29.	20.	-0.0060
SOURCE 12	X1, Y1, X2, Y2, SPEED, SLOPE	-10.	-25.	95.	500.	25.	-0.0040

RATIO OF CSNC TO CSC 1.00

AHT BY SOURCE	333.	200.	354.	333.	200.	354.	333.	200.	354.	333.	200.	354.

ANNUAL AVERAGE PERCENT HEAVY DUTY GAS TRUCKS BY SOURCE

2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0

ANNUAL AVERAGE PERCENT DIESEL TRUCKS BY SOURCE

1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5

ANNUAL AVERAGE PERCENT LIGHT TRUCKS BY SOURCE

6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0

ANNUAL AVERAGE PERCENT HOT START OPERATION BY SOURCE

12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0

ANNUAL AVERAGE PERCENT COLD START OPERATION BY SOURCE

16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9

TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR

MONTH 1 TV	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
MONTH 1 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 1 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

MONTH 2 TV	[illegible]	0.9000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
MONTH 2 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 2 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 TV	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
MONTH 3 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 3 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 TV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 4 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 TV	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
MONTH 5 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 5 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 TV	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
MONTH 6 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 6 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 TV	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
MONTH 7 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 7 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 TV	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800
MONTH 8 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 8 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 TV	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300	1.0300
MONTH 9 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 9 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 TV	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600	1.0600
MONTH 10 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 10 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 TV	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100	1.0100
MONTH 11 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 11 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 TV	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
MONTH 12 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
MONTH 12 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

MONTH 12 CS 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000

TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR

DAY 1 TV	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
DAY 1 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 1 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 TV	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900	0.9900
DAY 2 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 2 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 TV	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
DAY 3 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 3 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 TV	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 4 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 TV	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200	1.0200
DAY 5 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 5 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 TV	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500
DAY 6 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 6 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 TV	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
DAY 7 GT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 DT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 LT	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 HS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
DAY 7 CS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR

HOUR 1 TV	0.3600	0.3600	0.3600	0.2700	0.2700	0.2700	0.3600	0.3600	0.3600	0.2700	0.2700	0.2700
HOUR 1 GT	0.0700	0.0700	0.0700	0.1400	0.1400	0.1400	0.0700	0.0700	0.0700	0.1400	0.1400	0.1400
HOUR 1 DT	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
HOUR 1 LT	0.1700	0.1700	0.1700	0.2200	0.2200	0.2200	0.1700	0.1700	0.1700	0.2200	0.2200	0.2200
HOUR 1 HS	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200	0.3200
HOUR 1 CS	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400	1.4400
HOUR 2 TV	0.2200	0.2200	0.2200	0.1100	0.1100	0.1100	0.2200	0.2200	0.2200	0.1100	0.1100	0.1100
HOUR 2 GT	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700	0.0700
HOUR 2 DT	0.0	0.0	0.0	0.1000	0.1000	0.1000	0.0	0.0	0.0	0.1000	0.1000	0.1000
HOUR 2 LT	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700	0.1000	0.1000	0.1000	0.0700	0.0700	0.0700
HOUR 2 HS	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200	0.5200
HOUR 2 CS	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000	1.3000
HOUR 3 TV	0.1500	0.1500	0.1500	0.1100	0.1100	0.1100	0.1500	0.1500	0.1500	0.1100	0.1100	0.1100
HOUR 3 GT	0.0	0.0	0.0	0.0700	0.0700	0.0700	0.0	0.0	0.0	0.0700	0.0700	0.0700
HOUR 3 [illegible]	[illegible]	[illegible]	[illegible]	0.1000	0.1000	0.1000	0.0	0.0	0.0	0.1000	0.1000	0.1000

HOUR 3 HS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HOUR 3 CS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 4 TV	0.0700	0.0700	0.0700	0.0400	0.0400	0.0400	0.0700	0.0700	0.0700	0.0400	0.0400	0.0400
HOUR 4 GT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 4 DT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 4 LT	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
HOUR 4 HS	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
HOUR 4 CS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 5 TV	0.1000	0.1000	0.1000	0.0900	0.0900	0.0900	0.1000	0.1000	0.1000	0.0900	0.0900	0.0900
HOUR 5 GT	0.0	0.0	0.0	0.0700	0.0700	0.0700	0.0	0.0	0.0	0.0700	0.0700	0.0700
HOUR 5 DT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HOUR 5 LT	0.0500	0.0500	0.0500	0.0700	0.0700	0.0700	0.0500	0.0500	0.0500	0.0700	0.0700	0.0700
HOUR 5 HS	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000	0.6000
HOUR 5 CS	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800
HOUR 6 TV	0.1500	0.1500	0.1500	0.4600	0.4600	0.4600	0.1500	0.1500	0.1500	0.4600	0.4600	0.4600
HOUR 6 GT	0.0	0.0	0.0	0.2200	0.2200	0.2200	0.0	0.0	0.0	0.2200	0.2200	0.2200
HOUR 6 DT	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900
HOUR 6 LT	0.0700	0.0700	0.0700	0.3600	0.3600	0.3600	0.0700	0.0700	0.0700	0.3600	0.3600	0.3600
HOUR 6 HS	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900	0.6900
HOUR 6 CS	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000	1.2000
HOUR 7 TV	0.5300	0.5300	0.5300	1.9700	1.9700	1.9700	0.5300	0.5300	0.5300	1.9700	1.9700	1.9700
HOUR 7 GT	1.0100	1.0100	1.0100	1.3000	1.3000	1.3000	1.0100	1.0100	1.0100	1.3000	1.3000	1.3000
HOUR 7 DT	1.6500	1.6500	1.6500	1.6300	1.6300	1.6300	1.6500	1.6500	1.6500	1.6300	1.6300	1.6300
HOUR 7 LT	1.2800	1.2800	1.2800	1.2300	1.2300	1.2300	1.2800	1.2800	1.2800	1.2300	1.2300	1.2300
HOUR 7 HS	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
HOUR 7 CS	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0800	1.0803	1.0800
HOUR 8 TV	0.9000	0.9000	0.9000	2.7900	2.7900	2.7900	0.9000	0.9000	0.9000	2.7900	2.7900	2.7900
HOUR 8 GT	2.6700	2.6700	2.6700	2.3100	2.3100	2.3100	2.6700	2.6700	2.6700	2.3100	2.3100	2.3100
HOUR 8 DT	2.6300	2.6300	2.6300	2.0200	2.0200	2.0200	2.6300	2.6300	2.6300	2.0200	2.0200	2.0200
HOUR 8 LT	1.4000	1.4000	1.4000	1.2300	1.2300	1.2300	1.4000	1.4000	1.4000	1.2300	1.2300	1.2300
HOUR 8 HS	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600	1.1600
HOUR 8 CS	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
HOUR 9 TV	1.1500	1.1500	1.1500	2.3800	2.3800	2.3800	1.1500	1.1500	1.1500	2.3800	2.3800	2.3800
HOUR 9 GT	2.4600	2.4600	2.4600	2.3900	2.3900	2.3900	2.4600	2.4600	2.4600	2.3900	2.3900	2.3900
HOUR 9 DT	3.4000	3.4000	3.4000	2.9600	2.9600	2.9600	3.4000	3.4000	3.4000	2.9600	2.9600	2.9600
HOUR 9 LT	1.8300	1.8300	1.8300	1.7100	1.7100	1.7100	1.8300	1.8300	1.8300	1.7100	1.7100	1.7100
HOUR 9 HS	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300	1.2300
HOUR 9 CS	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
HOUR 10 TV	1.2500	1.2500	1.2500	1.4800	1.4800	1.4800	1.2500	1.2500	1.2500	1.4800	1.4800	1.4800
HOUR 10 GT	2.7600	2.7600	2.7600	2.6000	2.6000	2.6000	2.7600	2.7600	2.7600	2.6000	2.6000	2.6000
HOUR 10 DT	2.7300	2.7300	2.7300	2.4900	2.4900	2.4900	2.7300	2.7300	2.7300	2.4900	2.4900	2.4900
HOUR 10 LT	2.1200	2.1200	2.1200	1.8300	1.8300	1.8300	2.1200	2.1200	2.1200	1.8300	1.8300	1.8300
HOUR 10 HS	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800
HOUR 10 CS	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
HOUR 11 TV	1.3100	1.3100	1.3100	1.3600	1.3600	1.3600	1.3100	1.3100	1.3100	1.3600	1.3600	1.3600
HOUR 11 GT	2.8200	2.8200	2.8200	2.6000	2.6000	2.6000	2.8200	2.8200	2.8200	2.6000	2.6000	2.6000
HOUR 11 DT	2.5400	2.5400	2.5400	1.7300	1.7300	1.7300	2.5400	2.5400	2.5400	1.7300	1.7300	1.7300
HOUR 11 LT	2.2500	2.2500	2.2500	1.8300	1.8300	1.8300	2.2500	2.2500	2.2500	1.8300	1.8300	1.8300
HOUR 11 HS	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900	1.3900
HOUR 11 CS	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800	0.7800
HOUR 12 TV	1.6400	1.6400	1.6400	1.3800	1.3800	1.3800	1.6400	1.6400	1.6400	1.3800	1.3800	1.3800
HOUR 12 GT	2.5300	2.5300	2.5300	2.3900	2.3900	2.3900	2.5300	2.5300	2.5300	2.3900	2.3900	2.3900
HOUR 12 DT	2.2400	2.2400	2.2400	2.0200	2.0200	2.0200	2.2400	2.2400	2.2400	2.0200	2.0200	2.0200
HOUR 12 LT	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600
HOUR 12 HS	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100	1.3100
HOUR 12 CS	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900	0.7900
HOUR 13 TV	1.5200	1.5100	1.5100	1.5000	1.5000	1.5000	1.5100	1.5100	1.5100	1.5000	1.5000	1.5000
HOUR 13 GT	2.4600	2.4600	2.4600	2.2400	2.2400	2.2400	2.4600	2.4600	2.4600	2.2400	2.2400	2.2400
HOUR 13 DT	2.5400	2.5400	2.5400	2.3000	2.3000	2.3000	2.5400	2.5400	2.5400	2.3000	2.3000	2.3000
HOUR 13 LT	1.9500	1.9500	1.9500	1.6200	1.6200	1.6200	1.9500	1.9500	1.9500	1.6200	1.6200	1.6200
HOUR 13 HS	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100	1.2100
HOUR 13 CS	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600	0.7600
HOUR 14 TV	1.3300	1.3300	1.3300	1.3800	1.3800	1.3800	1.3300	1.3300	1.3300	1.3800	1.3800	1.3800
HOUR 14 GT	2.3900	2.3900	2.3900	1.8800	1.8800	1.8800	2.3900	2.3900	2.3900	1.8800	1.8800	1.8800
HOUR 14 DT	1.4600	1.4600	1.4600	2.1100	2.1100	2.1100	1.4600	1.4600	1.4600	2.1100	2.1100	2.1100

HOUR 14 LT	2.0000	2.0000	2.0000	2.0800	2.0800	2.0800	2.0000	2.0000	2.0000	2.0800	2.0800	2.0800
HOUR 14 HS	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800	1.3800
HOUR 14 CS	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300	0.7300
HOUR 15 TV	1.5400	1.5400	1.5400	1.2300	1.2300	1.2300	1.5400	1.5400	1.5400	1.2300	1.2300	1.2300
HOUR 15 GT	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600	1.7300	1.7300	1.7300	1.6600	1.6600	1.6600
HOUR 15 DT	1.5600	1.5600	1.5600	1.4400	1.4400	1.4400	1.5600	1.5600	1.5600	1.4400	1.4400	1.4400
HOUR 15 LT	2.3100	2.3100	2.3100	1.9300	1.9300	1.9300	2.3100	2.3100	2.3100	1.9300	1.9300	1.9300
HOUR 15 HS	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400	1.2400
HOUR 15 CS	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
HOUR 16 TV	2.0100	2.0100	2.0100	1.3400	1.3400	1.3400	2.0100	2.0100	2.0100	1.3400	1.3400	1.3400
HOUR 16 GT	1.3700	1.3700	1.3700	1.2300	1.2300	1.2300	1.3700	1.3700	1.3700	1.2300	1.2300	1.2300
HOUR 16 DT	1.3700	1.3700	1.3700	1.5400	1.5400	1.5400	1.3700	1.3700	1.3700	1.5400	1.5400	1.5400
HOUR 16 LT	2.0200	2.0200	2.0200	2.2600	2.2600	2.2800	2.0200	2.0200	2.0200	2.2800	2.2800	2.2800
HOUR 16 HS	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100	1.8100
HOUR 16 CS	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
HOUR 17 TV	2.2800	2.2400	2.2400	1.1000	1.1000	1.1000	2.2400	2.2400	2.2400	1.1000	1.1000	1.1000
HOUR 17 GT	0.5100	0.5100	0.5100	0.8700	0.8700	0.8700	0.5100	0.5100	0.5100	0.8700	0.8700	0.8700
HOUR 17 DT	0.6800	0.6800	0.6800	0.7700	0.7700	0.7700	0.6800	0.6800	0.6800	0.7700	0.7700	0.7700
HOUR 17 LT	1.2000	1.2000	1.2000	1.4500	1.4500	1.4500	1.2000	1.2000	1.2000	1.4500	1.4500	1.4500
HOUR 17 HS	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
HOUR 17 CS	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
HOUR 18 TV	2.0800	2.0400	2.0400	1.1100	1.1100	1.1100	2.0400	2.0400	2.0400	1.1100	1.1100	1.1100
HOUR 18 GT	0.2200	0.2200	0.2200	0.2900	0.2900	0.2900	0.2200	0.2200	0.2200	0.2900	0.2900	0.2900
HOUR 18 DT	0.2000	0.2000	0.2000	0.5800	0.5800	0.5800	0.2000	0.2000	0.2000	0.5800	0.5800	0.5800
HOUR 18 LT	0.8000	0.8000	0.8000	1.2300	1.2300	1.2300	0.8000	0.8000	0.8000	1.2300	1.2300	1.2300
HOUR 18 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 18 CS	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
HOUR 19 TV	1.5900	1.5900	1.5900	0.9200	0.9200	0.9200	1.5900	1.5900	1.5900	0.9200	0.5200	0.9200
HOUR 19 GT	0.2900	0.2900	0.2900	0.3600	0.3600	0.3600	0.2900	0.2900	0.2900	0.3600	0.3600	0.3600
HOUR 19 DT	0.2000	0.2000	0.2000	0.4800	0.4800	0.4800	0.2000	0.2000	0.2000	0.4800	0.4800	0.4800
HOUR 19 LT	0.7700	0.7700	0.7700	0.7200	0.7200	0.7200	0.7700	0.7700	0.7700	0.7200	0.7200	0.7200
HOUR 19 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 19 CS	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300	0.8300
HOUR 20 TV	1.0800	1.0800	1.0800	0.7800	0.7800	0.7800	1.0800	1.0800	1.0800	0.7800	0.7800	0.7800
HOUR 20 GT	0.2200	0.2200	0.2200	0.3600	0.3600	0.3600	0.2200	0.2200	0.2200	0.3600	0.3600	0.3600
HOUR 20 DT	0.2000	0.2000	0.2000	0.3800	0.3800	0.3800	0.2000	0.2000	0.2000	0.3800	0.3800	0.3800
HOUR 20 LT	0.5300	0.5300	0.5300	0.6300	0.6300	0.6300	0.5300	0.5300	0.5300	0.6300	0.6300	0.6300
HOUR 20 HS	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600	1.2600
HOUR 20 CS	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100	0.8100
HOUR 21 TV	0.8300	0.8300	0.8300	0.6200	0.6200	0.6200	0.8300	0.8300	0.8300	0.6200	0.6200	0.6200
HOUR 21 GT	0.1400	0.1400	0.1400	0.2900	0.2900	0.2900	0.1400	0.1400	0.1400	0.2900	0.2900	0.2900
HOUR 21 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 21 LT	0.4100	0.4100	0.4100	0.4800	0.4800	0.4800	0.4100	0.4100	0.4100	0.4800	0.4800	0.4800
HOUR 21 HS	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
HOUR 21 CS	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400	1.0400
HOUR 22 TV	0.7100	0.7100	0.7100	0.5600	0.5600	0.5600	0.7100	0.7100	0.7100	0.5600	0.5600	0.5600
HOUR 22 GT	0.1400	0.1400	0.1400	0.2200	0.2200	0.2200	0.1400	0.1400	0.1400	0.2200	0.2200	0.2200
HOUR 22 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 22 LT	0.3400	0.3400	0.3400	0.4300	0.4300	0.4300	0.3400	0.3400	0.3400	0.4300	0.4300	0.4300
HOUR 22 HS	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200	0.7200
HOUR 22 CS	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500	1.1500
HOUR 23 TV	0.6000	0.6900	0.6900	0.5500	0.5500	0.5500	0.6900	0.6900	0.6900	0.5500	0.5500	0.5500
HOUR 23 GT	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200
HOUR 23 DT	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900	0.1000	0.1000	0.1000	0.2900	0.2900	0.2900
HOUR 23 LT	0.2900	0.2900	0.2900	0.4300	0.4300	0.4300	0.2900	0.2900	0.2900	0.4300	0.4300	0.4300
HOUR 23 HS	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800	0.6800
HOUR 23 CS	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400	1.1400
HOUR 24 TV	0.6000	0.6000	0.6000	0.4700	0.4700	0.4700	0.6000	0.6000	0.6000	0.4700	0.4700	0.4700
HOUR 24 GT	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200	0.0700	0.0700	0.0700	0.2200	0.2200	0.2200
HOUR 24 DT	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900	0.1000	0.1000	0.1000	0.1900	0.1900	0.1900
HOUR 24 LT	0.2900	0.2900	0.2900	0.3900	0.3900	0.3900	0.2900	0.2900	0.2900	0.3900	0.3900	0.3900
HOUR 24 HS	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600	0.6600
HOUR 24 CS	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800	1.1800

GEOMETRIC STANDARD DEVIATIONS OF BACKGROUND CO BY MONTH FOR CO IN PPM

GEOMETRIC MEANS OF PPM CL BACKGROUND BY MONTH AND HOUR

HOUR 1	0.3974	0.4397	0.3382	0.4228	0.3551	0.3551	0.4481	0.5073	0.5073	0.5327	0.5327	0.6172
HOUR 2	0.3057	0.3382	0.2602	0.3252	0.2731	0.2731	0.3447	0.3902	0.3902	0.4098	0.4098	0.4748
HOUR 3	0.2751	0.3044	0.2341	0.2927	0.2459	0.2459	0.3102	0.3512	0.3512	0.3688	0.3688	0.4273
HOUR 4	0.3057	0.3382	0.2602	0.3252	0.2731	0.2731	0.3447	0.3902	0.3902	0.4098	0.4098	0.4748
HOUR 5	0.3666	0.4059	0.3122	0.3902	0.3278	0.3278	0.4137	0.4683	0.4683	0.4917	0.4917	0.5658
HOUR 6	0.6420	0.7102	0.5463	0.6829	0.5737	0.5737	0.7239	0.8195	0.8195	0.8605	0.8605	0.9971
HOUR 7	0.9171	1.0146	0.7805	0.9756	0.8195	0.8195	1.0341	1.1707	1.1707	1.2293	1.2293	1.4244
HOUR 8	0.7337	0.8117	0.6244	0.7805	0.6556	0.6556	0.8273	0.9366	0.9366	0.9834	0.9834	1.1395
HOUR 9	0.4585	0.4585	0.3902	0.4878	0.4098	0.4098	0.5171	0.5854	0.5854	0.6146	0.6146	0.7122
HOUR 10	0.5197	0.5750	0.4423	0.5528	0.4664	0.4664	0.5860	0.6634	0.6634	0.6966	0.6966	0.8072
HOUR 11	0.3363	0.3720	0.2862	0.3577	0.3005	0.3005	0.3792	0.4293	0.4293	0.4507	0.4507	0.5223
HOUR 12	0.3974	0.4397	0.3382	0.4228	0.3551	0.3551	0.4481	0.5073	0.5073	0.5327	0.5327	0.6172
HOUR 13	0.3666	0.4059	0.3122	0.3902	0.3278	0.3278	0.4137	0.4683	0.4683	0.4917	0.4917	0.5658
HOUR 14	0.3363	0.3720	0.2862	0.3577	0.3005	0.3005	0.3792	0.4293	0.4293	0.4507	0.4507	0.5223
HOUR 15	0.3666	0.4059	0.3122	0.3902	0.3278	0.3278	0.4137	0.4683	0.4683	0.4917	0.4917	0.5658
HOUR 16	0.4280	0.4735	0.3642	0.4553	0.3824	0.3824	0.4826	0.5463	0.5463	0.5737	0.5737	0.6647
HOUR 17	0.6114	0.6764	0.5203	0.6504	0.5463	0.5463	0.6894	0.7805	0.7805	0.8195	0.8195	0.9496
HOUR 18	0.4891	0.5411	0.4163	0.5203	0.4371	0.4371	0.5515	0.6244	0.6244	0.6556	0.6556	0.7597
HOUR 19	0.4280	0.4735	0.3642	0.4553	0.3824	0.3824	0.4826	0.5463	0.5463	0.5737	0.5737	0.6647
HOUR 20	0.5502	0.6088	0.4683	0.5854	0.4917	0.4917	0.6205	0.7024	0.7024	0.7376	0.7376	0.8546
HOUR 21	0.5808	0.6426	0.4943	0.6179	0.5190	0.5190	0.6550	0.7415	0.7415	0.7785	0.7785	0.9021
HOUR 22	0.4891	0.5411	0.4163	0.5203	0.4371	0.4371	0.5515	0.6244	0.6244	0.6556	0.6556	0.7598
HOUR 23	0.5197	0.5750	0.4423	0.5528	0.4644	0.4644	0.5860	0.6634	0.6634	0.6966	0.6966	0.8072
HOUR 24	0.4585	0.5073	0.3902	0.4878	0.4098	0.4098	0.5171	0.5854	0.5854	0.6146	0.6146	0.7122

FIRST AND LAST MONTHS OF DAYLIGHT SAVING TIME 5 10

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FROM THE MAXIMUM LIKELYHOOD ANALYSIS WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF P1 IS 0.262416E-03 WITH A STANDARD ERROR OF 0.547104E-04

THE ESTIMATE OF P01 IS 0.262485E-03 WITH A STANDARD ERROR OF 0.547250E-04

WHICH YIELD A PROBABILITY OF VIOLATING THE CC STANDARD OF 66.91 O/O WITH A STANDARD ERROR OF 7.89 O/O

AUXILIARY RESULTS OBTAINED UNDER VARIOUS ASSUMPTIONS ARE INCLUDED ON THE FOLLOWING PAGE.

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                    **** AUXILIARY RESULTS ***

     FROM THE LOGNORMAL ASSUMPTION (10 YEAR SIMULATION)

                    COMAX   =   30.5645
                    COMAX2  =   25.1456
                    MEANLN  =  0.260318E 00
                    STDLN   =  0.832687E 00

     FROM THE BINOMIAL ASSUMPTION (10 YEAR SIMULATION) WITH A STANDARD OF 35.00 PPM

                    PROB    =  70.00 O/O
                    SPROB   =  14.49 O/O

     ASSUMING THAT THE ONLY SOURCE OF CO  IS THE BACKGROUND CO  WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF P1 IS 0.0           WITH A STANDARD ERROR OF 0.0

THE ESTIMATE OF P01 IS 0.0          WITH A STANDARD ERROR OF 0.0

WHICH YIELD A PROBABILITY OF VIOLATING THE CO STANDARD OF    0.0  O/O WITH A STANDARD ERROR OF  0.0  O/O
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FOR THE PREDICTED CO CONCENTRATION (NO ASSUMPTIONS) WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF YEARLY AVERAGE CONCENTRATION IS 0.185864E 01 PPM

THE STANDARD DEVIATION OF YEARLY AVERAGE CONCENTRATION IS 0.575439E-01 PPM

ASSUMING THAT THE ONLY SOURCE OF CO IS THE BACKGROUND CO WITH A STANDARD OF 35.00 PPM

THE ESTIMATE OF YEARLY AVERAGE CONCENTRATION IS 0.641486E 00 PPM

THE STANDARD DEVIATION OF YEARLY AVERAGE CONCENTRATION IS 0.266326E-02 PPM

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SIMULATION HISTOGRAM

CO RANGE, PPM	NO. HOURS .EQ.	NO. HOURS .GE.
0.0 .LT. X .LE. 1.0	31597	87647
1.0 .LT. X .LE. 2.0	30559	56050
2.0 .LT. X .LE. 3.0	12854	25491
3.0 .LT. X .LE. 4.0	5355	12637
4.0 .LT. X .LE. 5.0	2622	7282
5.0 .LT. X .LE. 6.0	1529	4660
6.0 .LT. X .LE. 7.0	942	3131
7.0 .LT. X .LE. 8.0	624	2189
8.0 .LT. X .LE. 9.0	422	1565
9.0 .LT. X .LE. 10.0	279	1143
10.0 .LT. X .LE. 11.0	202	864
11.0 .LT. X .LE. 12.0	129	662
12.0 .LT. X .LE. 13.0	118	533
13.0 .LT. X .LE. 14.0	83	415
14.0 .LT. X .LE. 15.0	63	332
15.0 .LT. X .LE. 16.0	48	269
16.0 .LT. X .LE. 17.0	18	221
17.0 .LT. X .LE. 18.0	16	203
18.0 .LT. X .LE. 19.0	15	187
19.0 .LT. X .LE. 20.0	22	172
20.0 .LT. X .LE. 21.0	11	150
21.0 .LT. X .LE. 22.0	22	139
22.0 .LT. X .LE. 23.0	10	117
23.0 .LT. X .LE. 24.0	15	107
24.0 .LT. X .LE. 25.0	10	92
25.0 .LT. X .LE. 26.0	9	82
26.0 .LT. X .LE. 27.0	5	73
27.0 .LT. X .LE. 28.0	8	68
28.0 .LT. X .LE. 29.0	4	60
29.0 .LT. X .LE. 30.0	5	56
30.0 .LT. X .LE. 31.0	9	51
31.0 .LT. X .LE. 32.0	8	42
32.0 .LT. X .LE. 33.0	6	34
33.0 .LT. X .LE. 34.0	2	28
34.0 .LT. X .LE. 35.0	3	26
35.0 .LT. X .LE. 36.0	5	23
36.0 .LT. X .LE. 37.0	2	18
37.0 .LT. X .LE. 38.0	2	16
38.0 .LT. X .LE. 39.0	2	14
39.0 .LT. X .LE. 40.0	2	12
40.0 .LT. X .LE. 41.0	0	10
41.0 .LT. X .LE. 42.0	4	10
42.0 .LT. X .LE. 43.0	1	6
43.0 .LT. X .LE. 44.0	1	5
44.0 .LT. X .LE. 45.0	1	4
45.0 .LT. X .LE. 46.0	0	3
46.0 .LT. X .LE. 47.0	0	3
47.0 .LT. X .LE. 48.0	0	3
48.0 .LT. X .LE. 49.0	0	3
49.0 .LT. X .LE. 50.0	0	3
50.0 .LT. X .LE. 51.0	3	3

FROM THE ANALYSIS OF 10 YEARS OF SIMULATION DATA WITH AN EIGHT HOUR STANDARD OF 9.00 PPM

FRCE8 = 18.90 0/0
SPRCE8 = 12.38 0/0

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DESCRIPTION         1 AND 8-HOUR CO PROBABILITY

MASTER FILE          HWY001.HWYLIBR.P23WCP.LIBRARY.DISK
ADDED TO MASTER      02/17/81
LAST DATE COPIED      NONE
LAST DATE UPDATED    11/16/81  1212
NUMBER OF RECORDS     2764
NUMBER OF UPDATES        6
NUMBER OF ACCESSES      32
SEQUENCE PARAMS      74/7/0010/0010 - RESEQ
COMPRESS STATUS       FULL
MODULE STATUS         TEST

PASSWORD             LLFN
PROGRAMMER           RUNHEISLER
PROC PARAMETER       $NOJCL

      C                                                                      02/17/81
      C                                                                      02/17/81
      C     PROGRAM SIMCO(FILE5=READER, FILE6=PRINTER, FILE8=TAPE)           11/13/81
      C                                                                      02/17/81
      C                                                                      02/17/81
      C     BY                                                               02/17/81
      C     WILLIAM A. CARPENTER, SENIOR SCIENTIST                           02/17/81
      C     RESEARCH LABORATORIES FOR THE ENGINEERING SCIENCES               02/17/81
      C     UNIVERSITY OF VIRGINIA                                           02/17/81
      C                                                                      02/17/81
      C                                                                      02/17/81
      C                                                                      02/17/81
      C          SIMCO IS A SIMULATION PROGRAM DESIGNED TO PREDICT THE       11/16/81
      C     PROBABILITY THAT A HIGHWAY FACILITY (CONSISTING OF UP TO 13      02/17/81
      C     SEPERATE ROADWAY SEGMENTS) WILL PRODUCE HOURLY CO LEVELS IN      02/17/81
      C     EXCESS OF *STAND* (SEE BELOW) OR EIGHT HOUR AVERAGED CO LEVELS IN 02/26/81
      C     EXCESS OF *STAND8* (SEE BELOW) TWICE OR MORE IN ANY RANDOM ONE   02/26/81
      C     YEAR PERIOD.                                                     02/26/81
      C                                                                      02/17/81
      C                                                                      02/17/81
      C                                                                      02/17/81
      C                                                                      02/17/81
      C                                                                      02/17/81
            LOGICAL FINISH,START,TEST                                        02/17/81
      C                                                                      02/17/81
            INTEGER CLASS,COUNT,DAY,DSTM1,DSTM2,H,I,IX,IY,IYR,I1,I2,I8,I68,  02/24/81
           +I69,I70,I71,I72,I73,I74,I75,I78,I79,J,JCS,JHS,JS,JT,K,KALPHA,    02/24/81
           +KOUNT,LABEL,LYR,M,NOMYR,NS,NUM,NUMA,N11,N11A,TKONT,TOTAL,VCOUNT, 02/24/81
           +YEAR                                                             02/24/81
      C                                                                      02/17/81
            INTEGER HISTOG(51),RECORD(1000)                                  02/24/81
      C                                                                      02/17/81
            REAL A,ALPHA,A1,A2,A3,A4,A5,A6,A7,A8,A9,A10,A11,A12,A13,A14,A15, 02/17/81
           +A16,A17,A18,A19,A20,A21,A22,A23,A24,A25,A26,A27,A28,A29,A30,A31, 02/17/81
           +A32,A33,A34,A35,A36,A37,A38,A39,A40,A41,A42,A43,A44,A45,A46,A47, 02/17/81
           +A48,A49,A50,A51,A52,A53,A54,A55,A56,A57,A58,A59,A60,A61,A62,A63, 02/17/81
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      +A64,A65,A66,A67,A68,A69,A70,A71,A72,A73,A74,A75,A76,A77,A78,A79,   0000370   02/17/81
      +A80,A81,A82,A83,A84,A85,A86,A87,A88,A89,A90,A91,A92,A93,A94,A95,   0000380   02/17/81
      +A96,A97,A98,A99,A100,A101,A102,A103,A104,A105,A106,A107,A108,A109, 0000390   02/17/81
      +A110,A111,A112,A113,A114,A115,A116,A117,B,C,COMAX,COMAX2,CONC,     0000400   02/17/81
      +CONCA,D,DTVJ,DUMMX,DUMMY,EDT,EGT,EJ,F,FIRST,FIRSTA,F1,F4,          0000410   11/13/81
      +F7,F10,F13,F16,F19,F22,F28,F34,F40,F46,F52,F58,F64,F70,F76,F82,    0000420   02/17/81
      +F88,F94,F100,F106,F112,GAMMA,GRAN,GTVJ,INTGRL,LAST,LASTA,LCONC,    0000430   02/17/81
      +LENGTH,LTVJ,MC,MU,OX,OY,OZ,PCS,PCSNC,PCVJ,PHS,PRCON,PRCONA,        0000440   02/17/81
      +PROB,PROBB,PO1,P1,S,SC,SPDT,SPGT,SPLT,SPPC,SPRCB,SPROBB,SPO1,SP1,  0000450   02/24/81
      +STAND,STANDB,SUM,SUM2,TEMP,TVOL,URAN,V,VCONC,VCONCA,VPROB,VPROBB,  0000460   02/24/81
      +VPO1,VP1,WNDMIN,X1,X2,YCONC,YCONCA,Y1,Y2,ZCONC,ZCONCA,Z1,Z2,Z3,Z4, 0000470   02/24/81
      +Z5,Z6,Z7,Z8                                                        0000480   02/26/81
C                                                                         0000490   02/17/81
       REAL AHT(13),APCS(13),APDT(13),APGT(13),APHS(13),APLT(13),CMFF(5), 0000500   11/13/81
      +ELT(15,9,11),EPC(15,9,11),FCSD(13,7),FCSH(13,25),FCSM(13,12),      0000510   02/17/81
      +FDTD(13,7),FDTH(13,25),FDTM(13,12),FGTD(13,7),FGTH(13,25),         0000520   02/17/81
      +FGTM(13,12),FHSD(13,7),FHSH(13,25),FHSM(13,12),FLTD(13,7),         0000530   02/17/81
      +FLTH(13,25),FLTM(13,12),FTVD(13,7),FTVH(13,25),FTVM(13,12),        0000540   02/17/81
      +INT(13,96,5),MGCD(25,12),R(8),SCDT(56),SCGT(56),SCLT(56),SCPC(56), 0000550   02/24/81
      +SGCC(12),TFDT(20),TFGT(20),TFLT(20),TFPC(20),TS(13),TSPD(13)       0000560   02/17/81
C                                                                         0000570   02/17/81
       COMMON X1,Y1,OX,OY,OZ,ALPHA,GAMMA,LENGTH,CLASS                     0000580   02/17/81
C                                                                         0000590   02/17/81
       COMMON/LNKCOM/Z1,Z2,Z3,TEMP,PCSNC,PHS,PCS,Z4,Z5,Z6,Z7,Z8           0000600   02/17/81
C                                                                         0000610   02/17/81
       DATA ELT/1485*0.0/,EPC/1485*0.0/                                   0000620   11/13/81
C                                                                         0000630   02/17/81
       DATA IX/31415927/                                                  0000640   02/17/81
C                                                                         0000650   02/17/81
       DATA TKONT/8760/                                                   0000660   02/17/81
C                                                                         0000670   02/17/81
       DATA WNDMIN/1.0/                                                   0000680   02/17/81
C                                                                         0000690   02/17/81
       DATA F1,F4,F7,F10,F13,F16,F19,F22,F28,F34,F40,F46,F52,F58,F64,F70, 0000700   02/17/81
      +F76,F82,F88,F94,F100,F106,F112/23*0.0/                             0000710   02/17/81
C                                                                         0000720   02/17/81
       DATA A1,A2,A3,A4,A5,A6,A7,A8,A9,A10,A11,A12,A13,A14,A15,A16,A17,   0000730   02/17/81
      +A18,A19,A20,A21/                                                   0000740   02/17/81
      +1.44,-0.088,0.0008,1.2,-0.072,0.0006,1.44,-0.092,0.001,0.62,       0000750   02/17/81
      +-0.039,0.0004,1.24,-0.078,0.0008,1.54,-0.097,0.001,1.74,-0.117,    0000760   02/17/81
      +0.0015/                                                            0000770   02/17/81
C                                                                         0000780   02/17/81
       DATA A22,A23,A24,A25,A26,A27,A28,A29,A30,A31,A32,A33,              0000790   02/17/81
      +A34,A35,A36,A37,A38,A39,A40,A41,A42,A43,A44,A45,A46,A47,A48,A49,   0000800   02/17/81
      +A50,A51,A52,A53,A54,A55,A56,A57,A58,A59,A60,A61,A62,A63,A64,A65,   0000810   02/17/81
      +A66,A67,A68,A69/                                                   0000820   02/17/81
      +2.4875E0,-3.9156E-1,2.7072E-2,-9.7618E-4,1.6527E-5,-1.0432E-7,     0000830   02/17/81
      +2.8393E0,-3.6876E-1,2.1078E-2,-6.7644E-4,1.0627E-5,-6.3641E-8,     0000840   02/17/81
      +2.6845E0,-3.3282E-1,1.7628E-2,-5.2412E-4,7.7222E-6,-4.3702E-8,     0000850   02/17/81
      +2.7074E0,-3.3131E-1,1.7618E-2,-5.3858E-4,8.1740E-6,-4.7780E-8,     0000860   02/17/81
      +2.7890E0,-3.2711E-1,1.6294E-2,-4.6757E-4,6.7191E-6,-3.7440E-8,     0000870   02/17/81
      +2.7780E0,-3.1913E-1,1.5318E-2,-4.2233E-4,5.8495E-6,-3.1497E-8,     0000880   02/17/81
      +2.4655E0,-3.0502E-1,1.6050E-2,-4.7397E-4,6.9908E-6,-3.9976E-8,     0000890   02/17/81
      +2.3399E0,-2.9698E-1,1.6007E-2,-4.7740E-4,7.0675E-6,-4.0398E-8/     0000900   02/17/81
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C                                                                          0000910   02/17/81
      DATA A70,A71,A72,A73,A74,A75,A76,A77,A78,A79,A80,A81,                0000920   02/17/81
     +A82,A83,A84,A85,A86,A87,A88,A89,A90,A91,A92,A93,A94,A95,A96,A97,     0000930   02/17/81
     +A98,A99,A100,A101,A102,A103,A104,A105,A106,A107,A108,A109,A110,      0000940   02/17/81
     +A111,A112,A113,A114,A115,A116,A117/                                  0000950   02/17/81
     +2.4875E0,-3.9156E-1,2.7072E-2,-9.7618E-4,1.6527E-5,-1.0432E-7,       0000960   02/17/81
     +2.8393E0,-3.6876E-1,2.1078E-2,-6.7644E-4,1.0627E-5,-6.3641E-8,       0000970   02/17/81
     +2.6845E0,-3.3282E-1,1.7628E-2,-5.2412E-4,7.7222E-6,-4.3702E-8,       0000980   02/17/81
     +2.7074E0,-3.3131E-1,1.7618E-2,-5.3858E-4,8.1740E-6,-4.7780E-8,       0000990   02/17/81
     +2.7890E0,-3.2711E-1,1.6294E-2,-4.6757E-4,6.7191E-6,-3.7440E-8,       0001000   02/17/81
     +2.7780E0,-3.1913E-1,1.5318E-2,-4.2233E-4,5.8495E-6,-3.1497E-8,       0001010   02/17/81
     +2.4655E0,-3.0502E-1,1.6050E-2,-4.7397E-4,6.9908E-6,-3.9976E-8,       0001020   02/17/81
     +2.3399E0,-2.9698E-1,1.6007E-2,-4.7740E-4,7.0675E-6,-4.0398E-8/       0001030   02/17/81
C                                                                          0001040   02/17/81
      DATA TFDT/0.102,0.178,0.168,0.149,0.101,0.081,0.067,0.046,0.031,     0001050   02/17/81
     +0.021,0.016,0.009,0.008,0.006,0.006,0.004,0.003,0.002,0.002,0.001/   0001060   02/17/81
C                                                                          0001070   02/17/81
      DATA TFGT/0.061,0.116,0.122,0.124,0.098,0.088,0.079,0.063,0.049,     0001080   02/17/81
     +0.040,0.030,0.020,0.021,0.019,0.016,0.014,0.012,0.011,0.010,0.009/   0001090   02/17/81
C                                                                          0001100   02/17/81
      DATA TFLT/0.093,0.136,0.126,0.129,0.097,0.082,0.075,0.057,0.044,     0001110   02/17/81
     +0.031,0.023,0.015,0.018,0.016,0.014,0.012,0.011,0.009,0.008,0.007/   0001120   02/17/81
C                                                                          0001130   02/17/81
      DATA TFPC/0.106,0.142,0.133,0.123,0.108,0.092,0.077,0.064,0.050,     0001140   02/17/81
     +0.035,0.023,0.016,0.010,0.007,0.004,0.003,0.002,0.002,0.002,0.002/   0001150   02/17/81
C                                                                          0001160   02/17/81
C                                                                          0001170   02/17/81
C                                                                          0001180   02/17/81
C     A,B,C,D   REAL SCALARS -- CALCULATED.                                0001190   02/17/81
C               THE STATISTICS DEFINING P1 AND P01.                        0001200   02/17/81
C                                                                          0001210   02/17/81
C     AHT       REAL ARRAY -- DIMENSION 13 -- INPUT.                       0001220   02/17/81
C               THE ANNUAL AVERAGE TRAFFIC VOLUME IN VEHICLES/HOUR         0001230   02/17/81
C               INDEXED BY SOURCE.                                         0001240   02/17/81
C                                                                          0001250   02/17/81
C     ALPHA     REAL SCALAR -- CALCULATED/INPUT.                           0001260   02/17/81
C               THE WIND DIRECTION MEASURED CCW FROM EAST IN RADIANS.      0001270   02/17/81
C               ALPHA IS THE DIRECTION THE WIND IS COMING FROM.            0001280   02/17/81
C                                                                          0001290   02/17/81
C     APCS      REAL ARRAY -- DIMENSION 13 -- INPUT.                       0001300   02/17/81
C               ANNUAL AVERAGE PERCENT COLD STARTS INDEXED BY SOURCE.      0001310   02/17/81
C                                                                          0001320   02/17/81
C     APDT      REAL ARRAY -- DIMENSION 13 -- INPUT.                       0001330   02/17/81
C               ANNUAL AVERAGE PERCENT DIESEL TRUCKS INDEXED BY SOURCE.    0001340   02/17/81
C                                                                          0001350   02/17/81
C     APGT      REAL ARRAY -- DIMENSION 13 -- INPUT.                       0001360   02/17/81
C               ANNUAL AVERAGE PERCENT GAS TRUCKS INDEXED BY SOURCE.       0001370   02/17/81
C                                                                          0001380   02/17/81
C     APHS      REAL ARRAY -- DIMENSION 13 -- INPUT.                       0001390   02/17/81
C               ANNUAL AVERAGE PERCENT HOT STARTS INDEXED BY SOURCE.       0001400   02/17/81
C                                                                          0001410   02/17/81
C     APLT      REAL ARRAY -- DIMENSION 13 -- INPUT.                       0001420   02/17/81
C               ANNUAL AVERAGE PERCENT LIGHT TRUCKS INDEXED BY SOURCE.     0001430   02/17/81
C                                                                          0001440   02/17/81
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C     A1--A117 REAL SCALARS -- DATA.                                          0001450   02/17/81
C              THE COEFFICIENTS OF THE SPEED CORRECTION FUNCTIONS.            0001460   02/17/81
C                                                                             0001470   02/17/81
C     CLASS    INTEGER SCALAR -- CALCULATED/INPUT.                            0001480   02/17/81
C              STABILITY CLASS INDEX.                                         0001490   02/17/81
C                                                                             0001500   02/17/81
C     CMEF     REAL ARRAY -- DIMENSION 5 -- CALCULATED.                       0001510   11/13/81
C              THE MOBILE1 CALCULATED MODAL EMISSION FACTORS.                 0001520   11/13/81
C                                                                             0001530   11/13/81
C     COMAX    REAL SCALAR -- CALCULATED.                                     0001540   02/17/81
C              THE LARSEN ESTIMATE OF THE EXPECTED ANNUAL-MAXIMUM CO          0001550   02/17/81
C              CONCENTRATION IN PPM.                                          0001560   02/17/81
C                                                                             0001570   02/17/81
C     COMAX2   REAL SCALAR -- CALCULATED.                                     0001580   02/17/81
C              THE LARSEN ESTIMATE OF THE EXPECTED ANNUAL-SECOND-             0001590   02/17/81
C              MAXIMUM CO CONCENTRATION IN PPM.                               0001600   02/17/81
C                                                                             0001610   02/17/81
C     CONC     REAL SCALAR -- CALCULATED.                                     0001620   02/17/81
C              CONCENTRATION IN PPM CO.                                       0001630   02/17/81
C                                                                             0001640   02/17/81
C     CONCA    REAL SCALAR -- CALCULATED.                                     0001650   02/17/81
C              CONC UNDER THE ASSUMPTION THAT THE ONLY CO SOURCE IS           0001660   02/17/81
C              THE AMBIENT CO.                                                0001670   02/17/81
C                                                                             0001680   02/17/81
C     COUNT    INTEGER SCALAR -- CALCULATED.                                  0001690   02/17/81
C              NUMBER SIMULATED HOURS PER YEAR.                               0001700   02/17/81
C                                                                             0001710   02/17/81
C     DAY      INTEGER SCALAR -- CALCULATED.                                  0001720   02/17/81
C              THE DAY OF WEEK.                                               0001730   02/17/81
C                                                                             0001740   02/17/81
C     DSTM1    INTEGER SCALAR -- INPUT.                                       0001750   02/17/81
C              THE FIRST MONTH OF DAYLIGHT SAVING TIME.                       0001760   02/17/81
C                                                                             0001770   02/17/81
C     DSTM2    INTEGER SCALAR -- INPUT.                                       0001780   02/17/81
C              THE LAST MONTH OF DAYLIGHT SAVING TIME.                        0001790   02/17/81
C                                                                             0001800   02/17/81
C     DTVJ     REAL SCALAR -- CALCULATED.                                     0001810   02/17/81
C              THE DIESEL TRUCK VOLUME ON SOURCE J IN VEHICLES/HOUR.          0001820   02/17/81
C                                                                             0001830   02/17/81
C     DUMMX    REAL SCALAR -- CALCULATED.                                     0001840   02/17/81
C              A GENERAL PURPOSE DUMMY VARIABLE.                              0001850   02/17/81
C                                                                             0001860   02/17/81
C     DUMMY    REAL SCALAR -- CALCULATED.                                     0001870   02/17/81
C              A GENERAL PURPOSE DUMMY VARIABLE.                              0001880   02/17/81
C                                                                             0001890   02/17/81
C     EDT      REAL SCALAR -- CALCULATED.                                     0001900   02/17/81
C              THE DIESEL TRUCK EMISSION FACTOR AT 19.6 MPH IN                0001910   02/17/81
C              GM(CO)/MILE/VEHICLE.                                           0001920   02/17/81
C                                                                             0001930   02/17/81
C     EGT      REAL SCALAR -- CALCULATED.                                     0001940   02/17/81
C              THE HEAVY DUTY GAS TRUCK EMISSION FACTOR AT 19.6 MPH IN        0001950   02/17/81
C              GM(CO)/MILE/VEHICLE.                                           0001960   02/17/81
C                                                                             0001970   02/17/81
C     EJ       REAL SCALAR -- CALCULATED.                                     0001980   02/17/81
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C           THE TOTAL EMISSIONS FROM SOURCE J IN GM(CO)/MILE/HOUR.       02/17/81
C                                                                        02/17/81
C     ELT   REAL ARRAY -- DIMENSION 15,9,11 -- CALCULATED.               02/17/81
C           LIGHT TRUCK EMISSION FACTORS IN GM(CO)/MILE/VEHICLE          02/17/81
C           AT 19.6 MPH INDEXED BY COLD STARTS, HOT STARTS, AND          02/17/81
C           TEMPERATURE.                                                 02/17/81
C                                                                        02/17/81
C     EPC   REAL ARRAY -- DIMENSION 15,9,11 -- CALCULATED.               02/17/81
C           PASSENGER CAR EMISSION FACTORS IN GM(CO)/MILE/VEHICLE        02/17/81
C           AT 19.6 MPH INDEXED BY COLD STARTS, HOT STARTS, AND          02/17/81
C           TEMPERATURE.                                                 02/17/81
C                                                                        02/17/81
C     F     REAL SCALAR -- INPUT.                                        02/17/81
C           THE RATIO OF COLD START NON-CATALYST OPERATION TO COLD       02/17/81
C           START CATALYST OPERATION.                                    02/17/81
C                                                                        02/17/81
C     FCSD  REAL ARRAY -- DIMENSION 13,7 -- INPUT.                       02/17/81
C           DAY-OF-WEEK PERCENT COLD START FACTORS INDEXED BY            02/17/81
C           SOURCE AND DAY.  FCSD(I,D)*FCSM(I,M)*APCS(I) IS THE          02/17/81
C           AVERAGE HOURLY PERCENT COLD STARTS FOR DAY-OF-WEEK D,        02/17/81
C           MONTH M, AND SOURCE I.                                       02/17/81
C                                                                        02/17/81
C     FCSH  REAL ARRAY -- DIMENSION 13,25 -- INPUT.                      02/17/81
C           HOUR-OF-DAY PERCENT COLD START FACTORS INDEXED BY            02/17/81
C           SOURCE AND HOUR.  FCSH(I,H)*FCSD(I,D)*FCSM(I,M)*APCS(I)      02/17/81
C           IS THE AVERAGE HOURLY PERCENT COLD STARTS FOR                02/17/81
C           HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I.         02/17/81
C                      NOTE, FCSH(I,25) IS SET EQUAL TO FCSH(I,1)        02/17/81
C           INTERNALLY TO HANDLE THE DAYLIGHT SAVING TIME CONDITION.     02/17/81
C           FCSH IS INPUT RELATIVE TO "CLOCK" TIME.  FOR INSTANCE,       02/17/81
C           FCSH(I,9) WOULD BE THE FACTOR FOR 9 AM STANDARD TIME         02/17/81
C           FOR NOVEMBER THROUGH APRIL, AND FCSH(I,9) WOULD BE THE       02/17/81
C           COLD START FACTOR FOR 9 AM DAYLIGHT SAVING TIME FOR MAY      02/17/81
C           THROUGH OCTOBER.  SO THE TIME REFERENCE FOR FCSH (AND FOR    02/17/81
C           ALL INPUT TERMS WHICH ARE RELATIVE TO "CLOCK" TIME) IS       02/17/81
C           THAT TIME WHICH WE WOULD READ ON THE CLOCK.  ANOTHER WAY     02/17/81
C           TO EXPRESS THIS NOTION IS THAT "CLOCK" TIME REFERENCES       02/17/81
C           ARE EITHER ST OR DST WHICHEVER IS APPLICABLE TO THE MONTH    02/17/81
C           UNDER CONSIDERATION.                                         02/17/81
C     FCSM  REAL ARRAY -- DIMENSION 13,12 -- INPUT.                      02/17/81
C           MONTHLY PERCENT COLD START FACTORS INDEXED BY SOURCE         02/17/81
C           AND MONTH.  FCSM(I,M)*APCS(I) IS THE AVERAGE HOURLY          02/17/81
C           PERCENT COLD STARTS FOR MONTH M AND SOURCE I.                02/17/81
C                                                                        02/17/81
C     FDTD  REAL ARRAY -- DIMENSION 13,7 -- INPUT.                       02/17/81
C           DAY-OF-WEEK PERCENT DIESEL TRUCK FACTORS INDEXED BY          02/17/81
C           SOURCE AND DAY.  FDTD(I,D)*FDTM(I,M)*APDT(I) IS THE          02/17/81
C           AVERAGE HOURLY PERCENT DIESEL TRUCKS FOR DAY-OF-WEEK D,      02/17/81
C           MONTH M, AND SOURCE I.                                       02/17/81
C                                                                        02/17/81
C     FDTH  REAL ARRAY -- DIMENSION 13,25 -- INPUT.                      02/17/81
C           HOUR-OF-DAY PERCENT DIESEL TRUCK FACTORS INDEXED BY          02/17/81
C           SOURCE AND HOUR.  FDTH(I,H)*FDTD(I,D)*FDTM(I,M)*APDT(I)      02/17/81
C           IS THE AVERAGE HOURLY PERCENT DIESEL TRUCKS FOR              02/17/81
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C              HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I.    0002530   02/17/81
C              SEE NOTE UNDER FCSH.                                    0002540   02/17/81
C                                                                      0002550   02/17/81
C      FDTM    REAL ARRAY -- DIMENSION 13,12 -- INPUT.                 0002560   02/17/81
C              MONTHLY PERCENT DIESEL TRUCK FACTORS INDEXED BY SOURCE  0002570   02/17/81
C              AND MONTH.  FDTM(I,M)*APDT(I) IS THE AVERAGE HOURLY     0002580   02/17/81
C              PERCENT DIESEL TRUCKS FOR MONTH M AND SOURCE I.         0002590   02/17/81
C                                                                      0002600   02/17/81
C      FGTD    REAL ARRAY -- DIMENSION 13,7 -- INPUT.                  0002610   02/17/81
C              DAY-OF-WEEK PERCENT GAS TRUCK FACTORS INDEXED BY        0002620   02/17/81
C              SOURCE AND DAY.  FGTD(I,D)*FGTM(I,M)*APGT(I) IS THE     0002630   02/17/81
C              AVERAGE HOURLY PERCENT GAS TRUCKS FOR DAY-OF-WEEK D,    0002640   02/17/81
C              MONTH M, AND SOURCE I.                                  0002650   02/17/81
C                                                                      0002660   02/17/81
C      FGTH    REAL ARRAY -- DIMENSION 13,25 -- INPUT.                 0002670   02/17/81
C              HOUR-OF-DAY PERCENT GAS TRUCK FACTORS INDEXED BY        0002680   02/17/81
C              SOURCE AND HOUR.  FGTH(I,H)*FGTD(I,D)*FGTM(I,M)*APGT(I) 0002690   02/17/81
C              IS THE AVERAGE HOURLY PERCENT GAS TRUCKS FOR            0002700   02/17/81
C              HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I.    0002710   02/17/81
C              SEE NOTE UNDER FCSH.                                    0002720   02/17/81
C                                                                      0002730   02/17/81
C      FGTM    REAL ARRAY -- DIMENSION 13,12 -- INPUT.                 0002740   02/17/81
C              MONTHLY PERCENT GAS TRUCK FACTORS INDEXED BY SOURCE     0002750   02/17/81
C              AND MONTH.  FGTM(I,M)*APGT(I) IS THE AVERAGE HOURLY     0002760   02/17/81
C              PERCENT GAS TRUCKS FOR MONTH M AND SOURCE I.            0002770   02/17/81
C                                                                      0002780   02/17/81
C      FHSD    REAL ARRAY -- DIMENSION 13,7 -- INPUT.                  0002790   02/17/81
C              DAY-OF-WEEK PERCENT HOT START FACRORS INDEXED BY        0002800   02/17/81
C              SOURCE AND DAY.  FHSD(I,D)*FHSM(I,M)*APHS(I) IS THE     0002810   02/17/81
C              AVERAGE HOURLY PERCENT HOT STARTS FOR DAY-OF-WEEK D,    0002820   02/17/81
C              MONTH M, AND SOURCE I.                                  0002830   02/17/81
C                                                                      0002840   02/17/81
C      FHSH    REAL ARRAY -- DIMENSION 13,25 -- INPUT.                 0002850   02/17/81
C              HOUR-OF-DAY PERCENT HOT START FACTORS INDEXED BY        0002860   02/17/81
C              SOURCE AND HOUR.  FHSH(I,H)*FHSD(I,D)*FHSM(I,M)*APHS(I) 0002870   02/17/81
C              IS THE AVERAGE HOURLY PERCENT HOT STARTS FOR            0002880   02/17/81
C              HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I.    0002890   02/17/81
C              SEE NOTE UNDER FCSH.                                    0002900   02/17/81
C                                                                      0002910   02/17/81
C                                                                      0002920   02/26/81
C      FHSM    REAL ARRAY -- DIMENSION 13,12 -- INPUT.                 0002930   02/17/81
C              MONTHLY PERCENT HOT START FACTORS INDEXED BY SOURCE     0002940   02/17/81
C              AND MONTH.  FHSM(I,M)*APHS(I) IS THE AVERAGE HOURLY     0002950   02/17/81
C              PERCENT HOT STARTS FOR MONTH M AND SOURCE I.            0002960   02/17/81
C                                                                      0002970   03/02/81
C      FINISH  LOGICAL SCALAR -- CALCULATED.                           0002980   02/17/81
C              .TRUE. IF THE END OF FILEB HAS BEEN REACHED.            0002990   02/17/81
C                                                                      0003000   02/17/81
C      FIRST   REAL SCALAR -- CALCULATED.                              0003010   02/17/81
C              THE FIRST CO INDICATOR IN THE SIMULATED CONC SEQUENCE.  0003020   02/17/81
C                                                                      0003030   02/17/81
C      FIRSTA  REAL SCALAR -- CALCULATED.                              0003040   02/17/81
C              THE FIRST CO INDICATOR IN THE SIMULATED CONCA SEQUENCE. 0003050   02/17/81
C                                                                      0003060   02/17/81
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C      FLTD      REAL ARRAY -- DIMENSION 13,7 -- INPUT.                        0003070     02/17/81
C                DAY-OF-WEEK PERCENT LIGHT TRUCK FACTORS INDEXED BY            0003080     02/17/81
C                SOURCE AND DAY.  FLTD(I,D)*FLTM(I,M)*APLT(I) IS THE           0003090     02/17/81
C                AVERAGE HOURLY PERCENT LIGHT TRUCKS FOR DAY-OF-WEEK D,        0003100     02/17/81
C                MONTH M, AND SOURCE I.                                        0003110     02/17/81
C                                                                              0003120     02/17/81
C      FLTH      REAL ARRAY -- DIMENSION 13,25 -- INPUT.                       0003130     02/17/81
C                HOUR-OF-DAY PERCENT LIGHT TRUCK FACTORS INDEXED BY            0003140     02/17/81
C                SOURCE AND HOUR.  FLTH(I,H)*FLTD(I,D)*FLTM(I,M)*APLT(I)       0003150     02/17/81
C                IS THE AVERAGE HOURLY PERCENT LIGHT TRUCKS FOR                0003160     02/17/81
C                HOUR-OF-DAY H, DAY-OF-WEEK D, MONTH M, AND SOURCE I.          0003170     02/17/81
C                SEE NOTE UNDER FCSH.                                          0003180     02/17/81
C                                                                              0003190     02/17/81
C      FLTM      REAL ARRAY -- DIMENSION 13,12 -- INPUT.                       0003200     02/17/81
C                MONTHLY PERCENT LIGHT TRUCK FACTORS INDEXED BY SOURCE         0003210     02/17/81
C                AND MONTH.  FLTM(I,M)*APLT(I) IS THE AVERAGE HOURLY           0003220     02/17/81
C                PERCENT LIGHT TRUCKS FOR MONTH M AND SOURCE I.                0003230     02/17/81
C                                                                              0003240     02/17/81
C      FTVD      REAL ARRAY -- DIMENSION 13,7 -- INPUT.                        0003250     02/17/81
C                DAY-OF-WEEK TOTAL VEHICLE TRAFFIC VOLUME FACTORS INDEXED      0003260     02/17/81
C                BY SOURCE AND DAY.  FTVD(I,D)*FTVM(I,M)*AHT(I) IS THE         0003270     02/17/81
C                AVERAGE HOURLY TRAFFIC VOLUME FOR DAY-OF-WEEK D, MONTH M,     0003280     02/17/81
C                AND SOURCE I IN VEHICLES/HOUR.                                0003290     02/17/81
C                                                                              0003300     02/17/81
C      FTVH      REAL ARRAY -- DIMENSION 13,25 -- INPUT.                       0003310     02/17/81
C                HOUR-OF-DAY TOTAL VEHICLE TRAFFIC VOLUME FACTORS INDEXED      0003320     02/17/81
C                BY SOURCE AND HOUR.  FTVH(I,H)*FTVD(I,D)*FTVM(I,M)*AHT(I)     0003330     02/17/81
C                IS THE AVERAGE HOURLY TRAFFIC VOLUME FOR HOUR-OF-DAY H,       0003340     02/17/81
C                DAY-OF-WEEK D, MONTH M, AND SOURCE I IN VEHICLES/HOUR.        0003350     02/17/81
C                SEE NOTE UNDER FCSH.                                          0003360     02/17/81
C                                                                              0003370     02/17/81
C      FTVM      REAL ARRAY -- DIMENSION 13,12 -- INPUT.                       0003380     02/17/81
C                MONTHLY TOTAL VEHICLE TRAFFIC VOLUME FACTORS INDEXED BY       0003390     02/17/81
C                SOURCE AND MONTH.  FTVM(I,M)*AHT(I) IS THE AVERAGE HOURLY     0003400     02/17/81
C                TRAFFIC VOLUME FOR MONTH M AND SOURCE I IN VEHICLES/HOUR.     0003410     02/17/81
C                                                                              0003420     02/17/81
C      F1--F112  REAL SCALARS -- CALCULATED.                                   0003430     02/17/81
C                FACTORS FOR THE VEHICLE TYPE MODEL YEAR CATEGORIES.           0003440     02/17/81
C                                                                              0003450     02/17/81
C      GAMMA     REAL SCALAR -- CALCULATED.                                    0003460     02/17/81
C                ROAD ANGLE MEASURED CCW FROM EAST IN RADIANS.                 0003470     02/17/81
C                                                                              0003480     02/17/81
C      GTVJ      REAL SCALAR -- CALCULATED.                                    0003490     02/17/81
C                THE GAS TRUCK VOLUME ON SOURCE J IN VEHICLES/HOUR.            0003500     02/17/81
C      H         INTEGER SCALAR -- INPUT.                                      0003510     02/17/81
C                HOUR OF DAY (1,24 HOUR CLOCK).  HOURS INPUTTED FROM THE       0003520     02/17/81
C                METEOROLOGICAL DATA FILE ARE IN STANDARD TIME.  H IS          0003530     02/17/81
C                CONVERTED INTERNALLY TO "CLOCK" (SEE FCSH) TIME.              0003540     02/17/81
C                                                                              0003550     02/17/81
C                                                                              0003560     02/17/81
C      HISTOG    INTEGER ARRAY -- DIMENSION 51 -- CALCULATED.                  0003570     02/17/81
C                CONTAINS THE HISTOGRAM OF THE SIMULATED CONC SEQUENCE.        0003580     02/17/81
C                                                                              0003590     02/17/81
C      I         INTEGER SCALAR -- CALCULATED.                                 0003600     02/17/81
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C               AN INDEXING VARIABLE.                                       0003610    02/17/81
C                                                                           0003620    02/17/81
C       INT     REAL ARRAY -- DIMENSION 13,96,5 -- CALCULATED.              0003630    02/17/81
C               THE GAUSSIAN DISPERSION INTEGRALS IN METERS**-1 INDEXED     0003640    02/17/81
C               BY ROADWAY, KALPHA, AND CLASS.                              0003650    02/17/81
C                                                                           0003660    02/17/81
C                                                                           0003670    02/17/81
C       IX,IY   INTEGER SCALARS -- CALCULATED.                              0003680    02/17/81
C               PARAMETERS OF THE RANDOM NUMBER GENERATORS URAN AND GRAN.  0003690    02/17/81
C                                                                           0003700    02/17/81
C       IYR     INTEGER SCALAR -- CALCULATED.                               0003710    02/17/81
C               YEAR OF THE CURRENT METEOROLOGICAL INPUT RECORD.            0003720    02/17/81
C                                                                           0003730    02/17/81
C       I1--I79 INTEGER SCALARS -- CALCULATED.                              0003740    02/24/81
C               INDEXING VARIABLES.                                         0003750    02/17/81
C                                                                           0003760    02/17/81
C       J,K     INTEGER SCALARS -- CALCULATED.                              0003770    02/17/81
C               INDEXING VARIABLES.                                         0003780    02/17/81
C                                                                           0003790    02/17/81
C       JCS     INTEGER SCALAR -- CALCULATED.                               0003800    02/17/81
C               THE COLD START INDEX.                                       0003810    02/17/81
C                                                                           0003820    02/17/81
C       JHS     INTEGER SCALAR -- CALCULATED.                               0003830    02/17/81
C               THE HOT START INDEX.                                        0003840    02/17/81
C                                                                           0003850    02/17/81
C       JS      INTEGER SCALAR -- CALCULATED.                               0003860    02/17/81
C               THE SPEED INDEX.                                            0003870    02/17/81
C                                                                           0003880    02/17/81
C       JT      INTEGER SCALAR -- CALCULATED.                               0003890    02/17/81
C               THE TEMPERATURE INDEX.                                      0003900    02/17/81
C                                                                           0003910    02/17/81
C       KALPHA  INTEGER SCALAR -- CALCULATED.                               0003920    02/17/81
C               ALPHA DESCRETIZED TO INDEX THE ARRAY INT.                   0003930    02/17/81
C                                                                           0003940    02/17/81
C       KOUNT   INTEGER SCALAR -- CALCULATED.                               0003950    02/17/81
C               THE TOTAL NUMBER OF HOURS IN ALL SIMULATED YEARS.           0003960    02/17/81
C                                                                           0003970    02/17/81
C       LABEL   INTEGER SCALAR -- ASSIGNED.                                 0003980    02/17/81
C               AN ASSIGNED LABEL FOR TRANSFER TO STATEMENTS 420 AND 430.  0003990    02/17/81
C                                                                           0004000    02/17/81
C       LAST    REAL SCALAR -- CALCULATED.                                  0004010    02/17/81
C               THE LAST CO INDICATOR IN THE SIMULATED CONC SEQUENCE.       0004020    02/17/81
C                                                                           0004030    02/17/81
C       LASTA   REAL SCALAR -- CALCULATED.                                  0004040    02/17/81
C               THE LAST CO INDICATOR IN THE SIMULATED CONCA SEQUENCE.      0004050    02/17/81
C                                                                           0004060    02/17/81
C       LCONC   REAL SCALAR -- CALCULATED.                                  0004070    02/17/81
C               ALOG(CONC).                                                 0004080    02/17/81
C                                                                           0004090    02/17/81
C       LENGTH  REAL SCALAR -- CALCULATED.                                  0004100    02/17/81
C               THE LENGTH IN METERS OF A ROADWAY.                          0004110    02/17/81
C                                                                           0004120    02/17/81
C       LTVJ    REAL SCALAR -- CALCULATED.                                  0004130    02/17/81
C               THE LIGHT TRUCK VOLUME ON SOURCE J IN VEHICLES/HOUR.        0004140    02/17/81
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C                                                                    02/17/81
C     LYR      INTEGER SCALAR -- CALCULATED.                         02/17/81
C              THE YEAR FOR THE LAST METEOROLOGICAL INPUT RECORD.    02/17/81
C                                                                    02/17/81
C     M        INTEGER SCALAR -- INPUT.                              02/17/81
C              MONTH.                                                02/17/81
C                                                                    02/17/81
C     MC       REAL SCALAR -- CALCULATED.                            02/17/81
C              THE MEAN OF LCONC.                                    02/17/81
C                                                                    02/17/81
C     MGCC     REAL ARRAY -- DIMENSION 25,12 -- INPUT.               02/17/81
C              THE GEOMETRIC MEAN OF THE PPM CO BACKGROUND INDEXED   02/17/81
C              BY HOUR AND MONTH.  MGCO IS CONVERTED TO THE MEAN OF THE 02/17/81
C              LN(CO) BEFORE USE.  NOTE THAT MGCO(25,J) IS SET TO    02/17/81
C              MGCO(1,J) INTERNALLY TO HANDLE THE DAYLIGHT SAVING    02/17/81
C              TIME CONDITION.  MGCO IS INPUT RELATIVE TO "CLOCK" (SEE 02/17/81
C              FCSH) TIME.  NOTE THAT MGCO IS VERY NEARLY APPROXIMATED 02/17/81
C              BY THE ARITHMETIC MEAN.  THUS, IF GEOMETRIC MEANS ARE 02/17/81
C              UNAVAILABLE, THE ARITHMETIC MEANS MAY BE USED.        02/17/81
C                                                                    02/17/81
C     MU       REAL SCALAR -- INPUT.                                 02/17/81
C              WINDSPEED IN METERS/SECOND.                           02/17/81
C                                                                    02/17/81
C     NOMYR    INTEGER SCALAR -- INPUT.                              02/17/81
C              THE NOMINAL YEAR FOR THE ANALYSIS.                    02/17/81
C                                                                    02/17/81
C     NS       INTEGER SCALAR -- INPUT.                              02/17/81
C              THE NUMBER OF SOURCES (ROADWAYS) USED IN THE ANALYSES. 02/17/81
C                                                                    02/17/81
C     NUM      INTEGER SCALAR -- CALCULATED.                         02/17/81
C              THE NUMBER OF SIMULATED CONC LEVELS EXCEEDING STAND.  02/17/81
C                                                                    02/17/81
C     NUMA     INTEGER SCALAR -- CALCULATED.                         02/17/81
C              THE NUMBER OF SIMULATED CONCA LEVELS EXCEEDING STAND. 02/17/81
C                                                                    02/17/81
C     N11      INTEGER SCALAR -- CALCULATED.                         02/17/81
C              THE NUMBER OF SEQUENTIAL PAIRS OF SIMULATED CONC LEVELS 02/17/81
C              WHICH EXCEED STAND.                                   02/17/81
C                                                                    02/17/81
C     N11A     INTEGER SCALAR -- CALCULATED.                         02/17/81
C              THE NUMBER OF SEQUENTIAL PAIRS OF SIMULATED CONCA LEVELS 02/17/81
C              WHICH EXCEED STAND.                                   02/17/81
C                                                                    02/17/81
C     OX,OY,OZ REAL SCALARS -- INPUTS.                               02/17/81
C              THE X, Y, AND Z COORDINATES OF THE RECEPTOR LOCATION  02/17/81
C              IN METERS.                                            02/17/81
C                                                                    02/17/81
C     PCS      REAL SCALAR -- CALCULATED.                            02/17/81
C              THE PERCENT OF COLD START OPERATION, CATALYST.        02/17/81
C                                                                    02/17/81
C     PCSNC    REAL SCALAR -- CALCULATED.                            02/17/81
C              THE PERCENT OF COLD START OPERATION, NON-CATALYST.    02/17/81
C                                                                    02/17/81
C     PCVJ     REAL SCALAR -- CALCULATED.                            02/17/81
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C          THE PASSENGER CAR VOLUME ON SOURCE J IN VEHICLES/HOUR.    0004690  02/17/81
C                                                                    0004700  02/17/81
C  PHS     REAL SCALAR -- CALCULATED.                                0004710  02/17/81
C          THE PERCENT OF HOT START OPERATION.                       0004720  02/17/81
C                                                                    0004730  02/17/81
C  PRCCN   REAL SCALAR -- CALCULATED.                                0004740  02/17/81
C          THE VALUE OF THE PREVIOUS CONC.                           0004750  02/17/81
C                                                                    0004760  02/17/81
C  PRCCNA  REAL SCALAR -- CALCULATED.                                0004770  02/17/81
C          THE VALUE OF THE PREVIOUS CONCA.                          0004780  02/17/81
C                                                                    0004790  02/17/81
C  PROB    REAL SCALAR -- CALCULATED.                                0004800  02/17/81
C          THE PROBABILITY THAT CO .GT. STAND TWICE OR MORE IN ANY   0004810  02/17/81
C          RANDOM ONE YEAR PERIOD.                                   0004820  02/17/81
C                                                                    0004830  02/17/81
C  PROB8   REAL SCALAR -- CALCULATED.                                0004840  02/24/81
C          THE PROBABILITY THAT THE EIGHT HOUR AVERAGED CO .GT.      0004850  02/24/81
C          STAND8 TWICE OR MORE IN ANY RANDOM ONE YEAR PERIOD.       0004860  02/24/81
C                                                                    0004870  02/24/81
C  P01     REAL SCALAR -- CALCULATED.                                0004880  02/17/81
C          TRANSITION PROBABILITY FROM STATE=(CONC .LE. STAND) TO    0004890  02/17/81
C          STATE=(CONC .GT. STAND).                                  0004900  02/17/81
C                                                                    0004910  02/17/81
C  P1      REAL SCALAR -- CALCULATED.                                0004920  02/17/81
C          STATE PROBABILITY OF STATE=(CONC .GT. STAND).             0004930  02/17/81
C                                                                    0004940  02/17/81
C  R       REAL ARRAY -- DIMENSION 8 -- CALCULATED.                  0004950  02/24/81
C          R CONTAINS THE CURRENT AND SEVEN PREVIOUS CONC VALUES.    0004960  02/24/81
C                                                                    0004970  02/24/81
C  RECORD  INTEGER ARRAY -- DIMENSION 1000 -- CALCULATED.            0004980  02/24/81
C          RECORD(I) IS THE SIMULATION HOUR AT WHICH THE EIGHT HOUR  0004990  02/24/81
C          AVERAGED CO CONCENTRATION EXCEEDED STAND8 THE ITH TIME.   0005000  02/24/81
C                                                                    0005010  02/24/81
C  S       REAL SCALAR -- CALCULATED.                                0005020  02/17/81
C          AVERAGE ROUTE SPEED IN MPH.                               0005030  02/17/81
C                                                                    0005040  02/17/81
C  SC      REAL SCALAR -- CALCULATED.                                0005050  02/17/81
C          THE STANDARD DEVIATION OF LCONC.                          0005060  02/17/81
C                                                                    0005070  02/17/81
C  SCDT    REAL ARRAY -- DIMENSION 56 -- CALCULATED.                 0005080  02/17/81
C          THE SPEED CORRECTION FACTORS FOR DIESEL TRUCKS INDEXED    0005090  02/17/81
C          BY SPEED.                                                 0005100  02/17/81
C                                                                    0005110  02/17/81
C  SCGT    REAL ARRAY -- DIMENSION 56 -- CALCULATED.                 0005120  02/17/81
C          THE SPEED CORRECTION FACTORS FOR GAS TRUCKS INDEXED       0005130  02/17/81
C          BY SPEED.                                                 0005140  02/17/81
C                                                                    0005150  02/17/81
C  SCLT    REAL ARRAY -- DIMENSION 56 -- CALCULATED.                 0005160  02/17/81
C          THE SPEED CORRECTION FACTORS FOR LIGHT TRUCKS INDEXED     0005170  02/17/81
C          BY SPEED.                                                 0005180  02/17/81
C                                                                    0005190  02/17/81
C  SCPC    REAL ARRAY -- DIMENSION 56 -- CALCULATED.                 0005200  02/17/81
C          THE SPEED CORRECTION FACTORS FOR PASSENGER CARS INDEXED   0005210  02/17/81
C          BY SPEED.                                                 0005220  02/17/81
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C                                                                      0005230    02/17/81
C                                                                      0005240    02/26/81
C     SGCC      REAL ARRAY -- DIMENSION 12 -- INPUT.                   0005250    02/17/81
C               THE GEOMETRIC STANDARD DEVIATION OF THE BACKGROUND CO  0005260    02/17/81
C               INDEXED BY MONTH FOR CO IN PPM.  SGCC IS CONVERTED TO  0005270    02/17/81
C               THE STANDARD DEVIATION OF LN(CO) BEFORE USE.           0005280    02/17/81
C                                                                      0005290    02/17/81
C     SPDT      REAL STATEMENT FUNCTION -- CALCULATED.                 0005300    02/17/81
C               SPDT(S) RETURNS THE SPEED CORRECTION FACTOR FOR        0005310    02/17/81
C               DIESEL TRUCKS AT S MPH.                                0005320    02/17/81
C                                                                      0005330    02/17/81
C     SPGT      REAL STATEMENT FUNCTION -- CALCULATED.                 0005340    02/17/81
C               SPGT(S) RETURNS THE SPEED CORRECTION FACTOR FOR        0005350    02/17/81
C               HEAVY DUTY GAS TRUCKS AT S MPH.                        0005360    02/17/81
C                                                                      0005370    02/17/81
C     SPLT      REAL STATEMENT FUNCTION -- CALCULATED.                 0005380    02/17/81
C               SPLT(S) RETURNS THE SPEED CORRECTION FACTOR FOR        0005390    02/17/81
C               LIGHT TRUCKS AT S MPH.                                 0005400    02/17/81
C                                                                      0005410    02/17/81
C                                                                      0005420    02/17/81
C     SPPC      REAL STATEMENT FUNCTION -- CALCULATED.                 0005430    02/17/81
C               SPPC(S) RETURNS THE SPEED CORRECTION FACTOR FOR        0005440    02/17/81
C               PASSENGER CARS AT S MPH.                               0005450    02/17/81
C                                                                      0005460    02/17/81
C     SPROB     REAL SCALAR -- CALCULATED.                             0005470    02/17/81
C               THE STANDARD ERROR OF THE ESTIMATE OF PROB.            0005480    02/17/81
C                                                                      0005490    02/17/81
C     SPROB8    REAL SCALAR -- CALCULATED.                             0005500    02/24/81
C               AN UPPER BOUND ON THE ERROR OF ESTIMATE OF PROB8.      0005510    02/24/81
C                                                                      0005520    02/24/81
C     SP01      REAL SCALAR -- CALCULATED.                             0005530    02/17/81
C               THE STANDARD ERROR OF ESTIMATE OF P01.                 0005540    02/17/81
C                                                                      0005550    02/17/81
C     SP1       REAL SCALAR -- CALCULATED.                             0005560    02/17/81
C               THE STANDARD ERROR OF THE ESTIMATE OF P1.              0005570    02/17/81
C                                                                      0005580    02/17/81
C     STAND     REAL SCALAR -- INPUT.                                  0005590    02/17/81
C               THE CO LEVEL IN PPM NOT TO BE EXCEEDED MORE THAN       0005600    02/17/81
C               ONCE PER YEAR.                                         0005610    02/17/81
C                                                                      0005620    02/17/81
C     STAND8    REAL SCALAR -- INPUT.                                  0005630    02/24/81
C               THE EIGHT HOUR CO STANDARD IN PPM NOT TO BE EXCEEDED MORE 0005640 02/24/81
C               THAN ONCE PER YEAR.  THIS PROGRAM ASSUMES A COUNTING   0005650    02/24/81
C               SCHEME FOR THE EIGHT HOUR STANDARD WHICH SKIPS AHEAD   0005660    02/24/81
C               EIGHT HOURS WHENEVER AN EIGHT HOUR AVERAGED CO LEVEL   0005670    02/24/81
C               EXCEEDING STAND8 IS FOUND.                             0005680    02/24/81
C                                                                      0005690    02/24/81
C     START     LOGICAL SCALAR -- CALCULATED.                          0005700    02/17/81
C               .TRUE. UNTIL THE FIRST CO CONCENTRATION HAS BEEN       0005710    02/17/81
C               CALCULATED.                                            0005720    02/17/81
C                                                                      0005730    02/17/81
C     SUM       REAL SCALAR -- CALCULATED.                             0005740    02/17/81
C               THE SUM OF THE LCONC.                                  0005750    02/17/81
C                                                                      0005760    02/17/81
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C     SUM2      REAL SCALAR -- CALCULATED.                                0005770   02/17/81
C               THE SUM OF LCONC**2.                                      0005780   02/17/81
C                                                                         0005790   02/17/81
C     TEMP      REAL SCALAR -- INPUT.                                     0005800   02/17/81
C               AMBIENT TEMPERATURE IN DEGREES FARENHEIT.                 0005810   02/17/81
C                                                                         0005820   02/17/81
C     TEST      LOGICAL SCALAR -- INPUT.                                  0005830   02/17/81
C               IF TEST .EQ. .TRUE. THEN THE PROGRAM WILL OUTPUT          0005840   02/17/81
C               AUXILIARY INFORMATION FROM THE SIMULATION.                0005850   02/17/81
C                                                                         0005860   02/17/81
C     TFDT      REAL ARRAY -- DIMENSION 20 -- DATA.                       0005870   02/17/81
C               TFDT(I) IS THE FRACTION OF DIESEL TRUCK VEHICLE MILES     0005880   02/17/81
C               DRIVEN BY VEHICLES I-1 MODEL YEARS OLD.                   0005890   02/17/81
C                                                                         0005900   02/17/81
C     TFGT      REAL ARRAY -- DIMENSION 20 -- DATA.                       0005910   02/17/81
C               TFGT(I) IS THE FRACTION OF GAS TRUCK VEHICLE MILES        0005920   02/17/81
C               DRIVEN BY VEHICLES I-1 MODEL YEARS OLD.                   0005930   02/17/81
C                                                                         0005940   02/17/81
C     TFLT      REAL ARRAY -- DIMENSION 20 -- DATA.                       0005950   02/17/81
C               TFLT(I) IS THE FRACTION OF LIGHT TRUCK VEHICLE MILES      0005960   02/17/81
C               DRIVEN BY VEHICLES I-1 MODEL YEARS OLD.                   0005970   02/17/81
C                                                                         0005980   02/17/81
C     TFPC      REAL ARRAY -- DIMENSION 20 -- DATA.                       0005990   02/17/81
C               TFPC(I) IS THE FRACTION OF PASSENGER CAR VEHICLE MILES    0006000   02/17/81
C               DRIVEN BY VEHICLES I-1 MODEL YEARS OLD.                   0006010   02/17/81
C                                                                         0006020   02/17/81
C     TKONT     INTEGER SCALAR -- DATA.                                   0006030   02/17/81
C               THE NUMBER OF HOURS IN AN AVERAGE YEAR.                   0006040   02/17/81
C                                                                         0006050   02/17/81
C     TOTAL     INTEGER SCALAR -- CALCULATED.                             0006060   02/17/81
C               TOTAL NUMBER OF SIMULATED HOURS.                          0006070   02/17/81
C                                                                         0006080   02/17/81
C     TS        REAL ARRAY -- DIMENSION 13 -- INPUT.                      0006090   02/17/81
C               THE SLOPE OF THE SPEED VOLUME RELATIONSHIP IN             0006100   02/17/81
C               MPH/(VEH/HR) INDEXED BY SOURCE.                           0006110   02/17/81
C                                                                         0006120   02/17/81
C     TSPD      REAL ARRAY -- DIMENSION 13 -- INPUT.                      0006130   02/17/81
C               THE POSTED SPEED LIMIT IN MPH INDEXED BY SOURCE.          0006140   02/17/81
C                                                                         0006150   02/17/81
C     TVOL      REAL SCALAR -- CALCULATED.                                0006160   02/17/81
C               TRAFFIC VOLUME IN VEH/HR GENERATED RANDOMLY FROM THE      0006170   02/17/81
C               NORMAL APPROXIMATION TO THE POISSON DISTRIBUTION.         0006180   02/17/81
C                                                                         0006190   02/17/81
C     V         REAL SCALAR -- CALCULATED.                                0006200   02/17/81
C               THE NUMBER OF VIOLATING YEARS IN THE CONC SIMULATION.     0006210   02/17/81
C                                                                         0006220   02/17/81
C     VCONC     REAL SCALAR -- CALCULATED.                                0006230   02/17/81
C               THE VARIANCE OF YCONC.                                    0006240   02/17/81
C                                                                         0006250   02/17/81
C     VCONCA    REAL SCALAR -- CALCULATED.                                0006260   02/17/81
C               THE VARIANCE OF YCONCA.                                   0006270   02/17/81
C                                                                         0006280   02/17/81
C     VCOUNT    INTEGER SCALAR -- CALCULATED.                             0006290   02/17/81
C               THE NUMBER OF TIMES PER YEAR THAT CONC EXCEEDS STAND.     0006300   02/17/81
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C                                                                        0006310   02/17/81
C       VPROB    REAL SCALAR -- CALCULATED.                              0006320   02/17/81
C                THE VARIANCE OF THE ERROR OF THE ESTIMATE OF PROB.      0006330   02/17/81
C                                                                        0006340   02/17/81
C       VPROBB   REAL SCALAR -- CALCULATED.                              0006350   02/24/81
C                AN UPPER BOUND ON THE VARIANCE OF THE ERROR OF THE      0006360   02/24/81
C                ESTIMATE OF PROBB.                                      0006370   02/24/81
C                                                                        0006380   02/24/81
C       VP01     REAL SCALAR -- CALCULATED.                              0006390   02/17/81
C                THE VARIANCE OF THE ERROR OF THE ESTIMATE OF P01.       0006400   02/17/81
C                                                                        0006410   02/17/81
C       VP1      REAL SCALAR -- CALCULATED.                              0006420   02/17/81
C                THE VARIANCE OF THE ERROR OF THE ESTIMATE OF P1.        0006430   02/17/81
C                                                                        0006440   02/17/81
C       WNDMIN   REAL SCALAR -- DATA.                                    0006450   02/17/81
C                THE MINUMUM WIND SPEED, IN METERS/SECOND, TO BE USED IN 0006460   02/17/81
C                THE GAUSSIAN DISPERSION FORMULATION.                    0006470   02/17/81
C                                                                        0006480   02/17/81
C       X1,Y1    REAL SCALARS -- INPUTS.                                 0006490   02/17/81
C                THE X AND Y COORDINATES OF THE WEST-MOST END POINT OF A 0006500   02/17/81
C                ROADWAY, IN METERS.                                     0006510   02/17/81
C                                                                        0006520   02/17/81
C       X2,Y2    REAL SCALARS -- INPUTS.                                 0006530   02/17/81
C                THE X AND Y COORDINATES OF THE EAST-MOST END POINT OF A 0006540   02/17/81
C                ROADWAY IN METERS.                                      0006550   02/17/81
C                                                                        0006560   02/17/81
C       YCONC    REAL SCALAR -- CALCULATED.                              0006570   02/17/81
C                THE YEARLY AVERAGE OF CONC.                             0006580   02/17/81
C                                                                        0006590   02/17/81
C       YCONCA   REAL SCALAR -- CALCULATED.                              0006600   02/17/81
C                THE YEARLY AVERAGE OF CONCA.                            0006610   02/17/81
C                                                                        0006620   02/17/81
C       YEAR     INTEGER SCALAR -- CALCULATED.                           0006630   02/17/81
C                AN INDEXING VARIABLE FOR THE SIMULATIONS.               0006640   02/17/81
C                                                                        0006650   02/17/81
C       ZCONC    REAL SCALAR -- CALCULATED.                              0006660   02/17/81
C                THE AVERAGE OF YCONC.                                   0006670   02/17/81
C                                                                        0006680   02/17/81
C       ZCONCA   REAL SCALAR -- CALCULATED.                              0006690   02/17/81
C                THE AVERAGE OF YCONCA.                                  0006700   02/17/81
C                                                                        0006710   03/02/81
C                                                                        0006720   03/02/81
  5000 FORMAT(4(F6.0,1X),F2.0,1X,F7.4)                                   0006730   02/17/81
  5001 FORMAT(I2)                                                        0006740   02/17/81
  5003 FORMAT(13F6.0)                                                    0006750   02/17/81
  5004 FORMAT(I2,1X,I2)                                                  0006760   02/17/81
  5005 FORMAT(F5.0,1X,F5.0,1X,L1)                                        0006770   02/24/81
C                                                                        0006780   02/17/81
C                                                                        0006790   02/17/81
  6000 FORMAT(1H1//,41X,'INPUT DATA LISTING'///' THE NOMINAL CALENDAR YEA 0006800   02/17/81
     +R OF THIS ANALYSIS IS 19',I2)                                      0006810   02/17/81
  6003 FORMAT(///, T26,'FROM THE LOGNORMAL ASSUMPTION (',I2,' YEAR SIMULA 0006820   02/17/81
     +TION)')                                                            0006830   02/17/81
  6004 FORMAT(//,T40,'COMAX  = ',G13.6/,T40,'COMAX2 = ',G13.6/,          0006840   11/13/81
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      + T40,'MEANLN = ',E13.6/,T4C,'STDLN  = ',E13.6/)          C006850    11/13/81
 6005 FORMAT(1H1//T41,'SIMULATION HISTOGRAM'///T24,'CO  RANGE, PPM',  C006860    02/17/81
     +T44,'NO. HOURS .EC.',T64,'NO. HOURS .GE.'/)                 0006870    02/17/81
 6006 FORMAT(T19,F5.1,' .LT. X .LE.',F5.1,T47,I6,T67,I6)           0006880    02/24/81
 6008 FORMAT(////,T26,'FROM THE MAXIMUM LIKELYHOOD ANALYSIS WITH A STAND 0006890 02/17/81
     +ARD OF ',F5.2,' PPM')                                       00069C0    02/24/81
 6010 FORMAT(//, 11X,'THE ESTIMATE OF P1 IS ',E12.6,' WITH A STANDARD ER 0006910 02/17/81
     +ROR OF ',E12.6//11X,'THE ESTIMATE OF PC1 IS ',E12.6,' WITH A STAND 0006920 02/17/81
     +ARD ERROR OF ',E12.6//11X,'WHICH YIELD A PROBABILITY OF VIOLATING  0006930 02/17/81
     +THE CO STANDARD OF '      ,F6.2,' O/O WITH A STANDARD ERROR OF ',  0006940 02/17/81
     +F5.2,' O/O'/)                                               0006950    02/17/81
 6011 FORMAT(///T26,'ASSUMING THAT THE ONLY SOURCE OF CO  IS THE BACKGRO 0006960 02/17/81
     +UND CO  WITH A STANDARD OF ',F5.2,' PPM')                   0006970    02/24/81
 6014 FORMAT(///T26,'FROM THE BINOMIAL ASSUMPTION (',I2,' YEAR SIMULATIO 0006980 02/17/81
     +N) WITH A STANDARD OF ',F5.2,' PPM'//T40,'PROB   = ',F6.2,' O/O'/ 0006990 02/24/81
     +T40,'SPROB  = ',F6.2,' O/O'/)                               0007000    02/17/81
 6015 FORMAT(///T26,'FOR THE PREDICTED CO  CONCENTRATION (NO ASSUMPTIONS 0007010 02/17/81
     +) WITH A STANDARD OF ',F5.2,' PPM')                         0007020    07/22/81
 6016 FORMAT(//11X,'THE ESTIMATE OF YEARLY AVERAGE CONCENTRATION IS ',   0007030 02/17/81
     +E12.6,' PPM'//11X,'THE STANDARD DEVIATION OF YEARLY AVERAGE CONCEN 0007040 02/17/81
     +TRATION IS ',E12.6,' PPM'/)                                 0007050    02/17/81
 6500 FORMAT(//' RECEPTOR      GX, OY, OZ ',3(2X,F6.0))           0007060    02/17/81
 6503 FORMAT(' FIRST AND LAST MONTHS OF DAYLIGHT SAVING TIME ',2(2X,I2)) 0007070 02/17/81
 6513 FORMAT(' AHT BY SOURCE',T17,13(1X,F7.C))                    0007080    02/17/81
 6514 FORMAT(' ANNUAL AVERAGE PERCENT HEAVY DUTY GAS TRUCKS BY SOURCE'// 0007090 02/17/81
     +T17,13(3X,F5.1))                                            0007100    02/17/81
 6515 FORMAT(' ANNUAL AVERAGE PERCENT DIESEL TRUCKS BY SOURCE'//T17,13(  0007110 02/17/81
     +3X,F5.1))                                                   0007120    02/17/81
 6516 FORMAT(' ANNUAL AVERAGE PERCENT LIGHT TRUCKS BY SOURCE'//T17,13(   0007130 02/17/81
     +3X,F5.1))                                                   0007140    02/17/81
 6517 FORMAT(' ANNUAL AVERAGE PERCENT HOT START OPERATION BY SOURCE'//   0007150 02/17/81
     +T17,13(3X,F5.1))                                            0007160    02/17/81
 6518 FORMAT(' ANNUAL AVERAGE PERCENT COLD START OPERATION BY SOURCE'//  0007170 02/17/81
     +T17,13(3X,F5.1))                                            0007180    02/17/81
 6523 FORMAT(' MONTH ',I2,' TV',T17,13(1X,F7.4))                  0007190    02/17/81
 6524 FORMAT(' MONTH ',I2,' GT',T17,13(1X,F7.4))                  0007200    02/17/81
 6525 FORMAT(' MONTH ',I2,' DT',T17,13(1X,F7.4))                  0007210    02/17/81
 6526 FORMAT(' MONTH ',I2,' LT',T17,13(1X,F7.4))                  0007220    02/17/81
 6527 FORMAT(' MONTH ',I2,' HS',T17,13(1X,F7.4))                  0007230    02/17/81
 6528 FORMAT(' MONTH ',I2,' CS',T17,13(1X,F7.4))                  0007240    02/17/81
 6533 FORMAT(' DAY',I2,' TV',T17,13(1X,F7.4))                     0007250    02/17/81
 6534 FORMAT(' DAY',I2,' GT',T17,13(1X,F7.4))                     0007260    02/17/81
 6535 FORMAT(' DAY',I2,' DT',T17,13(1X,F7.4))                     0007270    02/17/81
 6536 FORMAT(' DAY',I2,' LT',T17,13(1X,F7.4))                     0007280    02/17/81
 6537 FORMAT(' DAY',I2,' HS',T17,13(1X,F7.4))                     0007290    02/17/81
 6538 FORMAT(' DAY',I2,' CS',T17,13(1X,F7.4))                     0007300    02/17/81
 6543 FORMAT(' HOUR ',I2,' TV',T17,13(1X,F7.4))                   0007310    02/17/81
 6544 FORMAT(' HOUR ',I2,' GT',T17,13(1X,F7.4))                   0007320    02/17/81
 6545 FORMAT(' HOUR ',I2,' DT',T17,13(1X,F7.4))                   0007330    02/17/81
 6546 FORMAT(' HOUR ',I2,' LT',T17,13(1X,F7.4))                   0007340    02/17/81
 6547 FORMAT(' HOUR ',I2,' HS',T17,13(1X,F7.4))                   0007350    02/17/81
 6548 FORMAT(' HOUR ',I2,' CS',T17,13(1X,F7.4))                   0007360    02/17/81
 6550 FORMAT(' SOURCE  ',I2,3X,' X1, Y1, X2, Y2, SPEED, SLOPE ',  0007370    02/17/81
     +4(F7.0,2X),2X,F3.C,4X,F7.4)                                 0007380    02/17/81
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      6553 FORMAT(' RATIO OF CSNC TO CSC',F5.2)                              02/17/81
      6583 FORMAT(' GEOMETRIC STANDARD DEVIATIONS OF BACKGROUND CO BY MONTH F 02/17/81
          +OR CO IN PPM'//T17,12(1X,F7.4))                                    02/24/81
      6593 FORMAT(' TOTAL TRAFFIC VOLUME, HEAVY DUTY GAS TRUCK, DIESEL TRUCK, 02/17/81
          + LIGHT TRUCK, HOT START, AND COLD START FACTORS BY SOURCE FOR'/)   02/17/81
      6600 FORMAT(1H1//)                                                      02/17/81
      6700 FORMAT(/)                                                          02/17/81
      6800 FORMAT(' GEOMETRIC MEANS OF PPM CO BACKGROUND BY MONTH AND HOUR'/) 02/17/81
      6801 FORMAT(' HOUR ',I2,T17,12(1X,F7.4))                                02/24/81
      6900 FORMAT(///T5, 'AUXILIARY RESULTS OBTAINED UNDER VARIOUS ASSUMPTION 02/17/81
          +S ARE INCLUDED ON THE FOLLOWING PAGE.'/1H1//T38,'**** AUXILIARY RE 02/17/81
          +SULTS ****'//)                                                     02/17/81
      6901 FORMAT(1H1////' **** ERROR ****'//' PCVJ .LT. -10.0'//             02/17/81
          +' J, M, DAY, H = ',4I4)                                            02/17/81
      6902 FORMAT(1H1//T26,'FROM THE ANALYSIS OF ',I2,' YEARS OF SIMULATION D 02/24/81
          +ATA WITH AN EIGHT HOUR STANDARD OF ',F5.2,' PPM'//T40,'PROBB  = ', 02/26/81
          +F6.2,' O/O'/T40,'SPROBB = ',F6.2,' O/C')                           02/24/81
C                                                                             02/17/81
C                                                                             02/17/81
      8000 FORMAT(2I2,2X,I2,F3.0,F5.0,T29,F4.0,T34,I1)                        02/17/81
      8001 FORMAT(/)                                                          02/17/81
C                                                                             02/17/81
C                                                                             02/17/81
C     THE SPEED CORRECTION FUNCTIONS SPDT,SPGT,SPLT,SPPC ARE DEFINED AS       02/17/81
C                                                                             02/17/81
      SPDT(S)=F1*EXP(A1+S*(A2+S*A3))                                          02/17/81
     +        +F4*EXP(A4+S*(A5+S*A6))                                         02/17/81
     +        +F7*EXP(A7+S*(A8+S*A9))                                         02/17/81
C                                                                             02/17/81
      SPGT(S)=F10*EXP(A10+S*(A11+S*A12))                                      02/17/81
     +        +F13*EXP(A13+S*(A14+S*A15))                                     02/17/81
     +        +F16*EXP(A16+S*(A17+S*A18))                                     02/17/81
     +        +F19*EXP(A19+S*(A20+S*A21))                                     02/17/81
C                                                                             02/17/81
      SPLT(S)=F22 *EXP(A22 +S*(A23 +S*(A24 +S*(A25 +S*(A26 +S*A27 )))))       02/17/81
     +        +F28 *EXP(A28 +S*(A29 +S*(A30 +S*(A31 +S*(A32 +S*A33 )))))      02/17/81
     +        +F34 *EXP(A34 +S*(A35 +S*(A36 +S*(A37 +S*(A38 +S*A39 )))))      02/17/81
     +        +F40 *EXP(A40 +S*(A41 +S*(A42 +S*(A43 +S*(A44 +S*A45 )))))      02/17/81
     +        +F46 *EXP(A46 +S*(A47 +S*(A48 +S*(A49 +S*(A50 +S*A51 )))))      02/17/81
     +        +F52 *EXP(A52 +S*(A53 +S*(A54 +S*(A55 +S*(A56 +S*A57 )))))      02/17/81
     +        +F58 *EXP(A58 +S*(A59 +S*(A60 +S*(A61 +S*(A62 +S*A63 )))))      02/17/81
     +        +F64 *EXP(A64 +S*(A65 +S*(A66 +S*(A67 +S*(A68 +S*A69 )))))      02/17/81
C                                                                             02/17/81
      SPPC(S)=F70 *EXP(A70 +S*(A71 +S*(A72 +S*(A73 +S*(A74 +S*A75 )))))       02/17/81
     +        +F76 *EXP(A76 +S*(A77 +S*(A78 +S*(A79 +S*(A80 +S*A81 )))))      02/17/81
     +        +F82 *EXP(A82 +S*(A83 +S*(A84 +S*(A85 +S*(A86 +S*A87 )))))      02/17/81
     +        +F88 *EXP(A88 +S*(A89 +S*(A90 +S*(A91 +S*(A92 +S*A93 )))))      02/17/81
     +        +F94 *EXP(A94 +S*(A95 +S*(A96 +S*(A97 +S*(A98 +S*A99 )))))      02/17/81
     +        +F100*EXP(A100+S*(A101+S*(A102+S*(A103+S*(A104+S*A105)))))      02/17/81
     +        +F106*EXP(A106+S*(A107+S*(A108+S*(A109+S*(A110+S*A111)))))      02/17/81
     +        +F112*EXP(A112+S*(A113+S*(A114+S*(A115+S*(A116+S*A117)))))      02/17/81
C                                                                             02/17/81
C     READ THE NOMINAL CALENDAR YEAR FOR THIS ANALYSIS.                       02/17/81
C                                                                             02/17/81
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      READ(5,5001)NOMYR                                              00007930   02/17/81
      IF(NOMYR .LT. 80)NOMYR=80                                      00007940   02/17/81
      IF(NOMYR .GT. 95)NOMYR=95                                      00007950   02/17/81
      WRITE(6,6000)NOMYR                                             00007960   02/17/81
C                                                                    00007970   02/17/81
C     READ THE MAXIMUM CO LEVEL WHICH IS NOT TO BE EXCEEDED MORE THAN 00007980  02/17/81
C     ONCE PER YEAR FOR THE ONE AND EIGHT HOUR STANDARDS AND THE     00007990   02/24/81
C     LOGICAL TEST COMMAND.                                          00008000   02/24/81
C                                                                    00008010   02/17/81
      READ(5,5005) STAND,STAND8,TEST                                 00008020   02/24/81
C                                                                    00008030   02/17/81
C     READ AND ECHO THE CARTESIAN COORDINATES OF THE RECEPTOR.       00008040   02/17/81
C                                                                    00008050   02/17/81
    1 READ(5,5000) OX,OY,OZ                                          00008060   02/17/81
      WRITE(6,6500) OX,OY,OZ                                         00008070   02/17/81
      WRITE(6,6700)                                                  00008080   02/17/81
C                                                                    00008090   02/17/81
C     READ THE NUMBER OF SOURCES (IE ROADWAYS).                      00008100   02/17/81
C                                                                    00008110   02/17/81
    2 READ(5,5001) NS                                                00008120   02/17/81
      DO 200 I=1,NS                                                  00008130   02/17/81
C                                                                    00008140   02/17/81
C     FOR EACH SOURCE READ AND ECHO THE COORDINATES OF ITS END POINTS, 00008150  02/17/81
C     THE POSTED SPEED LIMIT, AND THE SLOPE OF THE SPEED VOLUME      00008160   02/17/81
C     RELATIONSHIP.  ALSO CORRECT THE SLOPE IF IT IS NON-NEGATIVE, AND 00008170  02/17/81
C     REVERSE THE ROADWAY END POINTS IF THE FIRST IS EAST OF THE SECOND. 00008180 02/17/81
C     NOTE, THE VALUE -0.0115 IS THE NATIONAL AVERAGE SPEED/VOLUME SLOPE.00008190 02/17/81
C                                                                    00008200   02/17/81
      READ(5,5000) X1,Y1,X2,Y2,TSPD(I),TS(I)                         00008210   02/17/81
      IF(TS(I) .GE. 0.0) TS(I)=-0.0115                               00008220   02/17/81
      IF(X1 .LE. X2) GO TO 170                                       00008230   02/17/81
      DUMMX=X1                                                       00008240   02/17/81
      DUMMY=Y1                                                       00008250   02/17/81
      X1=X2                                                          00008260   02/17/81
      Y1=Y2                                                          00008270   02/17/81
      X2=DUMMX                                                       00008280   02/17/81
      Y2=DUMMY                                                       00008290   02/17/81
  170 WRITE(6,6550) I,X1,Y1,X2,Y2,TSPD(I),TS(I)                      00008300   02/17/81
C                                                                    00008310   02/17/81
C     DETERMINE GAMMA.  NOTE THAT 1.5707963 = PIE/2.                 00008320   02/17/81
C                                                                    00008330   02/17/81
      GAMMA=1.5707963                                                00008340   02/17/81
      IF(X1 .NE. X2) GAMMA=ATAN((Y2-Y1)/(X2-X1))                     00008350   02/17/81
C                                                                    00008360   02/17/81
C     CALCULATE THE ROADWAY LENGTH.                                  00008370   02/17/81
C                                                                    00008380   02/17/81
      LENGTH=SQRT((X2-X1)**2+(Y2-Y1)**2)                             00008390   02/17/81
C                                                                    00008400   02/17/81
C     FOR EACH ROADWAY, STABILITY CLASS, AND WIND ANGLE, COMPUTE AND 00008410   02/17/81
C     STORE THE GAUSSIAN DISPERSION INTEGRAL RELATIVE TO THE RECEPTOR. 00008420  02/17/81
C     NOTE THAT A TOLERENCE OF 0.0121 ON INTGRL YIELDS A TOLERENCE OF 00008430  02/17/81
C     ABOUT 0.01 PPM ON THE PREDICTION OF CO CONCENTRATION.          00008440   02/17/81
C                                                                    00008450   02/17/81
      ALPHA=-0.065449847                                             00008460   02/17/81
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      DO 190 K=1,96                                                        02/17/81
      ALPHA=ALPHA+0.065449847                                              02/17/81
      DO 180 J=1,5                                                         02/17/81
      CLASS=J                                                              02/17/81
      INT(I,K,CLASS)=INTGRL(0.0121)                                        02/17/81
  180 CONTINUE                                                             02/17/81
  190 CONTINUE                                                             02/17/81
  200 CONTINUE                                                             02/17/81
      WRITE(6,6700)                                                        02/17/81
C                                                                          02/17/81
C     READ AND ECHO THE RATIO OF COLD START NON-CATALYST OPERATION TO      02/17/81
C     COLD START CATALYST OPERATION.                                       02/17/81
C                                                                          02/17/81
      READ(5,5003) F                                                       02/17/81
      IF(F .GT. 1.0) F=F/100.0                                             02/17/81
      WRITE(6,6553) F                                                      02/17/81
      WRITE(6,6700)                                                        02/17/81
C                                                                          02/17/81
C     READ AND ECHO THE ANNUAL AVERAGE HOURLY TOTAL TRAFFIC VOLUME,        02/17/81
C     ANNUAL AVERAGE HEAVY DUTY GAS TRUCK PERCENTAGE, ANNUAL AVERAGE       02/17/81
C     DIESEL TRUCK PERCENTAGE, ANNUAL AVERAGE LIGHT TRUCK PERCENTAGE,      02/17/81
C     ANNUAL AVERAGE HOT START PERCENTAGE, AND ANNUAL AVERAGE COLD START   02/17/81
C     PERCENTAGE FOR EACH SOURCE.                                          02/17/81
C                                                                          02/26/81
C                                                                          02/17/81
      READ(5,5003) (AHT(I),I=1,NS)                                         02/17/81
      WRITE(6,6513) (AHT(I),I=1,NS)                                        02/17/81
      WRITE(6,6700)                                                        02/17/81
      READ(5,5003) (APGT(I),I=1,NS)                                        02/17/81
      WRITE(6,6514) (APGT(I),I=1,NS)                                       02/17/81
      WRITE(6,6700)                                                        02/17/81
      READ(5,5003) (APDT(I),I=1,NS)                                        02/17/81
      WRITE(6,6515) (APDT(I),I=1,NS)                                       02/17/81
      WRITE(6,6700)                                                        02/17/81
      READ(5,5003) (APLT(I),I=1,NS)                                        02/17/81
      WRITE(6,6516) (APLT(I),I=1,NS)                                       02/17/81
      WRITE(6,6700)                                                        02/17/81
      READ(5,5003) (APHS(I),I=1,NS)                                        02/17/81
      WRITE(6,6517) (APHS(I),I=1,NS)                                       02/17/81
      WRITE(6,6700)                                                        02/17/81
      READ(5,5003) (APCS(I),I=1,NS)                                        02/17/81
      WRITE(6,6518) (APCS(I),I=1,NS)                                       02/17/81
      WRITE(6,6700)                                                        02/17/81
C                                                                          02/17/81
C     READ AND ECHO THE MONTHLY FACTORS FOR TOTAL TRAFFIC VOLUME,HEAVY     02/17/81
C     DUTY GAS TRUCKS,DIESEL TRUCKS, LIGHT TRUCKS, HOT STARTS, AND COLD    02/17/81
C     STARTS FOR EACH SOURCE.                                              02/17/81
C                                                                          02/17/81
      WRITE(6,6593)                                                        02/17/81
      DO 201 J=1,12                                                        02/17/81
      READ(5,5003) (FTVM(I,J),I=1,NS)                                      02/17/81
      WRITE(6,6523) J,(FTVM(I,J),I=1,NS)                                   02/17/81
      READ(5,5003) (FGTM(I,J),I=1,NS)                                      02/17/81
      WRITE(6,6524) J,(FGTM(I,J),I=1,NS)                                   02/17/81
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      READ(5,5003) (FDTM(I,J),I=1,NS)                                0009010    02/17/81
      WRITE(6,6525) J,(FDTM(I,J),I=1,NS)                             0009020    02/17/81
      READ(5,5003) (FLTM(I,J),I=1,NS)                                0009030    02/17/81
      WRITE(6,6526) J,(FLTM(I,J),I=1,NS)                             0009040    02/17/81
      READ(5,5003) (FHSM(I,J),I=1,NS)                                0009050    02/17/81
      WRITE(6,6527) J,(FHSM(I,J),I=1,NS)                             0009060    02/17/81
      READ(5,5003) (FCSM(I,J),I=1,NS)                                0009070    02/17/81
      WRITE(6,6528) J,(FCSM(I,J),I=1,NS)                             0009080    02/17/81
  201 CONTINUE                                                       0009090    02/17/81
      WRITE(6,6700)                                                  0009100    02/17/81
C                                                                    0009110    02/17/81
C     READ AND ECHO THE DAY-OF-WEEK FACTORS FOR EACH SOURCE.         0009120    02/17/81
C                                                                    0009130    02/17/81
      WRITE(6,6593)                                                  0009140    02/17/81
      DO 211 J=1,7                                                   0009150    02/17/81
      READ(5,5003) (FTVD(I,J),I=1,NS)                                0009160    02/17/81
      WRITE(6,6533) J,(FTVD(I,J),I=1,NS)                             0009170    02/17/81
      READ(5,5003) (FGTD(I,J),I=1,NS)                                0009180    02/17/81
      WRITE(6,6534) J,(FGTD(I,J),I=1,NS)                             0009190    02/17/81
      READ(5,5003) (FDTD(I,J),I=1,NS)                                0009200    02/17/81
      WRITE(6,6535) J,(FDTD(I,J),I=1,NS)                             0009210    02/17/81
      READ(5,5003) (FLTD(I,J),I=1,NS)                                0009220    02/17/81
      WRITE(6,6536) J,(FLTD(I,J),I=1,NS)                             0009230    02/17/81
      READ(5,5003) (FHSD(I,J),I=1,NS)                                0009240    02/17/81
      WRITE(6,6537) J,(FHSD(I,J),I=1,NS)                             0009250    02/17/81
      READ(5,5003) (FCSD(I,J),I=1,NS)                                0009260    02/17/81
      WRITE(6,6538) J,(FCSD(I,J),I=1,NS)                             0009270    02/17/81
  211 CONTINUE                                                       0009280    02/17/81
      WRITE(6,6700)                                                  0009290    02/17/81
C                                                                    0009300    02/17/81
C     READ AND ECHO THE HOUR-OF-DAY FACTORS FOR EACH SOURCE.         0009310    02/17/81
C     NOTE THAT HOUR-OF-DAY FACTORS ARE INPUT RELATIVE TO "CLOCK" TIME. 0009320 02/17/81
C                                                                    0009330    02/17/81
      WRITE(6,6593)                                                  0009340    02/17/81
      DO 221 J=1,24                                                  0009350    02/17/81
      READ(5,5003) (FTVH(I,J),I=1,NS)                                0009360    02/17/81
      WRITE(6,6543) J,(FTVH(I,J),I=1,NS)                             0009370    02/17/81
      READ(5,5003) (FGTH(I,J),I=1,NS)                                0009380    02/17/81
      WRITE(6,6544) J,(FGTH(I,J),I=1,NS)                             0009390    02/17/81
      READ(5,5003) (FDTH(I,J),I=1,NS)                                0009400    02/17/81
      WRITE(6,6545) J,(FDTH(I,J),I=1,NS)                             0009410    02/17/81
      READ(5,5003) (FLTH(I,J),I=1,NS)                                0009420    02/17/81
      WRITE(6,6546) J,(FLTH(I,J),I=1,NS)                             0009430    02/17/81
      READ(5,5003) (FHSH(I,J),I=1,NS)                                0009440    02/17/81
      WRITE(6,6547) J,(FHSH(I,J),I=1,NS)                             0009450    02/17/81
      READ(5,5003) (FCSH(I,J),I=1,NS)                                0009460    02/17/81
      WRITE(6,6548) J,(FCSH(I,J),I=1,NS)                             0009470    02/17/81
  221 CONTINUE                                                       0009480    02/17/81
      WRITE(6,6700)                                                  0009490    02/17/81
C                                                                    0009500    02/17/81
C     SET HOURLY FACTORS SUB (I,25) EQUAL TO SUB (I,1) TO HANDLE THE 0009510    02/17/81
C     DAYLIGHT SAVING TIME CONDITION.                                0009520    02/17/81
C                                                                    0009530    02/17/81
      DO 222 I=1,NS                                                  0009540    02/17/81
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      FTVH(I,25)=FTVH(I,1)                                          02/17/81
      FGTH(I,25)=FGTH(I,1)                                          02/17/81
      FDTH(I,25)=FDTH(I,1)                                          02/17/81
      FLTH(I,25)=FLTH(I,1)                                          02/17/81
      FHSH(I,25)=FHSH(I,1)                                          02/17/81
      FCSH(I,25)=FCSH(I,1)                                          02/17/81
  222 CONTINUE                                                      02/17/81
C                                                                   02/17/81
C     READ AND ECHO THE GEOMETRIC STANDARD DEVIATIONS OF PPM BACKGROUND 02/17/81
C     CO FOR EACH MONTH AND CONVERT TO STANDARD DEVIATIONS OF LN(CO).   02/17/81
C                                                                   02/17/81
      READ(5,5003) (SGCO(J),J=1,12)                                 02/17/81
      WRITE(6,6583) (SGCO(J),J=1,12)                                02/17/81
      DO 223 J=1,12                                                 02/17/81
      SGCO(J)=ALOG(SGCO(J))                                         02/17/81
  223 CONTINUE                                                      02/17/81
      WRITE(6,6700)                                                 02/17/81
C                                                                   02/17/81
C     READ AND ECHO THE GEOMETRIC MEANS OF PPM BACKGROUND CO FOR EACH  02/17/81
C     HOUR AND MONTH AND CONVERT GEOMETRIC MEANS TO THE MEANS OF THE   02/17/81
C     LN(CO). NOTE THAT MGCO IS INPUT RELATIVE TO "CLOCK" TIME.     02/17/81
C                                                                   02/17/81
      WRITE(6,6800)                                                 02/17/81
      DO 232 I=1,24                                                 02/17/81
      READ(5,5003) (MGCO(I,J),J=1,12)                               02/17/81
      WRITE(6,6801) I,(MGCO(I,J),J=1,12)                            02/24/81
      DO 231 J=1,12                                                 02/17/81
      MGCO(I,J)=ALOG(MGCO(I,J))                                     02/17/81
  231 CONTINUE                                                      02/17/81
  232 CONTINUE                                                      02/17/81
      WRITE(6,6700)                                                 02/17/81
C                                                                   02/17/81
C                                                                   02/26/81
C                                                                   02/26/81
C     SET GEOMETRIC MEANS FOR HOUR 25 EQUAL TO THOSE FOR HOUR 1 TO  02/17/81
C     HANDLE THE DAYLIGHT SAVING TIME CONDITION.                    02/17/81
C                                                                   02/17/81
      DO 235 J=1,12                                                 02/17/81
      MGCO(25,J)=MGCO(1,J)                                          02/17/81
  235 CONTINUE                                                      02/17/81
C                                                                   02/17/81
C     READ AND ECHO THE FIRST AND LAST MONTHS OF DAYLIGHT SAVING TIME. 02/17/81
C     NOTE, IF ON INPUT DSTM1 .GT. DSTM2, THEN THE PROGRAM WILL ASSUME 02/17/81
C     STANDARD TIME THROUGHT THE YEAR AND IT WILL SET DSTM1=DSTM2=-1.  02/17/81
C     DSTM1 AND DSTM2 ARE SPECIFIED TO THE NEAREST FULL MONTH, GENERALLY 02/17/81
C     THE MONTHS FOR DSTM1 AND DSTM2 ARE 5, AND 10 RESPECTIVELY.    02/17/81
C                                                                   02/17/81
      READ(5,5004) DSTM1,DSTM2                                      02/17/81
      IF(DSTM1 .LE. DSTM2) GO TO 236                                02/17/81
      DSTM1=-1                                                      02/17/81
      DSTM2=-1                                                      02/17/81
  236 WRITE(6,6503) DSTM1,DSTM2                                     02/17/81
C                                                                   02/17/81
C     FIND F1,F4,F7, THE FACTORS FOR THE DIESEL TRUCK AGE CATEGORIES.  02/17/81
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      C                                                                  0010090   02/17/81
            I79=MINO(NCMYR-78,20)                                        0010100   02/17/81
            DO 240 I=1,I79                                               0010110   02/17/81
            F1=F1+TFDT(I)                                                0010120   02/17/81
        240 CONTINUE                                                     0010130   02/17/81
            I78=I79+1                                                    0010140   02/17/81
            IF(I78 .GT. 20) GO TO 242                                    0010150   02/17/81
            I74=MINO(I78+4,20)                                           0010160   02/17/81
            DO 241 I=I78,I74                                             0010170   02/17/81
            F4=F4+TFDT(I)                                                0010180   02/17/81
        241 CONTINUE                                                     0010190   02/17/81
        242 F7=1.0-F1-F4                                                 0010200   02/17/81
      C                                                                  0010210   02/17/81
      C     FIND F10,F13,F16,F19, THE FACTORS FOR THE GAS TRUCK AGE CATEGORIES.0010220   02/17/81
      C                                                                  0010230   02/17/81
            DO 250 I=1,I79                                               0010240   02/17/81
            F10=F10+TFGT(I)                                              0010250   02/17/81
        250 CONTINUE                                                     0010260   02/17/81
            IF(I78 .GT. 20) GO TO 253                                    0010270   02/17/81
            DO 251 I=I78,I74                                             0010280   02/17/81
            F13=F13+TFGT(I)                                              0010290   02/17/81
        251 CONTINUE                                                     0010300   02/17/81
            I73=I74+1                                                    0010310   02/17/81
            IF(I73 .GT. 20) GO TO 253                                    0010320   02/17/81
            I70=MINO(I73+3,20)                                           0010330   02/17/81
            DO 252 I=I73,I70                                             0010340   02/17/81
            F16=F16+TFGT(I)                                              0010350   02/17/81
        252 CONTINUE                                                     0010360   02/17/81
        253 F19=1.0-F10-F13-F16                                          0010370   02/17/81
      C                                                                  0010380   02/17/81
      C     FIND F22,F28,F34,F40,F46,F52,F58,F64, THE FACTORS FOR THE LIGHT  0010390   02/17/81
      C     TRUCK AGE CATEGORIES.                                        0010400   02/17/81
      C                                                                  0010410   02/17/81
            I75=MINO(NCMYR-74,20)                                        0010420   02/17/81
            DO 260 I=1,I75                                               0010430   02/17/81
            F22=F22+TFLT(I)                                              0010440   02/17/81
        260 CONTINUE                                                     0010450   02/17/81
            I74=I75+1                                                    0010460   02/17/81
            IF(I74 .GT. 20) GO TO 262                                    0010470   02/17/81
            I73=MINO(I74+1,20)                                           0010480   02/17/81
            DO 261 I=I74,I73                                             0010490   02/17/81
            F28=F28+TFLT(I)                                              0010500   02/17/81
        261 CONTINUE                                                     0010510   02/17/81
            I72=I73+1                                                    0010520   02/17/81
            IF(I72 .GT. 20) GO TO 262                                    0010530   02/17/81
            F34=TFLT(I72)                                                0010540   02/17/81
            I71=I72+1                                                    0010550   02/17/81
            IF(I71 .GT. 20) GO TO 262                                    0010560   02/17/81
            F40=TFLT(I71)                                                0010570   02/17/81
            I70=I71+1                                                    0010580   02/17/81
            IF(I70 .GT. 20) GO TO 262                                    0010590   02/17/81
            F46=TFLT(I70)                                                0010600   02/17/81
            I69=I70+1                                                    0010610   02/17/81
            IF(I69 .GT. 20) GO TO 262                                    0010620   02/17/81
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            F52=TFLT(I69)                                                  0010630   02/17/81
            I68=I69+1                                                      0010640   02/17/81
            IF(I68 .GT. 20) GO TO 262                                      0010650   02/17/81
            F58=TFLT(I68)                                                  0010660   02/17/81
      262   F64=1.0-F22-F28-F34-F40-F46-F52-F58                            0010670   02/17/81
C                                                                          0010680   02/17/81
C           FIND F70,F76,F82,F88,F94,F100,F106,F112, THE FACTORS FOR THE   0010690   02/17/81
C           PASSENGER CAR AGE CATEGORIES.                                  0010700   02/17/81
C                                                                          0010710   02/17/81
            DO 270 I=1,I75                                                 0010720   02/17/81
            F70=F70+TFPC(I)                                                0010730   02/17/81
      270   CONTINUE                                                       0010740   02/17/81
            IF(I74 .GT. 20) GO TO 272                                      0010750   02/17/81
            DO 271 I=I74,I73                                               0010760   02/17/81
            F76=F76+TFPC(I)                                                0010770   02/17/81
      271   CONTINUE                                                       0010780   02/17/81
            IF(I72 .GT. 20) GO TO 272                                      0010790   02/17/81
            F82=TFPC(I72)                                                  0010800   02/17/81
            IF(I71 .GT. 20) GO TO 272                                      0010810   02/17/81
            F88=TFPC(I71)                                                  0010820   02/17/81
            IF(I70 .GT. 20) GO TO 272                                      0010830   02/17/81
            F94=TFPC(I70)                                                  0010840   02/17/81
            IF(I69 .GT. 20) GO TO 272                                      0010850   02/17/81
            F100=TFPC(I69)                                                 0010860   02/17/81
            IF(I68 .GT. 20) GO TO 272                                      0010870   02/17/81
            F106=TFPC(I68)                                                 0010880   02/17/81
      272   F112=1.0-F70-F76-F82-F88-F94-F100-F106                         0010890   02/17/81
C                                                                          0010900   02/17/81
C           PRECOMPUTE THE SPEED CORRECTION FACTORS TO SAVE SIMULATION TIME.  0010910   02/17/81
C                                                                          0010920   02/17/81
            DO 280 I=1,56                                                  0010930   02/17/81
            S=I+4                                                          0010940   02/17/81
            SCDT(I)=SPDT(S)                                                0010950   02/17/81
            SCGT(I)=SPGT(S)                                                0010960   02/17/81
            SCLT(I)=SPLT(S)                                                0010970   02/17/81
            SCPC(I)=SPPC(S)                                                0010980   02/17/81
      280   CONTINUE                                                       0010990   02/17/81
C                                                                          0011000   02/17/81
C           PRECOMPUTE THE EMISSION FACTORS AT 19.6 MPH FOR PASSENGER CARS AND  0011010   02/17/81
C           LIGHT TRUCKS.                                                  0011020   02/17/81
C                                                                          0011030   02/17/81
            Z1=19.6                                                        0011040   02/17/81
            Z2=19.6                                                        0011050   02/17/81
            Z3=19.6                                                        0011060   02/17/81
            Z4=0.5                                                         0011070   11/13/81
            Z5=0.25                                                        0011080   11/13/81
            Z6=0.25                                                        0011090   11/13/81
            Z7=0.0                                                         0011100   02/17/81
            Z8=0.0                                                         0011110   02/17/81
            DO 293 I=1,15                                                  0011120   02/17/81
            PCS=(I-1)*5                                                    0011130   02/17/81
            PCSAC=PCS*F                                                    0011140   02/17/81
            DO 292 J=1,9                                                   0011150   02/17/81
            PHS=(J-1)*5                                                    0011160   11/13/81
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      DUMMY = PCS + PHS                                           0011170   11/13/81
      IF(DUMMY .GT. 100.0) GO TO 292                              0011180   11/13/81
      DO 291 K=1,11                                               0011190   02/17/81
      TEMP=(K-1)*10                                               0011200   02/17/81
      CALL EMISSN(NOMYR,CMEF)                                     0011210   11/13/81
      EPC(I,J,K)=CMEF(1)                                          0011220   11/13/81
      ELT(I,J,K)=(CMEF(2)+CMEF(3))*0.5                            0011230   11/13/81
  291 CONTINUE                                                    0011240   02/17/81
  292 CONTINUE                                                    0011250   02/17/81
  293 CONTINUE                                                    0011260   02/17/81
C                                                                 0011270   02/17/81
C     PRECOMPUTE THE EMISSION FACTORS AT 19.6 MPH FOR GAS AND DIESEL  0011280   02/17/81
C     TRUCKS.                                                     0011290   02/17/81
C                                                                 0011300   02/17/81
      Z4=0.0                                                      0011310   02/17/81
      Z5=0.0                                                      0011320   02/17/81
      Z6=0.0                                                      0011330   02/17/81
      Z7=0.5                                                      0011340   11/13/81
      Z8=0.5                                                      0011350   11/13/81
      CALL EMISSN(NOMYR,CMEF)                                     0011360   11/13/81
      EGT=CMEF(4)                                                 0011370   11/13/81
      EDT=CMEF(5)                                                 0011380   11/13/81
C                                                                 0011390   02/17/81
C     ***            ***                                          0011400   02/17/81
C        SIMULATION                                               0011410   02/17/81
C     ***            ***                                          0011420   02/17/81
C                                                                 0011430   02/17/81
  298 WRITE(6,6600)                                               0011440   02/17/81
C                                                                 0011450   02/17/81
C     INITIALIZE SIMULATION VARIABLES.                            0011460   02/17/81
C                                                                 0011470   02/17/81
      I8=0                                                        0011480   02/24/81
      N11=0                                                       0011490   02/17/81
      N11A=0                                                      0011500   02/17/81
      COUNT=0                                                     0011510   02/17/81
      VCOUNT=0                                                    0011520   02/17/81
      DAY=1                                                       0011530   02/17/81
      DO 299 I=1,51                                               0011540   02/17/81
      HISTOG(I)=0                                                 0011550   02/17/81
  299 CONTINUE                                                    0011560   02/17/81
      KOUNT=0                                                     0011570   02/17/81
      NUM=0                                                       0011580   02/17/81
      NUMA=0                                                      0011590   02/17/81
      YEAR=0                                                      0011600   02/17/81
      V=0.0                                                       0011610   02/17/81
      SUM=0.0                                                     0011620   02/17/81
      SUM2=0.0                                                    0011630   02/17/81
      PRCON=0.0                                                   0011640   02/17/81
      PRCONA=0.0                                                  0011650   02/17/81
      FIRST=0.0                                                   0011660   02/17/81
      FIRSTA=0.0                                                  0011670   02/17/81
      VCONC=0.0                                                   0011680   02/17/81
      VCONCA=0.0                                                  0011690   02/17/81
      YCONC=0.0                                                   0011700   02/17/81
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      YCONCA=0.0                                                      0011710   02/17/81
      ZCONC=0.0                                                       0011720   02/17/81
      ZCONCA=0.0                                                      0011730   02/17/81
      FINISH=.FALSE.                                                  0011740   02/17/81
      START=.TRUE.                                                    0011750   02/17/81
      LYR=-911                                                        0011760   02/17/81
C                                                                     0011770   02/17/81
C     SPACE PAST THE HEADING INFORMATION ON THE MET TAPE.             0011780   02/17/81
C                                                                     0011790   02/17/81
      REWIND 8                                                        0011800   02/17/81
      READ(8,8001)                                                    0011810   02/17/81
C                                                                     0011820   02/17/81
C     READ A METEOROLOGICAL/TIME RECORD.                              0011830   02/17/81
C                                                                     0011840   02/17/81
  300 READ(8,8000,END=998) IYR,M,H,ALPHA,MU,TEMP,CLASS                0011850   02/17/81
  301 IF(IYR .NE. LYR) GO TO 360                                      0011860   02/17/81
  302 COUNT=COUNT+1                                                   0011870   02/17/81
      KOUNT=KOUNT+1                                                   0011880   02/17/81
      IF(H .EQ. 0) DAY=DAY+1                                          0011890   02/17/81
      IF(DAY .GT. 7) DAY=1                                            0011900   02/17/81
      JT=(TEMP/100.0)+1.5                                             0011910   02/17/81
      IF(JT .LT. 1) JT=1                                              0011920   02/17/81
      IF(JT .GT. 11) JT=11                                            0011930   02/17/81
C                                                                     0011940   02/17/81
C     SINCE MET TAPES USE A 0-23 HOUR CLOCK, CONVERT H TO A 1-24 CLOCK. 0011950 02/17/81
C                                                                     0011960   02/17/81
      H=H+1                                                           0011970   02/17/81
C                                                                     0011980   02/17/81
C     H AS INPUTTED FROM THE MET TAPE IS IN STANDARD TIME.  TO ACCOUNT 0011990  02/17/81
C     FOR THE FACT THAT "CLOCK" TIME IS ONE HOUR AHEAD OF STANDARD TIME 0012000 02/17/81
C     DURRING DST MONTHS, WE WISH TO SET H TO H+1 FOR DST.            0012010   02/17/81
C                                                                     0012020   02/17/81
      IF(M .GE. DSTM1 .AND. M .LE. DSTM2) H=H+1                       0012030   02/17/81
C                                                                     0012040   02/17/81
C     GENERATE THE RANDOM PPM CO BACKGROUND CONCENTRATION USING       0012050   02/17/81
C     THE LOGNORMAL DISTRIBUTION.                                     0012060   02/17/81
C                                                                     0012070   02/17/81
      CONCA=EXP(GRAN(IX,MGCO(H,M),SGCO(M)))                           0012080   02/17/81
      IF(CONCA .LT. 1.0E-3) CONCA=1.0E-3                              0012090   02/17/81
C                                                                     0012100   02/17/81
C     IF MU IS 0, THEN ALPHA IS RANDOM OVER 0 TO 360 DEGREES.         0012110   02/17/81
C                                                                     0012120   02/17/81
      IF(MU .LE. 0.0) ALPHA=URAN(IX,IY)*360.0                         0012130   02/17/81
      MU=AMAX1(MU,WNDMIN)                                             0012140   02/17/81
C                                                                     0012150   02/17/81
C                                                                     0012160   02/17/81
C     ALPHA IS RELATIVE TO EAST ON INPUT.                             0012170   11/13/81
C                                                                     0012180   02/17/81
      KALPHA=ALPHA/3.75+1                                             0012190   02/17/81
      IF(KALPHA .GT. 96) KALPHA=1                                     0012200   02/17/81
C                                                                     0012210   02/17/81
C     COMPUTE THE CO CONCENTRATION AT THE RECEPTOR.                   0012220   02/17/81
C                                                                     0012230   02/17/81
      CONC=0.0                                                        0012240   02/17/81
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      DO 310 J=1,NS                                                    02/17/81
C                                                                      02/17/81
C     GENERATE THE RANDOM TRAFFIC VOLUME FOR SOURCE J FROM THE HOURLY  02/17/81
C     AVERAGE TRAFFIC VOLUME FOR J,M,DAY,AND H USING THE NORMAL        02/17/81
C     APPROXIMATION TO THE POISSON DISTRIBUTION.                       02/17/81
C                                                                      02/17/81
      TVOL=AHT(J)*FTVM(J,M)*FTVD(J,DAY)*FTVH(J,H)                      02/17/81
      TVOL=ABS(GRAN(IX,TVOL,SQRT(TVOL)))                               02/17/81
C                                                                      02/17/81
C     COMPUTE THE SPEED INDEX AS A LINEAR FUNCTION OF TVOL.            02/17/81
C                                                                      02/17/81
      JS=TSPD(J)+TS(J)*TVOL-4                                          02/17/81
      IF(JS .LT. 1) JS=1                                               02/17/81
      IF(JS .GT. 56) JS=56                                             02/17/81
C                                                                      02/17/81
C     DETERMINE THE PERCENT HOT AND COLD START INDICES.                02/26/81
C                                                                      02/17/81
      JHS=(APHS(J)*FHSM(J,M)*FHSD(J,DAY)*FHSH(J,H)/5.0)+1.5            02/17/81
      IF(JHS .LT. 1) JHS=1                                             02/17/81
      IF(JHS .GT. 9) JHS=9                                             02/17/81
      JCS=(APCS(J)*FCSM(J,M)*FCSD(J,DAY)*FCSH(J,H)/5.0)+1.5            02/17/81
      IF(JCS .LT. 1) JCS=1                                             02/17/81
      IF(JCS .GT. 15) JCS=15                                           02/17/81
C                                                                      02/17/81
C     COMPUTE THE VEHICLE TYPE VOLUMES FOR SOURCE J FROM TVOL.         02/17/81
C                                                                      02/17/81
      DTVJ=TVOL*APDT(J)*FDTM(J,M)*FDTD(J,DAY)*FDTH(J,H)/100.0          02/17/81
      GTVJ=TVOL*APGT(J)*FGTM(J,M)*FGTD(J,DAY)*FGTH(J,H)/100.0          02/17/81
      LTVJ=TVOL*APLT(J)*FLTM(J,M)*FLTD(J,DAY)*FLTH(J,H)/100.0          02/17/81
      PCVJ=TVOL-DTVJ-GTVJ-LTVJ                                         02/17/81
      IF(PCVJ .GT. -10.0) GO TO 309                                    02/17/81
      WRITE(6,6901) J,M,DAY,H                                          02/17/81
      STOP 0010                                                        11/13/81
C                                                                      02/17/81
C     COMPUTE THE TOTAL EMISSIONS FROM SOURCE J.                       02/17/81
C                                                                      02/17/81
  309 EJ=DTVJ*EDT*SCDT(JS)+GTVJ*EGT*SCGT(JS)+LTVJ*ELT(JCS,JHS,JT)*     02/17/81
     +SCLT(JS)+PCVJ*EPC(JCS,JHS,JT)*SCPC(JS)                           02/17/81
C                                                                      02/17/81
C     ADD THE CONCENTRATION OF CO CONTRIBUTED BY SOURCE J TO THE       02/17/81
C     CONCENTRATION CONTRIBUTED BY THE OTHER SOURCES.                  02/17/81
C                                                                      02/17/81
      CONC=CONC+INT(J,KALPHA,CLASS)*EJ                                 02/17/81
  310 CONTINUE                                                         02/17/81
C                                                                      02/17/81
C     COMPLETE THE COMPUTATION OF CONCENTRATION BY INCLUDING THE       02/17/81
C     WINDSPEED, BACKGROUND, AND SCALING TERMS.  NOTE, THE CONSTANT    02/17/81
C     4.799391E-5 IS OBTAINED FROM (1 MILE/1609 M)*(1 HR/3600 SEC)*    02/17/81
C     (1 PPM CO/0.001145 G CO/M**3)*(1/PIE).                           02/17/81
C                                                                      02/17/81
      CONC=CONC*(4.799391E-5)/AMAX1(MU,WNDMIN)+CONCA                   02/17/81
      IF(START .AND. CONC .GT. STAND) FIRST=1.0                        02/17/81
      IF(START .AND. CONCA .GT. STAND) FIRSTA=1.0                      02/17/81
      START=.FALSE.                                                    02/17/81
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      LCONC=ALOG(AMAX1(CONC,1.0E-9))                                    02/17/81
      I=MIN1(CONC-1.0E-30,50.C)+1                                       02/17/81
      HISTOG(I)=HISTOG(I)+1                                             02/17/81
C                                                                       02/17/81
C     IF WE HAVE COUNTED 1000 EIGHT HOUR PERIODS WHICH EXCEED STAND8,   02/24/81
C     WE CAN ASSUME THAT THE EIGHT HOUR STANDARD WILL BE EXCEEDED WITH  02/24/81
C     A PROBABILITY OF 1.C.                                             02/24/81
C                                                                       02/24/81
      IF(I8 .GE. 1000) GO TO 320                                        02/24/81
      IF(KOUNT .LE. 8) GO TO 313                                        02/24/81
C                                                                       02/24/81
C     COMPUTE THE CURRENT EIGHT HOUR AVERAGE CO LEVEL AND PLACE THE     02/24/81
C     TIME=KOUNT-7 IN THE ARRAY, RECORD, IF THIS AVERAGE EXCEEDS STAND8. 02/24/81
C                                                                       02/24/81
      DUMMY=0.0                                                         02/24/81
      DO 311 I=1,7                                                      02/24/81
      R(I)=R(I+1)                                                       02/24/81
      DUMMY=DUMMY+R(I)                                                  02/24/81
  311 CONTINUE                                                          02/24/81
      R(8)=CONC                                                         02/24/81
      DUMMY=DUMMY+CONC                                                  02/24/81
  312 IF(DUMMY .LE. 8.0*STAND8) GO TO 320                               02/24/81
      I8=I8+1                                                           02/24/81
      RECORD(I8)=KOUNT-7                                                02/24/81
      GO TO 320                                                         02/24/81
C                                                                       02/24/81
C     THE EIGHT HOUR AVERAGES FOR HOUR 1, 2, ETC. CANNOT BE COMPUTED    02/24/81
C     UNTIL THE FIRST 8 CONC LEVELS HAVE BEEN CALCULATED.               02/24/81
C                                                                       02/24/81
  313 R(KOUNT)=CONC                                                     02/24/81
      IF(KOUNT .NE. 8) GO TO 320                                        02/24/81
C                                                                       02/24/81
C     IF THIS IS THE EIGHTH HOUR WE CAN FIND THE FIRST EIGHT HOUR       02/24/81
C     AVERAGED CONCENTRATION.  WE PLACE THE TIME=KOUNT-7=1 IN THE ARRAY, 02/24/81
C     RECORD, IF THIS AVERAGE EXCEEDS STAND8.                           02/24/81
C                                                                       02/24/81
      DUMMY=0.0                                                         02/24/81
      DO 314 I=1,8                                                      02/24/81
      DUMMY=DUMMY+R(I)                                                  02/24/81
  314 CONTINUE                                                          02/24/81
      GO TO 312                                                         02/24/81
C                                                                       02/24/81
  320 SUM=SUM+LCONC                                                     02/24/81
      SUM2=SUM2+LCONC*LCONC                                             02/17/81
      YCONC=YCONC+CONC                                                  02/17/81
      YCONCA=YCONCA+CONCA                                               02/17/81
      IF(CONC.LE.STAND) GO TO 330                                       02/17/81
      NUM=NUM+1                                                         02/17/81
      VCOUNT=VCOUNT+1                                                   02/17/81
      IF(PRCON.GT.STAND) N11=N11+1                                      02/17/81
      IF(CONCA .LE. STAND) GO TO 330                                    02/17/81
      NUMA=NUMA+1                                                       02/17/81
      IF(PRCONA .GT. STAND) N11A=N11A+1                                 02/17/81
  330 PRCONA=CONCA                                                      02/17/81
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      PRCON=CONC                                                            02/17/81
      GO TO 300                                                             02/17/81
C                                                                           02/17/81
C     AT THE END OF EACH SIMULATED YEAR DETERMINE THE YEARLY AVERAGE        02/17/81
C     CONCENTRATIONS, AND COMPUTE THE PARTIALS OF THE OVERALL AVERAGE       02/17/81
C     AND VARIANCE OF YEARLY AVERAGES.                                      02/17/81
C                                                                           02/17/81
  360 LYR=IYR                                                               02/17/81
      IF(COUNT .EQ. 0) GO TO 3C2                                            02/17/81
      YEAR=YEAR+1                                                           02/17/81
      IF(VCOUNT .GT. 1) V=V+1.C                                             02/17/81
      VCOUNT=0                                                              02/17/81
      DUMMY=COUNT                                                           02/17/81
      YCONC=YCONC/DUMMY                                                     02/17/81
      YCONCA=YCONCA/DUMMY                                                   02/17/81
      VCONC=VCONC+YCONC**2                                                  02/17/81
      VCONCA=VCONCA+YCONCA**2                                               02/17/81
      ZCONC=ZCONC+YCONC                                                     02/17/81
      ZCONCA=ZCONCA+YCONCA                                                  02/17/81
      IF(FINISH) GO TO 400                                                  02/17/81
      COUNT=0                                                               02/17/81
      YCONC=0.0                                                             02/17/81
      YCONCA=0.0                                                            02/17/81
      GO TO 302                                                             02/17/81
C                                                                           02/17/81
C     CALCULATE STATISTICS FROM THE SIMULATION RESULTS.                     02/17/81
C                                                                           02/17/81
  400 WRITE(6,6600)                                                         02/17/81
      WRITE(6,6700)                                                         02/17/81
      WRITE(6,6700)                                                         02/17/81
C                                                                           02/17/81
C     WE CAN FIND P01 AND P1 FROM SIMULATION RESULTS TO ESTIMATE THE        02/17/81
C     PROBABILITY OF VIOLATING THE CO STANDARD AS FOLLOWS.                  02/17/81
C                                                                           02/17/81
      ASSIGN 420 TO LABEL                                                   02/17/81
  410 D=N11                                                                 02/17/81
      C=NUM-D-LAST                                                          02/17/81
      B=NUM-D-FIRST                                                         02/17/81
      A=KOUNT-1+D-2*NUM+FIRST+LAST                                          02/17/81
C                                                                           02/17/81
C     SKIP COMPUTATIONS WHICH WILL RESULT IN AN UNDERFLOW CONDITION.        02/17/81
C                                                                           02/17/81
      P1=FLOAT(NUM)/FLOAT(KOUNT)                                            02/17/81
      IF(P1 .EQ. 1.0) P1=1.C-1.0E-10                                        02/17/81
      P01=1.0-1.0E-10                                                       02/17/81
      IF(A+B .NE. 0.0) P01=B/(A+B)                                          02/17/81
      P01=AMIN1(P01,P1/(1.0-P1))                                            02/17/81
      PROB=1.0                                                              02/17/81
      IF(P01 .GE. 0.007) GO TO 411                                          02/17/81
      PROB=0.0                                                              02/17/81
      IF(P1 .EQ. 0.0) GO TO 411                                             02/17/81
      PROB=1.0-((1.0-P01)**(TKCNT-1))*(1.0-P1)-((1.0-P1)*P01*(1.0-P01)**   02/17/81
     +TKONT)*(2.C*(1.0-P01)+(TKONT-2)*(1.0-P1)*P01/P1)                     02/17/81
C                                                                           02/17/81
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C     WE CAN THEN FIND THE VARIANCE OF THE ESTIMATE OF PROB FROM THE        C2/17/81
C     VARIANCES OF THE ESTIMATES OF P1 AND PC1 AS FOLLOWS.                   C2/17/81
C                                                                            C2/17/81
  411 VPO1=0.0                                                               C2/17/81
      IF(A+B .NE. 0.0) VPO1=PC1*(1.C-PO1)/(A+B)                              02/17/81
      SPO1=SQRT(VPO1)                                                        02/17/81
      VP1=P1*(1.C-P1)/FLOAT(KOUNT)                                           C2/17/81
      SP1=SQRT(VP1)                                                          C2/17/81
      DUMMX=0.0                                                              C2/17/81
      DUMMY=0.0                                                              C2/17/81
      IF(PO1 .GE. 0.007) GO TO 412                                           C2/17/81
      IF(P1 .EQ. 0.0) GO TO 412                                              02/17/81
      DUMMX=(1.0-PROB)/(1.0-P1)+(TKONT-2)*(1.0-P1)*((1.0-PC1)**              C2/17/81
     +(TKONT-3))*(PO1/P1)**2                                                 C2/17/81
      DUMMY=((1.C-PC1)**(TKCNT-2))*(1.0-P1)*(TKCNT-1)-(1.0-P1)*              02/17/81
     +((1.0-PO1)**(TKONT-3))*PC1*((TKONT-2)*(1.0-P1)/P1-2.0)-(1.C-P1)*       02/17/81
     +((1.0-PO1)**(TKONT-3))*PO1*(1.0/PO1-(TKCNT-3)/(1.0-PO1))*              C2/17/81
     +(2.0*(1.0-PO1)+(TKONT-2)*(1.0-P1)*PO1/P1)                              C2/17/81
  412 VPROB=VP1*DUMMX**2+VPC1*DUMMY**2                                       02/17/81
      IF(VPROB .LT. 0.0) VPROB=0.0                                           C2/17/81
      SPROB=SQRT(VPROB)*100.C                                                C2/17/81
      PROB=PROB*100.0                                                        C2/17/81
      GO TO LABEL,(420,430)                                                  C2/17/81
  420 WRITE(6,6008) STAND                                                    02/17/81
      WRITE(6,6010) P1,SP1,PO1,SPO1,PROB,SPROB                               02/17/81
      WRITE(6,6900)                                                          02/17/81
C                                                                            C2/17/81
C     ASSUMING THAT THE LOGNORMAL MODEL IS APPROPRIATE, WE CAN ESTIMATE      02/17/81
C     THE EXPECTED ANNUAL MAXIMUM AND SECOND-MAXIMUM CO LEVELS AS            02/17/81
C     DESCRIBED BY LARSEN IN EPA PUBLICATION AP-89.                          C2/17/81
C                                                                            02/17/81
      MC=SUM/KOUNT                                                           C2/17/81
      SC=SQRT(SUM2/KOUNT-MC*MC)                                              C2/17/81
      COMAX=EXP(MC+3.81*SC)                                                  C2/17/81
      COMAX2=EXP(MC+3.56*SC)                                                 02/17/81
      WRITE(6,6003)YEAR                                                      C2/17/81
      WRITE(6,6004) COMAX,COMAX2,MC,SC                                       C2/17/81
C     ASSUMING THAT THE BINOMIAL MODEL IS APPROPRIATE, WE CAN ESTIMATE       02/17/81
C     THE PROBABILITY OF VIOLATING THE CO STANDARD AT THIS LOCATION.         02/17/81
C                                                                            C2/17/81
      DUMMY=YEAR                                                             02/17/81
      PROB=(100.0*V)/DUMMY                                                   02/17/81
      VPROB=PROB*(100.0-PROB)/DUMMY                                          C2/17/81
      SPROB=SQRT(VPROB)                                                      C2/17/81
      WRITE(6,6014) YEAR,STAND,PROB,SPROB                                    02/17/81
C                                                                            02/17/81
C     WE CAN ALSO ESTIMATE THE PROBABILITY OF VIOLATING THE CO               02/17/81
C     STANDARD AT THIS LOCATION ASSUMING THAT THE HIGHWAY FACILITY           C2/17/81
C     DOES NOT GENERATE ANY CO BY EXAMINING ONLY THE BACKGROUND SOURCE.      02/17/81
C                                                                            C2/17/81
      N11=N11A                                                               C2/17/81
      NUM=NUMA                                                               02/17/81
      FIRST=FIRSTA                                                           02/17/81
      LAST=LASTA                                                             C2/17/81
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      ASSIGN 430 TO LABEL                                              0014410   02/17/81
      GO TO 410                                                        0014420   02/17/81
  430 WRITE(6,6011) STAND                                              0014430   02/17/81
      WRITE(6,6010) P1,SP1,PC1,SPC1,PROB,SPROB                         0014440   02/17/81
C                                                                      0014450   02/17/81
C     WE NOW OUTPUT STATISTICS ON THE YEARLY AVERAGE CONCENTRATION WHICH 0014460 02/17/81
C     CAN BE USED TO FIND THE PROBABILITY THAT THE YEARLY AVERAGE      0014470   02/17/81
C     CONCENTRATION WILL EXCEED SOME VALUE.                            0014480   02/17/81
C                                                                      0014490   02/17/81
      DUMMY=YEAR                                                       0014500   02/17/81
      ZCONC=ZCONC/DUMMY                                                0014510   02/17/81
      ZCONCA=ZCONCA/DUMMY                                              0014520   02/17/81
      VCONC=SQRT(VCONC/DUMMY-ZCONC**2)                                 0014530   02/17/81
      VCONCA=SQRT(VCONCA/DUMMY-ZCONCA**2)                              0014540   02/17/81
      WRITE(6,6600)                                                    0014550   02/17/81
      WRITE(6,6015) STAND                                              0014560   02/17/81
      WRITE(6,6016) ZCONC,VCONC                                        0014570   02/17/81
      WRITE(6,6011) STAND                                              0014580   02/17/81
      WRITE(6,6016) ZCONCA,VCONCA                                      0014590   02/17/81
      IF( .NOT. TEST) GO TO 500                                        0014600   02/24/81
      TOTAL=KOUNT                                                      0014610   02/17/81
      WRITE(6,6005)                                                    0014620   02/17/81
      DUMMY=0.0                                                        0014630   02/17/81
      DO 460 I=1,51                                                    0014640   02/17/81
      DUMMX=DUMMY                                                      0014650   02/17/81
      DUMMY=DUMMY+1.0                                                  0014660   02/17/81
      WRITE(6,6006) DUMMX,DUMMY,HISTOG(I),TOTAL                        0014670   02/17/81
      TOTAL=TOTAL-HISTOG(I)                                            0014680   02/17/81
  460 CONTINUE                                                         0014690   02/17/81
C                                                                      0014700   02/24/81
C     COMPUTE THE PROBABILITY OF VIOLATING THE EIGHT HOUR STANDARD.    0014710   02/24/81
C                                                                      0014720   02/24/81
  500 PROB8=1.0                                                        0014730   02/24/81
      VPROB8=0.0                                                       0014740   02/24/81
      SPROB8=0.0                                                       0014750   02/24/81
      IF(I8 .GE. 1000) GO TO 570                                       0014760   02/24/81
      I8=I8+1                                                          0014770   02/24/81
      RECORD(I8)=999999                                                0014780   02/24/81
C                                                                      0014790   02/24/81
C     NUM IS THE NUMBER OF YEARS WHICH VIOLATE THE EIGHT HOUR STANDARD. 0014800  02/24/81
C     I1 AND I2 ARE THE INDICES WHICH DENOTE THE START AND END OF A    0014810   02/24/81
C     YEAR, RESPECTIVELY.                                              0014820   02/24/81
C                                                                      0014830   02/24/81
      NUM=0                                                            0014840   02/24/81
      I1=1                                                             0014850   02/24/81
      I2=8760                                                          0014860   02/24/81
      I=1                                                              0014870   02/24/81
  510 IF(RECORD(I) .LT. I1) I=I+1                                      0014880   02/24/81
      IF(RECORD(I) .EQ. 999999) GO TO 560                              0014890   02/24/81
      IF(RECORD(I) .LE. I2) GO TO 520                                  0014900   02/24/81
C                                                                      0014910   02/24/81
C     TO GET HERE THERE MUST BE NO EIGHT HOUR CO LEVELS .GT. STANDA IN 0014920   02/24/81
C     THE YEAR (I1,I2).  THEREFORE THE YEAR (I1,I2) IS NOT IN VIOLATION. 0014930 02/24/81
C     CHECK THE NEXT YEAR.                                             0014940   02/24/81
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C                                                                        02/24/81
      I1=I1+1                                                            02/24/81
      I2=I2+1                                                            02/24/81
      GO TO 510                                                          02/24/81
C                                                                        02/24/81
C     TO GET HERE THERE MUST BE AT LEAST ONE EIGHT HOUR CO LEVEL .GT.    02/24/81
C     STAND8 IN THE YEAR (I1,I2).  THEREFORE WE WANT TO FIND IF THERE    02/24/81
C     IS AT LEAST ONE MORE COUNTABLE EIGHT HOUR CO LEVEL .GT. STAND8     02/24/81
C     IN THE YEAR (I1,I2).  NOTE THAT LEVELS EXCEEDING STAND8 IN THE     02/24/81
C     INTERVAL FROM RECORD(I)+1 TO RECORD(I)+7 INCLUSIVE ARE NOT         02/24/81
C     COUNTABLE BECAUSE OF THE SKIP-AHEAD-8 RULE.                        02/24/81
C                                                                        02/24/81
  520 DUMMY=RECORD(I)+7                                                  02/24/81
      DO 530 J=1,8                                                       02/24/81
      K=J                                                                02/24/81
      IF(RECORD(I+J) .GT. DUMMY) GO TO 540                               02/24/81
  530 CONTINUE                                                           02/24/81
C                                                                        02/24/81
C     RECORD(I+K) IS THE TIME OF THE NEXT COUNTABLE EIGHT HOUR CO LEVEL  02/24/81
C     WHICH IS .GT. STAND8.                                              02/24/81
C                                                                        02/24/81
  540 IF(RECORD(I+K) .LE. I2) GO TO 550                                  02/24/81
C                                                                        02/24/81
C     TO GET HERE THERE WAS ONLY ONE COUNTABLE EIGHT HOUR CO LEVEL .GT.  02/24/81
C     STAND8 IN THE YEAR (I1,I2).  THEREFORE THE YEAR (I1,I2) IS NOT IN  02/24/81
C     VIOLATION.  CHECK THE NEXT YEAR.                                   02/24/81
C                                                                        02/24/81
      I1=I1+1                                                            02/24/81
      I2=I2+1                                                            02/24/81
      GO TO 510                                                          02/24/81
C                                                                        02/24/81
C     TO GET HERE THERE MUST BE AT LEAST TWO COUNTABLE EIGHT HOUR CO     02/24/81
C     LEVELS .GT. STAND8 IN THE YEAR (I1,I2).  THEREFORE THE YEAR        02/24/81
C     (I1,I2) IS IN VIOLATION.  FURTHERMORE ALL YEARS FROM THE YEAR      02/24/81
C     (I1,I2) TO THE YEAR (RECORD(I),RECORD(I)+8759) INCLUSIVE WILL BE   02/24/81
C     IN VIOLATION SINCE EACH OF THESE YEARS WILL INCLUDE AT LEAST AS    02/24/81
C     MANY COUNTABLE EIGHT HOUR CO LEVELS EXCEEDIND STAND8 AS DOES THE   02/24/81
C     YEAR (I1,I2).                                                      02/24/81
C                                                                        02/24/81
  550 NUM=NUM+1+RECORD(I)-I1                                             02/26/81
      I1=RECORD(I)+1                                                     02/24/81
      I2=I1+8759                                                         02/24/81
      GO TO 510                                                          02/24/81
C                                                                        02/24/81
C     THE TOTAL NUMBER OF YEARS (I1,I2) CONSIDERED=KCUNT+1-8760.  THUS   02/24/81
C     WE CAN ESTIMATE PROB8 AND UPPER BOUNDS ON VPROB8 AND SPROB8.       02/24/81
C                                                                        02/24/81
  560 PROB8=FLOAT(NUM)/FLOAT(KCUNT-8759)                                 02/26/81
      VPROB8=PROB8*(1.0-PROB8)/(KCUNT/8760.0)                            02/24/81
      SPROB8=SQRT(VPROB8)                                                02/24/81
      PROB8=100.0*PROB8                                                  02/24/81
      SPROB8=100.0*SPROB8                                                02/24/81
  570 WRITE(6,6902) YEAR,STAND8,PROB8,SPROB8                             02/24/81
      STOP                                                               02/17/81
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  998 FINISH=.TRUE.                                                    02/17/81
      LAST=0.0                                                         02/17/81
      LASTA=0.0                                                        02/17/81
      IF(CONC .GT. STAND) LAST=1.0                                     02/17/81
      IF(CONCA .GT. STAND) LASTA=1.0                                   02/17/81
      GO TO 360                                                        02/17/81
      END                                                              02/17/81
      REAL FUNCTION URAN(IX,IY)                                        02/17/81
C                                                                      02/17/81
C     URAN RETURNS A UNIFORM (0,1) RANDOM VARIABLE.  IX AND IY ARE     02/17/81
C     CALLED BY NAME.  IX MUST BE INITIALIZED TO A POSITIVE INTEGER    02/17/81
C     BEFORE THE FIRST CALL TO URAN.  URAN IS SPECIFIC TO IBM.         02/17/81
C                                                                      02/17/81
      IY=IX*65539                                                      02/17/81
      IF(IY) 5,6,6                                                     02/17/81
    5 IY=IY+2147483647+1                                               02/17/81
    6 URAN=IY                                                          02/17/81
      URAN=URAN*0.4656613E-9                                           02/17/81
      IX=IY                                                            02/17/81
      RETURN                                                           02/17/81
      END                                                              02/17/81
      REAL FUNCTION GRAN(IX,AVG,STD)                                   02/17/81
C                                                                      02/17/81
C     GRAN RETURNS A NORMAL RANDOM VARIABLE WITH MEAN = AVG AND        02/17/81
C     STANDARD DEVIATION = STD.  IX IS CALLED BY NAME.  AVG AND STD ARE 02/17/81
C     CALLED BY VALUE.  IX MUST BE INITIALIZED TO A POSITIVE INTEGER   02/17/81
C     BEFORE THE FIRST CALL TO URAN.  URAN OPERATES ON THE CENTRAL     02/17/81
C     LIMIT PRINCIPAL WHICH STATES THAT THE DISTRIBUTION OF A SUM OF   02/17/81
C     INDEPENDENT IDENTICALLY DISTRIBUTED RANDOM VARIABLES APPROACHES  02/17/81
C     THE NORMAL DISTRIBUTION.                                         02/17/81
C                                                                      02/17/81
      A=0.0                                                            02/17/81
      DO 50 I=1,12                                                     02/17/81
      A=A+URAN(IX,IY)                                                  02/17/81
   50 CONTINUE                                                         02/17/81
      GRAN=(A-6.0)*STD+AVG                                             02/17/81
      RETURN                                                           02/17/81
      END                                                              02/17/81
      REAL FUNCTION INTGRL(TOLER)                                      02/17/81
C                                                                      02/17/81
C     INTGRL COMPUTES THE GAUSSIAN DISPERSION INTEGRAL RELATIVE TO A   02/17/81
C     RECEPTOR AT (OX,OY,OZ) FOR A GROUND LEVEL LINE SOURCE RUNNING FROM 02/17/81
C     (RX1,RY1) TO (RX2,RY2) GIVEN THE WIND ANGLE AND THE STABILITY    02/17/81
C     CLASS. NOTE THAT (EXCEPT FOR THE DESIRED TOLERANCE) THE PARAMETERS 02/17/81
C     OF INTGRL ARE PASSED THROUGH BLANK COMMON TO SPEED EXECUTION.    02/17/81
C     TOLER IS CALLED BY VALUE.                                        02/17/81
C                                                                      02/17/81
C                                                                      02/17/81
      LOGICAL FIRST                                                    02/17/81
C                                                                      02/17/81
      INTEGER CLASS,ID,IR,IRO,JR,KR                                    02/17/81
C                                                                      02/17/81
      REAL AHC,ALPHA,BHC,CA,CAG,CG,COTEST,DA,DB,DIST,DISTR,DLSTAR,DR,  02/17/81
     -DSTAR,DUMMY,ER,FR,FREXP,FRC,FR1,FR2,GAMMA,HC,INTGRX,L,LAST,LAST1, 02/17/81
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     -OX,OY,OZ,P,PR,R,RA,RB,RC,RSTAR,RX,RX1,RY1,R1,R2,SA,SAG,SG,        0016030   02/17/81
     -SIGMAH,SIGMAV,STEP,STEP2,STEP3,SUM,TOLER,TOLER1,TOLER2,TOLER3,    0016040   02/17/81
     -VC,ZR                                                             0016050   02/17/81
C                                                                       0016060   02/17/81
      INTEGER INDEX(1C1)                                                0016070   02/17/81
C                                                                       0016080   02/17/81
      REAL AH(6),AV(9,6),BH(6),BV(9,6),HOFSET(6),VOFSET(6),Y(7),Z(7)    0016090   02/17/81
C                                                                       0016100   02/17/81
      COMMON RX1,RY1,OX,OY,OZ,ALPHA,GAMMA,L,CLASS                       0016110   02/17/81
C                                                                       0016120   02/17/81
C                                                                       0016130   02/17/81
C                                                                       0016140   02/17/81
C     AH          REAL ARRAY -- DIMENSION 6 -- CONSTANT.                0016150   02/17/81
C                 CONTAINS THE LOG-LOG INTERCEPTS IN METERS FOR THE     0016160   02/17/81
C                 HORIZONTAL DISPERSION PARAMETER, INDEXED BY CLASS.    0016170   02/17/81
C                                                                       0016180   02/17/81
C     AHC         REAL SCALAR -- CALCULATED.                            0016190   02/17/81
C                 = AH(C), IN METERS.                                   0016200   02/17/81
C                                                                       0016210   02/17/81
C     ALPHA       REAL SCALAR -- PARAMETER/COMMON.                      0016220   02/17/81
C                 = THE WIND DIRECTION MEASURED CCW IN RADIANS FROM EAST. 0016230 02/17/81
C                 ALPHA IS THE DIRECTION THE WIND IS COMMING FROM.      0016240   02/17/81
C                                                                       0016250   02/17/81
C     AV          REAL ARRAY -- DIMENSION 9,6 -- CONSTANT.              0016260   02/17/81
C                 CONTAINS THE LOG-LOG INTERCEPTS IN METERS FOR THE     0016270   02/17/81
C                 VERTICLE DISPERSION PARAMETER INDEXED BY DIST AND CLASS. 0016280 02/17/81
C                                                                       0016290   02/17/81
C     BH          REAL ARRAY -- DIMENSION 6 -- CONSTANT.                0016300   02/17/81
C                 CONTAINS THE LOG-LOG SLOPES FOR THE HORIZONTAL DISPERSION 0016310 02/17/81
C                 PARAMETER, INDEXED BY CLASS.                          0016320   02/17/81
C                                                                       0016330   02/17/81
C     BHC         REAL SCALAR -- CALCULATED.                            0016340   02/17/81
C                 = BH(C).                                              0016350   02/17/81
C                                                                       0016360   02/17/81
C     BV          REAL ARRAY -- DIMENSION 9,6 -- CONSTANT.              0016370   02/17/81
C                 CONTAINS THE LOG-LOG SLOPES FOR THE VERTICLE DISPERSION 0016380 02/17/81
C                 PARAMETER INDEXED BY DIST AND CLASS.                  0016390   02/17/81
C                                                                       0016400   02/17/81
C     CA          REAL SCALAR -- CALCULATED.                            0016410   02/17/81
C                 = COS(ALPHA).                                         0016420   02/17/81
C                                                                       0016430   02/17/81
C     CAG         REAL SCALAR -- CALCULATED.                            0016440   02/17/81
C                 = COS(ALPHA-GAMMA).                                   0016450   02/17/81
C                                                                       0016460   02/17/81
C     CG          REAL SCALAR -- CALCULATED.                            0016470   02/17/81
C                 = COS(GAMMA).                                         0016480   02/17/81
C                                                                       0016490   02/17/81
C     CLASS       INTEGER SCALAR -- PARAMETER/COMMON.                   0016500   02/17/81
C                 = ATMOSPHERIC STABILITY CLASS.                        0016510   02/17/81
C                                                                       0016520   02/17/81
C     COTES1      REAL SCALAR -- CALCULATED.                            0016530   02/17/81
C                 = THE TEMPORARY INTEGRAL OVER EITHER R1 TO RO OR RO TO R2 0016540 02/17/81
C                 COMPUTED FROM COTE"S METHOD OF ORDER 1 IN METERS**-1. 0016550   02/17/81
C                                                                       0016560   02/17/81
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C     DA       REAL SCALAR -- CALCULATED.                               00165700   02/17/81
C              = THE DERIVATIVE OF F AT RA, WHERE F IS THE GAUSSIAN     00165800   02/17/81
C              INTEGRAND.                                               00165900   02/17/81
C                                                                       00166000   02/17/81
C     DB       REAL SCALAR -- CALCULATED.                               00166100   02/17/81
C              = THE DERIVATIVE OF F AT RB.                             00166200   02/17/81
C                                                                       00166300   02/17/81
C     DIST(R)  REAL SCALAR (STATEMENT FUNCTION) -- CALCULATED.          00166400   02/17/81
C              = THE DISTANCE MEASURED ALONG THE WIND VECTOR IN METERS  00166500   02/17/81
C              FROM THE RECEPTOR TO THE ROADWAY POINT R.                00166600   02/17/81
C                                                                       00166700   02/17/81
C     DISTR    REAL SCALAR -- CALCULATED.                               00166800   02/17/81
C              = DIST(R), IN METERS.                                    00166900   02/17/81
C                                                                       00167000   02/17/81
C     DLSTAR   REAL SCALAR -- CALCULATED.                               00167100   02/17/81
C              = DIST(L), IN METERS.                                    00167200   02/17/81
C                                                                       00167300   02/17/81
C     DR       REAL SCALAR -- CALCULATED.                               00167400   02/17/81
C              = THE DERIVATIVE OF F AT R.                              00167500   02/17/81
C                                                                       00167600   02/17/81
C     DSTAR    REAL SCALAR -- CALCULATED.                               00167700   02/17/81
C              = DIST(0), IN METERS.                                    00167800   02/17/81
C                                                                       00167900   02/17/81
C     DUMMY    REAL SCALAR -- CALCULATED.                               00168000   02/17/81
C              A TEMPORARY STORAGE VARIABLE.                            00168100   02/17/81
C                                                                       00168200   02/17/81
C     ER       REAL SCALAR -- CALCULATED.                               00168300   02/17/81
C              = THE APPROXIMATE AREA UNDER F(R) FROM R TO AN END POINT. 00168400  02/17/81
C                                                                       00168500   02/17/81
C     FIRST    LOGICAL SCALAR -- CALCULATED.                            00168600   02/17/81
C              = .TRUE. WHEN SUBPROGRAM IS INTEGRATING OVER THE FIRST   00168700   02/17/81
C              HALF OF THE INTERVAL (R1,R2), IE OVER THE INTERVAL       00168800   02/17/81
C              (R1,R0).                                                 00168900   02/17/81
C                                                                       00169000   02/17/81
C     FR       REAL SCALAR -- CALCULATED.                               00169100   02/17/81
C              = F(R), IN METERS.                                       00169200   02/17/81
C                                                                       00169300   02/17/81
C     FREXP    REAL SCALAR -- CALCULATED.                               00169400   02/17/81
C              = THE EXPONENT OF THE EXPONENTIAL PART OF F(R).          00169500   02/17/81
C                                                                       00169600   02/17/81
C     FR0      REAL SCALAR -- CALCULATED.                               00169700   02/17/81
C              = F(R0), IN METERS.                                      00169800   02/17/81
C                                                                       00169900   02/17/81
C                                                                       00170000   02/17/81
C                                                                       00170100   02/17/81
C     FR1      REAL SCALAR -- CALCULATED.                               00170200   02/17/81
C              = F(R1), IN METERS.                                      00170300   02/17/81
C                                                                       00170400   02/17/81
C     FR2      REAL SCALAR -- CALCULATED.                               00170500   02/17/81
C              = F(R2), IN METERS.                                      00170600   02/17/81
C                                                                       00170700   02/17/81
C     GAMMA    REAL SCALAR -- PARAMETER/COMMON.                         00170800   02/17/81
C              = THE ROAD ANGLE MEASURED CCW IN RADIANS FROM EAST.      00170900   02/17/81
C                                                                       00171000   02/17/81
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C                                                                          02/17/81
C     HC       REAL SCALAR -- CALCULATED.                                  02/17/81
C              = HOFSET(CLASS), IN METERS.                                 02/17/81
C                                                                          02/17/81
C     HOFSET   REAL ARRAY -- DIMENSION 6 -- CONSTANT.                      02/17/81
C              CONTAINS THE OFFSET DISTANCES IN METERS FOR THE             02/17/81
C              HORIZONTAL DISPERSION PARAMETER, INDEXED BY CLASS.          02/17/81
C                                                                          02/17/81
C     ID       INTEGER SCALAR -- CALCULATED.                               02/17/81
C              = INDEX(MIN1(101.C,(DISTRO+VC)/100.0+1.0)).                 02/17/81
C                                                                          02/17/81
C     INDEX    INTEGER ARRAY -- DIMENSION 101 -- CONSTANT.                 02/17/81
C              CONTAINS THE INDICES FOR THE FIRST SUBSCRIPT IN AV AND BV   02/17/81
C              INDEXED BY DIST.                                            02/17/81
C                                                                          02/17/81
C     INTGRX   REAL SCALAR -- CALCULATED.                                  02/17/81
C              = THE TEMPORARY VALUE OF EITHER THE INTEGRAL FROM R1 TO     02/17/81
C              RO OR THE INTEGRAL FROM RO TO R2, IN METERS**-1.            02/17/81
C                                                                          02/17/81
C     IR       INTEGER SCALAR -- CALCULATED.                               02/17/81
C              = THE COUNT OF THE NUMBER OF BISECTIONS USED TO REFINE AN   02/17/81
C              INTEGRATION END POINT, AND                                  02/17/81
C              = THE COUNT (IN POWERS OF TWO) OF THE NUMBER OF COTE"S      02/17/81
C              INTERVALS USED TO DO AN INTEGRATION.                        02/17/81
C                                                                          02/17/81
C     IRO      INTEGER SCALAR -- CALCULATED.                               02/17/81
C              = THE COUNT OF THE NUMBER OF BISECTIONS USED TO FIND RO.    02/17/81
C                                                                          02/17/81
C     JR       INTEGER SCALAR -- CALCULATED.                               02/17/81
C              = THE LOOP STARTING POINT FOR CALCULATING THE NEXT GROUP    02/17/81
C              OF ELEMENTS OF Y.                                           02/17/81
C                                                                          02/17/81
C     KR       INTEGER SCALAR -- CALCULATED.                               02/17/81
C              = THE LOOP INCREMENT FOR CALCULATING THE NEXT GROUP OF      02/17/81
C              ELEMENTS OF Y.                                              02/17/81
C                                                                          02/17/81
C     L        REAL SCALAR -- PARAMETER/COMMON.                            02/17/81
C              = THE ROADWAY LENGTH, IN METERS.                            02/17/81
C                                                                          02/17/81
C     LAST     REAL SCALAR -- CALCULATED.                                  02/17/81
C              = THE PREVIOUS VALUE OF INTGRX IN THE ITERATION OF THE      02/17/81
C              COTE"S INTEGRATION.                                         02/17/81
C                                                                          02/17/81
C     LAST1    REAL SCALAR -- CALCULATED.                                  02/17/81
C              = THE PREVIOUS VALUE OF COTES1 IN THE ITERATION OF THE      02/17/81
C              COTE"S FIRST ORDER INTEGRATION.                             02/17/81
C                                                                          02/17/81
C                                                                          02/17/81
C                                                                          02/17/81
C     OX,OY,OZ REAL SCALARS -- PARAMETERS/COMMON.                          02/17/81
C              = THE X, Y, AND Z COORDINATES OF THE RECEPTOR LOCATION,     02/17/81
C              IN METERS.                                                  02/17/81
C                                                                          02/17/81
C     P(R)     REAL SCALAR (STATEMENT FUNCTION) -- CALCULATED.             02/17/81
C              = THE DISTANCE MEASURED PERPENDICULAR TO THE WIND VECTOR    02/17/81
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C            IN METERS FROM THE RECEPTOR TO THE WIND VECTOR THROUGH      0017650   02/17/81
C            THE ROADWAY POINT R.                                        0017660   02/17/81
C                                                                        0017670   02/17/81
C   PR       REAL SCALAR -- CALCULATED.                                  0017680   02/17/81
C            = P(R), IN METERS.                                          0017690   02/17/81
C                                                                        0017700   02/17/81
C   R        REAL SCALAR -- CALCULATED.                                  0017710   02/17/81
C            = THE DISTANCE IN METERS FROM (RX1,RY1) AS MEASURED         0017720   02/17/81
C            ALONG THE ROADWAY.                                          0017730   02/17/81
C                                                                        0017740   02/17/81
C   RA,RB    REAL SCALARS -- CALCULATED.                                 0017750   02/17/81
C            = THE LEFT AND RIGHT-HAND END POINTS IN THE SEVERAL         0017760   02/17/81
C            BISECTION TECHNIQUES AND INTEGRATIONS USED, MEASURED        0017770   02/17/81
C            ALONG THE ROADWAY FROM (RX1,RY1) IN METERS.                 0017780   02/17/81
C                                                                        0017790   02/17/81
C   RO       REAL SCALAR -- CALCULATED.                                  0017800   02/17/81
C            = THE DISTANCE MEASURED ALONG THE ROADWAY IN METERS FROM    0017810   02/17/81
C            (RX1,RY1) TO THE POINT WHERE F(R) REACHES ITS MAXIMUM.      0017820   02/17/81
C                                                                        0017830   02/17/81
C   RSTAR    REAL SCALAR -- CALCULATED.                                  0017840   02/17/81
C            = THE DISTANCE MEASURED ALONG THE ROADWAY IN METERS         0017850   02/17/81
C            FROM (RX1,RY1), TO THE POINT WHERE DIST(R) = 0.             0017860   02/17/81
C                                                                        0017870   02/17/81
C   RX       REAL SCALAR -- CALCULATED.                                  0017880   02/17/81
C            = EITHER R1 OR R2 DEPENDING ON WHETHER WE ARE DOING A       0017890   02/17/81
C            COTE"S INTEGRATION ON (R1,RO) OR (RO,R2).                   0017900   02/17/81
C                                                                        0017910   02/17/81
C   RX1,RY1  REAL SCALARS -- PARAMETERS/COMMON.                          0017920   02/17/81
C            = THE X AND Y COORDINATES OF THE WEST-MOST ROADWAY END      0017930   02/17/81
C            POINT, IN METERS.                                           0017940   02/17/81
C                                                                        0017950   02/17/81
C   R1       REAL SCALAR -- CALCULATED.                                  0017960   02/17/81
C            = THE DISTANCE MEASURED ALONG THE ROADWAY IN METERS         0017970   02/17/81
C            FROM (RX1,RY1) TO THE LEFT-HAND END POINT OF THE            0017980   02/17/81
C            INTEGRATION INTERVAL.                                       0017990   02/17/81
C                                                                        0018000   02/17/81
C   R2       REAL SCALAR -- CALCULATED.                                  0018010   02/17/81
C            = THE DISTANCE MEASURED ALONG THE ROADWAY IN METERS FROM    0018020   02/17/81
C            (RX1,RY1) TO THE RIGHT-HAND END POINT OF THE INTEGRATION    0018030   02/17/81
C            INTERVAL.                                                   0018040   02/17/81
C                                                                        0018050   02/17/81
C   SA       REAL SCALAR -- CALCULATED.                                  0018060   02/17/81
C            = SIN(ALPHA).                                               0018070   02/17/81
C                                                                        0018080   02/17/81
C   SAG      REAL SCALAR -- CALCULATED.                                  0018090   02/17/81
C            = SIN(ALPHA-GAMMA).                                         0018100   02/17/81
C                                                                        0018110   02/17/81
C   SG       REAL SCALAR -- CALCULATED.                                  0018120   02/17/81
C            = SIN(GAMMA).                                               0018130   02/17/81
C                                                                        0018140   02/17/81
C   SIGMAH   REAL SCALAR -- CALCULATED.                                  0018150   02/17/81
C            = THE HORIZONTAL DISPERSION PARAMETER, IN METERS.           0018160   02/17/81
C                                                                        0018170   02/17/81
C   SIGMAV   REAL SCALAR -- CALCULATED.                                  0018180   02/17/81
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C                = THE VERTICLE DISPERSION PARAMETER IN METERS.              0018190   02/17/81
C                                                                            0018200   02/17/81
C     STEP       REAL SCALAR -- CALCULATED.                                  0018210   02/17/81
C                = THE STEP SIZE USED IN THE COTE"S INTEGRATION.             0018220   02/17/81
C                                                                            0018230   02/17/81
C     STEP2      REAL SCALAR -- CALCULATED.                                  0018240   02/17/81
C                = STEP/2.0.                                                 0018250   02/17/81
C                                                                            0018260   02/17/81
C     STEP3      REAL SCALAR -- CALCULATED.                                  0018270   02/17/81
C                = STEP*3.                                                   0018280   02/17/81
C                                                                            0018290   02/17/81
C     SUM        REAL SCALAR -- CALCULATED.                                  0018300   02/17/81
C                = (APPROXIMATELY) THE SUM OF THE INTEGRAND VALUES USED TO   0018310   02/17/81
C                DETERMINE COTES).                                           0018320   02/17/81
C                                                                            0018330   02/17/81
C     TOLER      REAL SCALAR -- PARAMETER.                                   0018340   02/17/81
C                = THE DESIRED PRECISION OF THE VALUE RETURNED BY INTGRL.    0018350   02/17/81
C                                                                            0018360   02/17/81
C     TOLER1     REAL SCALAR -- CALCULATED.                                  0018370   02/17/81
C                = LN(TOLER).                                                0018380   02/17/81
C                                                                            0018390   02/17/81
C     TOLER2     REAL SCALAR -- CALCULATED.                                  0018400   02/17/81
C                = TOLER/2.                                                  0018410   02/17/81
C                                                                            0018420   02/17/81
C     TOLER3     REAL SCALAR -- CALCULATED.                                  0018430   02/17/81
C                = (APPROXIMATELY) LN(TOLER/2/1500) WHICH REPRESENTS THE     0018440   02/17/81
C                LN OF THAT ERROR WHICH COULD BE TOLERATED IN THE            0018450   02/17/81
C                INTEGRAND OVER AN INTERVAL OF 1500 METERS AND STILL         0018460   02/17/81
C                YEILD AN INTEGRATION ERROR .LT. TOLER/2.                    0018470   02/17/81
C                                                                            0018480   02/17/81
C     VC         REAL SCALAR -- CALCULATED.                                  0018490   02/17/81
C                = VOFSET(CLASS), IN METERS.                                 0018500   02/17/81
C                                                                            0018510   02/17/81
C     VOFSET     REAL ARRAY -- DIMENSION 6 -- CONSTANT.                      0018520   02/17/81
C                CONTAINS THE OFFSET DISTANCES IN METERS FOR THE VERTICLE    0018530   02/17/81
C                DISPERSION PARAMETER, INDEXED BY CLASS.                     0018540   02/17/81
C                                                                            0018550   02/17/81
C     Y          REAL ARRAY -- DIMENSION 7 -- CALCULATED.                    0018560   02/17/81
C                = THE SEVEN COTE"S VARIABLES USED IN THE INTEGRATION.       0018570   02/17/81
C                                                                            0018580   02/17/81
C     Z          REAL ARRAY -- DIMENSION 7 -- CONSTANT.                      0018590   02/17/81
C                CONTAINS THE SEVEN COTE"S CONSTANTS.                        0018600   02/17/81
C                                                                            0018610   02/17/81
C     ZR         REAL SCALAR -- CALCULATED.                                  0018620   02/17/81
C                = THE LENGTH IN METERS OF A COTE"S INTEGRATION SUB          0018630   02/17/81
C                INTERVAL DIVIDED BY 840.                                    0018640   02/17/81
C                                                                            0018650   02/17/81
C                                                                            0018660   02/17/81
      DATA AH /0.4998,0.3399,0.2001,0.1137,0.09524,0.063887/                 0018670   02/17/81
C                                                                            0018680   02/17/81
      DATA AV /0.1181,0.04661,0.01164,6*0.0001818,3*0.1301,6*0.05566,       0018690   02/17/81
     -9*0.1103,3*0.08671,2*0.1648,4*0.4533,2*0.07748,3*0.1375,2*0.3038,     0018700   02/17/81
     -2*0.8287,4*0.05943,0.1080,0.1859,2*0.5836,1.5252/                      0018710   02/17/81
C                                                                            0018720   02/17/81
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      DATA BH /0.6679,0.8760,0.8961,0.9251,0.9011,0.9000/                02/17/81
C                                                                        02/17/81
      DATA BV /1.0401,1.2155,1.4587,6*2.1280,3*0.9596,6*1.0962,9*0.9119, 02/17/81
     -3*0.8647,2*0.7614,4*0.6149,2*0.8299,3*0.7293,2*0.6146,2*0.4936,    02/17/81
     -4*0.7976,0.7042,0.6256,2*0.4751,0.3708/                            02/17/81
C                                                                        02/17/81
      DATA HOFSET /7.8848,12.0129,20.5217,34.3906,45.9989,72.0415/       02/17/81
C                                                                        02/17/81
      DATA INDEX /2*1,2,2*3,4,4*5,10*6,20*7,60*8,9/                      02/17/81
C                                                                        02/17/81
      DATA VOFSET /11.5155,12.7796,17.4995,27.0231,35.5362,57.2639/      02/17/81
C                                                                        02/17/81
      DATA Z /41.0,216.0,27.0,272.0,27.0,216.0,41.0/                     02/17/81
C                                                                        02/17/81
C                                                                        02/17/81
C     STATEMENT FUNCTIONS P(R) AND DIST(R) ARE DEFINED AS FOLLOWS.       02/17/81
C                                                                        02/17/81
      P(R)=R*SAG+SA*(RX1-OX)-CA*(RY1-OY)                                 02/17/81
      DIST(R)=R*CAG+CA*(RX1-OX)+SA*(RY1-OY)                              02/17/81
C                                                                        02/17/81
C     INITIALIZE INTGRL, SET UP VARIOUS TOLERANCE LIMITS BASED ON TOLER, 02/17/81
C     AND ASSIGN FREQUENTLY USED ARRAY ELEMENTS AND FUNCTION CALLS TO    02/17/81
C     SCALARS TO SPEED EXECUTION.                                        02/17/81
C                                                                        02/17/81
      INTGRL=0.0                                                         02/17/81
      TOLER1=ALOG(TOLER)                                                 02/17/81
      TOLER2=TOLER/2.0                                                   02/17/81
      TOLER3=TOLER1-8.0                                                  02/17/81
      VC=VOFSET(CLASS)                                                   02/17/81
      HC=HOFSET(CLASS)                                                   02/17/81
      AHC=AH(CLASS)                                                      02/17/81
      BHC=BH(CLASS)                                                      02/17/81
      CA=COS(ALPHA)                                                      02/17/81
      SA=SIN(ALPHA)                                                      02/17/81
      CG=COS(GAMMA)                                                      02/17/81
      SG=SIN(GAMMA)                                                      02/17/81
      CAG=COS(ALPHA-GAMMA)                                               02/17/81
      SAG=SIN(ALPHA-GAMMA)                                               02/17/81
C                                                                        02/17/81
C     RSTAR IS THE R AT WHICH DIST(R) = 0.                               02/17/81
C                                                                        02/17/81
C                                                                        02/17/81
C     INITIALIZE RSTAR TO A LARGE VALUE.                                 02/17/81
C                                                                        02/17/81
      RSTAR=1.0E70                                                       02/17/81
      IF(CAG .NE. 0.0) RSTAR=(CA*(OX-RX1)+SA*(OY-RY1))/CAG               02/17/81
C                                                                        02/17/81
C     WE WISH TO INTEGRATE OVER ALL R SUCH THAT DIST(R) .GE. 0, TO DO    02/17/81
C     THIS WE FIND R1 AND R2, THE POINTS BETWEEN WHICH DIST(R) .GE. 0.   02/17/81
C                                                                        02/17/81
      IF(RSTAR .LT. 0.0) GO TO 20                                        02/17/81
      IF(RSTAR .EQ. 0.0) GO TO 30                                        02/17/81
C                                                                        02/17/81
C     DSTAR IS THE VALUE OF DIST(0).                                     02/17/81
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C                                                                        02/17/81
      DSTAR=-RSTAR*CAG                                                   02/17/81
      IF(DSTAR .LT. 0.0) GO TO 10                                        02/17/81
C                                                                        02/17/81
C     IF RSTAR .GT. 0 AND DSTAR .GE. 0, R1 = 0 AND R2 = MIN(RSTAR,L).    02/17/81
C                                                                        02/17/81
      R1=0.0                                                             02/17/81
      R2=AMIN1(RSTAR,L)                                                  02/17/81
      GO TO 40                                                           02/17/81
C                                                                        02/17/81
C     IF RSTAR .GT. 0 AND DSTAR .LT. 0, R1 = RSTAR AND R2 = L.           02/17/81
C                                                                        02/17/81
 10   R1=RSTAR                                                           02/17/81
      R2=L                                                               02/17/81
C                                                                        02/17/81
C     R1 .GE. R2 IMPLIES THAT THE INTERVAL OVER WHICH DIST(R) .GE. 0 IS  02/17/81
C     NOT CONTAINED WITHIN THE ROADWAY LENGTH.  THUS THE INTEGRAL = 0.   02/17/81
C                                                                        02/17/81
      IF(R1 .GE. R2) RETURN                                              02/17/81
      GO TO 40                                                           02/17/81
C                                                                        02/17/81
C     DSTAR IS THE VALUE OF DIST(0).                                     02/17/81
C                                                                        02/17/81
 20   DSTAR=-RSTAR*CAG                                                   02/17/81
C                                                                        02/17/81
C     RSTAR .LT. 0 AND DSTAR .LT. 0 IMPLIES THAT THE INTERVAL OVER WHICH 02/17/81
C     DIST(R) .GE. 0 IS NOT CONTAINED WITHIN THE ROADWAY LENGTH.  THUS   02/17/81
C     THE INTEGRAL = 0.                                                  02/17/81
C                                                                        02/17/81
      IF(DSTAR .LT. 0.0) RETURN                                          02/17/81
C                                                                        02/17/81
C     IF RSTAR .LT. 0 AND DSTAR .GE. 0, R1 = 0 AND R2 = L.               02/17/81
C                                                                        02/17/81
      R1=0.0                                                             02/17/81
      R2=L                                                               02/17/81
      GO TO 40                                                           02/17/81
C                                                                        02/17/81
C     DLSTAR IS THE VALUE OF DIST(L).                                    02/17/81
C                                                                        02/17/81
 30   DLSTAR=L*CAG+CA*(RX1-OX)+SA*(RY1-OY)                               02/17/81
C                                                                        02/17/81
C     RSTAR .EQ. 0 AND DLSTAR .LT. 0 IMPLIES THAT THE INTERVAL OVER      02/17/81
C     WHICH DIST(R) .GE. 0 IS NOT CONTAINED WITHIN THE ROADWAY LENGTH.   02/17/81
C     THUS THE INTEGRAL = 0.                                             02/17/81
C                                                                        02/17/81
      IF(DLSTAR .LT. 0.0) RETURN                                         02/17/81
C                                                                        02/17/81
C     IF RSTAR .EQ. 0 AND DLSTAR .GE. 0, R1 = 0 AND R2 = L.              02/17/81
C                                                                        02/17/81
      R1=0.0                                                             02/17/81
      R2=L                                                               02/17/81
C                                                                        02/17/81
C     FIND RO, THE R SUCH THAT THE DERIVATIVE OF F(R) = 0.               02/17/81
C                                                                        02/17/81
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      C                                                                  02/17/81
      C     FIND DA, THE DERIVATIVE OF F AT R1.                          02/17/81
      C                                                                  02/17/81
   40       PR=P(R1)                                                     02/17/81
            DISTR=DIST(R1)                                               02/17/81
            ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                   02/17/81
            SIGMAH=AHC*(DISTR+HC)**BHC                                   02/17/81
            SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                 02/17/81
            DA=(-PR*SAG/SIGMAH**2)+(((PR/SIGMAH)**2-1.0)*(BHC/(DISTR+HC))+   02/17/81
           -((OZ/SIGMAV)**2-1.0)*(BV(ID,CLASS)/(DISTR+VC)))*CAG           02/17/81
      C                                                                  02/17/81
      C     IF DA .EQ. 0, WE HAVE FOUND RO.                              02/17/81
      C                                                                  02/17/81
            IF(DA .EQ. 0.0) GO TO 110                                    02/17/81
      C                                                                  02/17/81
      C     FIND DB, THE DERIVATIVE OF F AT R2.                          02/17/81
      C                                                                  02/17/81
            PR=P(R2)                                                     02/17/81
            DISTR=DIST(R2)                                               02/17/81
            ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                   02/17/81
            SIGMAH=AHC*(DISTR+HC)**BHC                                   02/17/81
            SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                 02/17/81
            DB=(-PR*SAG/SIGMAH**2)+(((PR/SIGMAH)**2-1.0)*(BHC/(DISTR+HC))+   02/17/81
           -((OZ/SIGMAV)**2-1.0)*(BV(ID,CLASS)/(DISTR+VC)))*CAG           02/17/81
      C                                                                  02/17/81
      C     IF DB .EQ. 0, WE HAVE FOUND RO.                              02/17/81
      C                                                                  02/17/81
            IF(DB .EQ. 0.0) GO TO 110                                    02/17/81
      C                                                                  02/17/81
      C     STARTING WITH THE ROADWAY END POINTS AND ROADWAY POINT CLOSEST TO   02/17/81
      C     THE RECEPTOR, USE THE BISECTION TECHNIQUE (THE DERIVATIVE OF F      02/17/81
      C     CHANGES SIGN ONLY AT RO) TO LOCATE RO.                       02/17/81
      C                                                                  02/17/81
            RA=R1                                                        02/17/81
            RB=R2                                                        02/17/81
      C                                                                  02/17/81
      C     THIS VALUE OF RO IS THE ROAD POINT CLOSSEST TO THE OBSERVER  02/17/81
      C                                                                  02/17/81
            RO=CA*(RY1-OY)-SA*(RX1-OX)                                   02/17/81
            IF(RO .LE. RA .OR. RO .GE. RB) RO=(RA+RB)/2.0                02/17/81
      C                                                                  02/17/81
      C     IRO IS A COUNTER.  WE WILL PERFORM A MAXIMUM OF 20 BISECTIONS TO   02/17/81
      C     LOCATE RO.                                                   02/17/81
      C                                                                  02/17/81
            IRO=1                                                        02/17/81
      C                                                                  02/17/81
      C     IF THE INTERVAL CONTAINING RO IS STILL LARGE, AND WE HAVE NOT YET   02/17/81
      C     DONE 20 BISECTIONS, WE CONTINUE THE BISECTION PROCESS.       02/17/81
      C                                                                  02/17/81
   50       IF((RB-RA) .LT. 1.0 .OR. IRO .GT. 20) GO TO 110              02/17/81
            IRO=IRO+1                                                    02/17/81
            PR=P(RO)                                                     02/17/81
            DISTR=DIST(RO)                                               02/17/81
            ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                   02/17/81
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      SIGMAH=AHC*(DISTR+HC)**BHC                                        02/17/81
      SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                      02/17/81
      DR=(-PR*SAG/SIGMAH**2)+(((PR/SIGMAH)**2-1.0)*(BHC/(DISTR+HC))+    02/17/81
     -((OZ/SIGMAV)**2-1.0)*(BV(ID,CLASS)/(DISTR+VC)))*CAG               02/17/81
      IF(DR .EQ. 0.0) GO TO 110                                         02/17/81
      IF(SIGN(1.0,DA) .NE. SIGN(1.0,DR)) GO TO 60                       02/17/81
C                                                                       02/17/81
C     SIGN(DA) .EQ. SIGN(DR) IMPLIES THAT RO LIES BETWEEN RO AND RB.    02/17/81
C     THUS WE SET RA TO RO AND BISECT TO OBTAIN THE NEXT RO.            02/17/81
C                                                                       02/17/81
      DA=DR                                                             02/17/81
      RA=RO                                                             02/17/81
      RO=(RA+RB)/2.0                                                    02/17/81
      GO TO 50                                                          02/17/81
C                                                                       02/17/81
C     SIGN(DA) .NE. SIGN(DR) IMPLIES THAT RO LIES BETWEEN RA AND RO.    02/17/81
C     THUS WE SET RB TO RO AND BISECT TO OBTAIN THE NEXT RO.            02/17/81
C                                                                       02/17/81
   60 DB=DR                                                             02/17/81
      RB=RO                                                             02/17/81
      RO=(RA+RB)/2.0                                                    02/17/81
      GO TO 50                                                          02/17/81
C                                                                       02/17/81
C     RO HAS BEEN FOUND.                                                02/17/81
C                                                                       02/17/81
  110 DISTR=DIST(RO)                                                    02/17/81
      ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                        02/17/81
      SIGMAH=AHC*(DISTR+HC)**BHC                                        02/17/81
      SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                      02/17/81
      FREXP=-0.5*((P(RO)/SIGMAH)**2+(OZ/SIGMAV)**2)                     02/17/81
C                                                                       02/17/81
C     SINCE THE INTEGRAL .LT. F(RO)*(R2-R1) (THAT IS .LT. THE PEAK      02/17/81
C     INTEGRAND VALUE TIMES THE LENGTH OF THE INTEGRATION INTERVAL), AND 02/17/81
C     WE ONLY DESIRE AN ACCURACY OF TOLER, WE MAY RETURN IF THE LN OF   02/17/81
C     THIS UPPER LIMIT IS .LT. TOLER1 = LN(TOLER).                      02/17/81
C                                                                       02/17/81
      IF(FREXP+ALOG((R2-R1)/(SIGMAH*SIGMAV)) .LT. TOLER1) RETURN        02/17/81
      FRO=EXP(FREXP)/(SIGMAH*SIGMAV)                                    02/17/81
C                                                                       02/17/81
C     SINCE INTEGRATING FROM R1 TO R2 WILL GENERALLY BE QUITE EXPENSIVE 02/17/81
C     DUE TO THE LENGTH OF THE INTERVAL (R1,R2), AND SINCE THE NATURE   02/17/81
C     OF F IS SUCH THAT IT DECAYS EXPONENTIALLY AWAY FROM RO, IT IS     02/17/81
C     WORTH SHORTENING THE INTERVAL (R1,R2) AS MUCH AS POSSIBLE WITHOUT 02/17/81
C     CAUSING AN ERROR IN THE INTEGRATION OF MORE THAN TOLER/2.  THIS   02/17/81
C     PROCESS ALSO ELIMINATES THE POSSIBILITY OF EXPONENTIAL UNDERFLOW  02/17/81
C     OCCURRING WHEN TRYING TO EVALUATE THE INTEGRAND AT LARGE DISTANCES 02/17/81
C     FROM RO.                                                          02/17/81
C                                                                       02/17/81
C     USE THE BISECTION TECHNIQUE (WITH A MAXIMUM OF 15 TRIALS) STARTING 02/17/81
C     WITH THE POINTS RX (RX IS FIRST R1 AND THEN R2) AND RO TO FIND A  02/17/81
C     NEW RX SUCH THAT THE ELIMINATED PORTION OF THE INTEGRAL WILL BE   02/17/81
C     BOUNDED BY AN AREA .LT. TOLER/2.                                  02/17/81
C                                                                       02/17/81
C                                                                       02/17/81
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C       REFINE R1 TO ELIMINATE UNDERFLOW AND INCREASE EFFICIENCY.            0020890   02/17/81
C                                                                            0020900   02/17/81
        RX=R1                                                                0020910   02/17/81
        RA=R0                                                                0020920   02/17/81
        DISTR=DIST(R1)                                                       0020930   02/17/81
        ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                           0020940   02/17/81
        SIGMAH=AHC*(DISTR+HC)**BHC                                           0020950   02/17/81
        SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                         0020960   02/17/81
        FR1=0.0                                                              0020970   02/17/81
        ER=-0.5*((P(R1)/SIGMAH)**2+(DZ/SIGMAV)**2)                           0020980   02/17/81
        IF(ER .GT. TOLER3) FR1=EXP(ER)/(SIGMAH*SIGMAV)                       0020990   02/17/81
        IR=0                                                                 0021000   02/17/81
  121   R=(RA+R1)/2.0                                                        0021010   02/17/81
        IR=IR+1                                                              0021020   02/17/81
        DISTR=DIST(R)                                                        0021030   02/17/81
        ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                           0021040   02/17/81
        SIGMAH=AHC*(DISTR+HC)**BHC                                           0021050   02/17/81
        SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                         0021060   02/17/81
        FR=0.0                                                               0021070   02/17/81
        ER=-0.5*((P(R)/SIGMAH)**2+(DZ/SIGMAV)**2)                            0021080   02/17/81
        IF(ER .GT. TOLER3) FR=EXP(ER)/(SIGMAH*SIGMAV)                        0021090   02/17/81
        ER=(FR1+FR)*(R-RX)/2.0                                               0021100   02/17/81
        IF(ER .LE. TOLER2) R1=R                                              0021110   02/17/81
        IF(ER .GT. TOLER2) RA=R                                              0021120   02/17/81
        IF(IR .GE. 15 .OR. ABS(RA-R1) .LT. 1.0) GO TO 140                    0021130   02/17/81
        GO TO 121                                                            0021140   02/17/81
C                                                                            0021150   02/17/81
C       COMPUTE F AT THE NEW VALUE OF R1.                                    0021160   02/17/81
C                                                                            0021170   02/17/81
  140   FR=FR1                                                               0021180   02/17/81
        DISTR=DIST(R1)                                                       0021190   02/17/81
        ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                           0021200   02/17/81
        SIGMAH=AHC*(DISTR+HC)**BHC                                           0021210   02/17/81
        SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                         0021220   02/17/81
        FR1=EXP(-0.5*((P(R1)/SIGMAH)**2+(DZ/SIGMAV)**2))/(SIGMAH*SIGMAV)     0021230   02/17/81
C                                                                            0021240   02/17/81
C       REFINE R2 TO ELIMINATE UNDERFLOW AND IMPROVE EFFICIENCY.             0021250   02/17/81
C                                                                            0021260   02/17/81
        RX=R2                                                                0021270   02/17/81
        RA=R0                                                                0021280   02/17/81
        DISTR=DIST(R2)                                                       0021290   02/17/81
        ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                           0021300   02/17/81
        SIGMAH=AHC*(DISTR+HC)**BHC                                           0021310   02/17/81
        SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                         0021320   02/17/81
        FR2=0.0                                                              0021330   02/17/81
        ER=-0.5*((P(R2)/SIGMAH)**2+(DZ/SIGMAV)**2)                           0021340   02/17/81
        IF(ER .GT. TOLER3) FR2=EXP(ER)/(SIGMAH*SIGMAV)                       0021350   02/17/81
        IR=0                                                                 0021360   02/17/81
  151   R=(RA+R2)/2.0                                                        0021370   02/17/81
        IR=IR+1                                                              0021380   02/17/81
        DISTR=DIST(R)                                                        0021390   02/17/81
        ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                           0021400   02/17/81
        SIGMAH=AHC*(DISTR+HC)**BHC                                           0021410   02/17/81
        SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                         0021420   02/17/81
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      FR=0.0                                                         02/17/81
      ER=-0.5*((P(R)/SIGMAH)**2+(DZ/SIGMAV)**2)                      02/17/81
      IF(ER .GT. TOLER3) FR=EXP(FR)/(SIGMAH*SIGMAV)                  02/17/81
      ER=(FR2+FR)*(RX-R)/2.0                                         02/17/81
      IF(ER .LE. TOLER2) R2=R                                        02/17/81
      IF(ER .GT. TOLER2) RA=R                                        02/17/81
      IF(IR .GE. 15 .OR. ABS(RA-R2) .LT. 1.0) GO TO 160              02/17/81
      GO TO 151                                                      02/17/81
C                                                                    02/17/81
C                                                                    02/17/81
C     COMPUTE F AT THE NEW VALUE OF R2.                              02/17/81
C                                                                    02/17/81
  160 FR=FR2                                                         02/17/81
      DISTR=DIST(R2)                                                 02/17/81
      ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                     02/17/81
      SIGMAH=AHC*(DISTR+HC)**BHC                                     02/17/81
      SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(IC,CLASS)                   02/17/81
      FR1=EXP(-0.5*((P(R2)/SIGMAH)**2+(DZ/SIGMAV)**2))/(SIGMAH*SIGMAV) 02/17/81
C                                                                    02/17/81
      INTGRL=0.5*((RO-R1)*(FRO+FR1)+(R2-RO)*(FR2+FRO))               02/17/81
C                                                                    02/17/81
C                                                                    02/17/81
C     SINCE THE INTEGRAL IS .LT. THIS VALUE OF INTGRL, WE MAY RETURN IF 02/17/81
C     INTGRL IS .LT. TOLER.                                          02/17/81
C                                                                    02/17/81
      IF(INTGRL .LT. TOLER) RETURN                                   02/17/81
C                                                                    02/17/81
C     INTEGRATE F(R) FROM RA TO RB.  NOTE THAT F(R) IS INTEGRATED AS THE 02/17/81
C     SUM OF THE INTEGRAL FROM R1 TO RO AND THE INTEGRAL FROM RO TO R2. 02/17/81
C                                                                    02/17/81
      INTGRL=0.0                                                     02/17/81
      RA=R1                                                          02/17/81
      RB=RO                                                          02/17/81
      FR=FR1                                                         02/17/81
      FIRST=.TRUE.                                                   02/17/81
C                                                                    02/17/81
C     SET UP VARIABLES FOR COTE"S INTEGRATION (FIRST AND SIXTH ORDERS.) 02/17/81
C     DO NOT INTEGRATE IF THE UPPER BOUND OF THE INTEGRAL OVER THIS  02/17/81
C     INTERVAL IS .LT. TOLER2 = TOLER/2.                             02/17/81
C                                                                    02/17/81
  170 INTGRX=0.5*(RB-RA)*(FRO+FR)                                    02/17/81
      IF(INTGRX .LT. TOLER2) GO TO 221                               02/17/81
      ZR=ABS(RB-RA)/840.0                                            02/17/81
      IR=3                                                           02/17/81
      LAST=0.0                                                       02/17/81
      SUM=0.0                                                        02/17/81
      STEP=(RB-RA)/6.0                                               02/17/81
      STEP3=STEP*3.0                                                 02/17/81
      R=RA-STEP                                                      02/17/81
      DO 180 JR=1,7                                                  02/17/81
      R=R+STEP                                                       02/17/81
      DISTR=DIST(R)                                                  02/17/81
      ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                     02/17/81
      SIGMAH=AHC*(DISTR+HC)**BHC                                     02/17/81
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      SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                      0021970   02/17/81
      FR=EXP(-0.5*((P(R)/SIGMAH)**2+(DZ/SIGMAV)**2))/(SIGMAH*SIGMAV)    0021980   02/17/81
      LAST=LAST+FR*Z(JR)                                                0021990   02/17/81
      Y(JR)=FR                                                          0022000   02/17/81
      IF(JR .EQ. 1 .OR. JR .EQ. 7) FR=FR/2.0                            0022010   02/17/81
      SUM=SUM+FR                                                        0022020   02/17/81
  180 CONTINUE                                                          0022030   02/17/81
      LAST=LAST*ZR                                                      0022040   02/17/81
      LAST1=SUM*ZR*140.0                                                0022050   02/17/81
C                                                                       0022060   02/17/81
C     REPEAT COTE"S INTEGRATION UNTIL DESIRED ACCURACY.                 0022070   02/17/81
C                                                                       0022080   02/17/81
C                                                                       0022090   02/17/81
C     GENERATE NEXT SET OF COTE"S VARIABLES.                            0022100   02/17/81
  190 STEP2=STEP/2.0                                                    0022110   02/17/81
      DUMMY=Y(4)                                                        0022120   02/17/81
      Y(1)=Y(1)+DUMMY                                                   0022130   02/17/81
      Y(7)=Y(7)+DUMMY                                                   0022140   02/17/81
      DUMMY=Y(3)                                                        0022150   02/17/81
      Y(3)=Y(2)+Y(5)                                                    0022160   02/17/81
      Y(5)=Y(6)+DUMMY                                                   0022170   02/17/81
      IR=IR*2                                                           0022180   02/17/81
      DO 201 KR=1,3                                                     0022190   02/17/81
      R=RA+STEP2-STEP*KR                                                0022200   02/17/81
      DUMMY=0.0                                                         0022210   02/17/81
      DO 200 JR=KR,IR,3                                                 0022220   02/17/81
      R=R+STEP3                                                         0022230   02/17/81
      DISTR=DIST(R)                                                     0022240   02/17/81
      ID=INDEX(MIN1(101.0,(DISTR+VC)/100.0+1.0))                        0022250   02/17/81
      SIGMAH=AHC*(DISTR+HC)**BHC                                        0022260   02/17/81
      SIGMAV=AV(ID,CLASS)*(DISTR+VC)**BV(ID,CLASS)                      0022270   02/17/81
      FR=EXP(-0.5*((P(R)/SIGMAH)**2+(DZ/SIGMAV)**2))/(SIGMAH*SIGMAV)    0022280   02/17/81
      DUMMY=DUMMY+FR                                                    0022290   02/17/81
      SUM=SUM+FR                                                        0022300   02/17/81
  200 CONTINUE                                                          0022310   02/17/81
      Y(2*KR)=DUMMY                                                     0022320   02/17/81
  201 CONTINUE                                                          0022330   02/17/81
      ZR=ZR/2.0                                                         0022340   02/17/81
      INTGRX=ZR*(Z(1)*(Y(1)+Y(7))+Z(2)*(Y(2)+Y(6))+Z(3)*(Y(3)+Y(5))+    0022350   02/17/81
     -Z(4)*Y(4))                                                        0022360   02/17/81
C                                                                       0022370   02/17/81
C     TEST THE COTE"S SIXTH ORDER INTEGRAL FOR CONVERGENCE.  IF IT FAILS 0022380  02/17/81
C     TEST THE FIRST ORDER INTEGRAL. NOTE THAT FOR ASYMPTOTIC INTEGRANDS 0022390  02/17/81
C     THE LOWER ORDER COTE"S FORMULAS ARE OFTEN SUPERIOR.               0022400   02/17/81
C                                                                       0022410   02/17/81
      IF(ABS(LAST-INTGRX) .LE. TOLER2) GO TO 221                        0022420   02/17/81
      COTES1=SUM*ZR*140.0                                               0022430   02/17/81
      IF(ABS(LAST1-COTES1) .LE. TOLER2) GO TO 219                       0022440   02/17/81
      LAST=INTGRX                                                       0022450   02/17/81
      LAST1=COTES1                                                      0022460   02/17/81
      STEP=STEP2                                                        0022470   02/17/81
      STEP3=STEP*3.0                                                    0022480   02/17/81
      GO TO 190                                                         0022490   02/17/81
C                                                                       0022500   02/17/81
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 219  INTGRX=COTES1                                                    C022510   02/17/81
 221  INTGRL=INTGRL+INTGRX                                             C022520   02/17/81
      IF(.NOT.FIRST) RETURN                                            C022530   02/17/81
 222  FIRST=.FALSE.                                                    C022540   02/17/81
      RA=R0                                                            C022550   02/17/81
      RB=R2                                                            C022560   02/17/81
      FR=FR2                                                           C022570   02/17/81
      GO TO 170                                                        C022580   02/17/81
      END                                                              C022590   02/17/81
C*****************************************************************CCCC22600   02/12/81
C                                                                  CCCC22610   02/12/81
C            MOBILE1: MOBILE SOURCE EMISSIONS MODEL                CC0022620   02/12/81
C                                                                  CCC022630   02/12/81
C*****************************************************************CC0022640   02/12/81
C                                                                  CC0022650   02/12/81
C        DESIGNED AND WRITTEN BY LEWIS E. GUTHMAN                  CC0022660   02/12/81
C        JANUARY, 1978                                             CCC022670   02/12/81
C                                                                  CC0022680   02/12/81
C*****************************************************************CC0022690   02/12/81
C                                                                   C022700   02/12/81
C         ALL COMMENT REFERENCES TO TABLES AND APPENDICES ARE FOUND  C022710   02/12/81
C             IN THE EPA'S 'MOBILE SOURCE EMISSION FACTORS' FINAL    C022720   02/12/81
C             DOCUMENT, JANUARY 1978.                                C022730   02/12/81
C                                                                    C022740   02/12/81
C         ORIGINAL PROGRAM HAS BEEN REVISED BY RONALD L. HEISLER     C022750   02/12/81
C             OF THE VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANS.      C022760   02/12/81
C                                                                    C022770   02/12/81
C         ALL PROBLEMS WITH THE PROGRAM SHOULD BE REFERRED TO VIRGINIA. C022780 02/12/81
C                                                                    C022790   02/12/81
C             VIRGINIA DEPARTMENT OF HIGHWAYS AND TRANS.             C022800   02/12/81
C             1221 EAST BROAD ST.                                    C022810   02/12/81
C             RICHMOND, VA. 23219                                    C022820   02/12/81
C                                                                    C022830   02/12/81
C             TELEPHONE: 804-786-7265                                C022840   11/13/81
C                                                                   00022850   02/12/81
C                                                                   CC022860   02/12/81
C**MAIN: MAIN ROUTINE FOR CALCULATING MOBILE SOURCE EMISSION FACTORS CC022870  02/12/81
C                                                                   00022880   02/12/81
C                                                                   00022890   02/12/81
      SUBROUTINE EMISSN(IY,COMPMY)                                   C022900   11/13/81
      COMMON/LNKCOM/SPD,TEMP,PCCC,PCHS,PCCC,MS                       C022910   02/12/81
      INTEGER CY                                                     C022920   02/12/81
      REAL COMPMY(5)                                                 C022930   11/13/81
      REAL SPD(3), MS(5)                                             C022940   02/12/81
      REAL WTEDEF, LNKDTA(7)                                         C022950   02/12/81
      DATA INITFL / 1 /                                              C022960   02/12/81
C                                                                   CC022970   02/12/81
      EQUIVALENCE (SPD(1),LNKDTA(1))                                CC022980   02/12/81
C                                                                   00022990   02/12/81
      IF(INITFL .EQ. 0) GO TO 10                                     C023000   02/12/81
      INITFL = 0                                                     C023010   02/12/81
      CALL TFCALX                                                   CC023020   02/12/81
      CALL BEFGEN                                                    C023030   02/12/81
 10   CONTINUE                                                       C023040   02/12/81
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C                                                                  0023050    02/12/81
      CY = IY                                                      0023060    02/12/81
C                                                                  0023070    02/12/81
C*****   CY = CALENDAR YEAR                                        0023080    02/12/81
C*****   MS = MODAL SPLIT                                          0023090    02/12/81
C*****   COMPMY = MODAL EMISSION FACTORS                           0023100    11/13/81
C                                                                  0023110    02/12/81
      CALL EFCALX(CY,LNKDTA,MS,COMPMY)                             0023120    11/13/81
C                                                                  0023130    02/12/81
      RETURN                                                       0023140    02/12/81
      END                                                          0023150    02/12/81
      SUBROUTINE EFCALX(CY,LNKDTA,MS,COMPMY)                       0023160    11/13/81
C                                                                  0023170    06/07/78
C*****   COMPUTES IDLE & EXHAUST EMISSION FACTORS                  0023180    06/07/78
C                                                                  0023190
      COMMON/BEFCOM/BEF                                            0023200
      COMMON/MYMCOM/MYM,MYR,TF                                     0023210
C                                                                  0023220
      INTEGER MYP, CY, CYP                                         0023230    01/16/81
C                                                                  0023240
      REAL     BEF(20,26,5),        CFRET(20,5),                   0023250    01/15/81
     *                              COMPEF(20,5),                  0023260    01/16/81
     *         COMPMY(5),           LNKDTA(7),                     0023270    01/15/81
     *         MYM(20,5),           MYR(20,5),                     0023280    01/16/81
     *         MS(5),               PCCO,                          0023290    01/16/81
     *         PCCC,                PCHS,                          0023300
     *         SPD(3),              TEMP,                          0023310
     *         TF(20,5),            WTEDEF                         0023320    01/15/81
C                                                                  0023330
C**********************************************************************0023340
C                                                                  0023350
      SPD(1)  = LNKDTA(1)                                          0023360
      SPD(2)  = LNKDTA(2)                                          0023370
      SPD(3)  = LNKDTA(3)                                          0023380
      TEMP    = LNKDTA(4)                                          0023390
      PCCO    = LNKDTA(5)                                          0023400
      PCHS    = LNKDTA(6)                                          0023410
      PCCC    = LNKDTA(7)                                          0023420
C                                                                  0023430
C*****   COMPUTE CORRECTION FACTORS FOR SPEED, TEMP. & HOT/COLD - CFRET 0023440    12/11/80
C                                                                  0023450
            CALL BIGCFX(CY,TEMP,PCCO,PCHS,PCCC,SPD,CFRET)          0023460
C                                                                  0023470
      CYP = CY - 69                                                0023480
C                                                                  0023490
C     MS(M) IS THE MODAL SPLIT, BUT IT IS USED IN THIS MOBILE1 VERSION 0023500    11/13/81
C     AS AN INDICATOR.  WE WANT THE MODAL EMISSION FACTORS, NOT THE    0023510    11/13/81
C     COMPOSITE EMISSION FACTOR OF ALL THE MODES THAT IS COMPUTED IN   0023520    11/13/81
C     THE NORMAL MOBILE1 MODEL.                                    0023530    11/13/81
C                                                                  0023540    11/13/81
         DO 400 M = 1,5                                            0023550    06/07/78
               COMPMY(M) = 0.0                                     0023560    01/15/81
         IF(MS(M) .EQ. 0.0) GO TO 400                              0023570    11/13/81
            DO 300 I = 1,20                                        0023580
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               COMPEF(I,M) = (BEF(I,CYP,M) * CFRET(I,M)) * TF(I,M)        C1/15/81
               COMPMY(M) = COMPMY (M) + COMPEF(I,M)                        C1/15/81
300        CONTINUE
C       WTEDEF = WTEDEF + COMPMY(M) * MS(M)                                11/13/81
400     CONTINUE
C
      RETURN
      END
      SUBROUTINE BIGCFX(CY,T,PCCO,PCHS,PCCC,SPD,CFRET)
C
C*****   COMPUTES CORRECTION FACTORS FOR SPEED/TEMP./COLD START FACTORS   C6/07/78
C*****        AND HEAVY DUTY TRUCK SPEED CORRECTION FACTORS               06/07/78
C                                                                          C6/07/78
      COMMON/SP1COM/SP1,SPAV
      COMMON/MYMCOM/MYM,MYR,TF
C
      INTEGER INITFL, IEQNAR(45,3), HCINDX(45), CY, G(45,3)               C1/15/81
C***** IN G, 1ST INDEX IS MY, 2NC IS MODE                                 C1/16/81
C***** IN IEQNAR, 2ND IS MOCE                                             01/16/81
C
      REAL T, SPD(3), SPB(3), CFRET(20,5)                                 C1/15/81
      REAL D1(4), D2(4)                                                   01/15/81
      REAL MIDDLE,LEFT
      REAL SPBACK(18,3), SPBCT(18,3)                                      C1/15/81
      REAL ATR(4,2), BTR(4,2), CTR(4,2)                                   01/15/81
      REAL C(4,8)                                                         01/15/81
      REAL CUMMIL(2C,5), MYP(20,5), MYR(20,5), TF(20,5)                   C1/16/81
C
      DATA SPBACK / 54*C.0 /, SPBOT / 54*0.C /                            11/13/81
      DATA INITFL/1/
C
C*******************************************************************
C
C**COEFFICIENTS IN SPEED/TEMP/COLD START FACTOR: EQN,INDEX,POL.
C*****   SEE TABLE I-6, II-6 A & B IN MOBILE SOURCE EMISSION FACTORS       C6/07/78
      DATA C/
     *   5.654800, 5.654800, 5.546C00, 4.239100,
     *  -C.015965,-0.015965,-0.028945,-0.017522,
     * -14.74,-33.89, 11.29, -0.20,  9.62,  9.77,
     *   4.24,  6.99, 42.84, 25.26, 15.85,  4.12,
     *   5.76,  4.71,  2.34,  2.20, 57.57, 35.90,
     *  21.17,  3.96,  7.74,  6.70,  3.13,  2.12/                         01/15/81
C
C**COEFFICIENTS IN DENOMINATOR OF SPEED/TEMP/COLD START FACTOR
      DATA  D1/ 56.43, 36.4, 23.7, 6.98 /                                 C1/15/81
      DATA  D2/  7.59, 6.79, 3.14, 3.14 /                                 01/15/81
C
C**SPEED CORRECTION FACTOR INDEX: CAL. YR., REGION, MODE
      DATA G/15*2, 2, 2, 4, 5, 6, 7,14,17,17,18,18,18,18*18,
     *        15*2, 2, 2, 4, 5, 6, 7,14,17,17,18,18,18,18*18,
     *        28*14, 17*18 /                                              C1/16/81
C
C*****   INDEX FOR C, COEFFICIENTS IN SPEED/TEMP./COLD START              11/13/81
C*****         FACTORS.  TABLE INDEXES APPENDIX B TABLE.                  C6/07/78
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C                                                                       00024130   06/07/78
      DATA IEQNAR / 17*1, 7*2, 5*3, 16*4,                               00024140   01/15/81
     *              17*1, 7*2, 21*3,                                    00024150   01/15/81
     *              28*2, 17*3          /                               00024160   01/15/81
C                                                                       00024170
      DATA HDINDX / 19*1, 4*2, 5*3, 17*4 /                              00024180   01/15/81
C                                                                       00024190
C***********************************************************************00024200
C                                                                       00024210
      IF(INITFL.NE.1) GO TO 177                                         00024220
C HERE 1ST TIME                                                         00024230
      INITFL = 0                                                        00024240
      SPB(1) = 26.0                                                     00024250
      SPB(2) = 16.0                                                     00024260
      SPB(3) = 26.0                                                     00024270
      CALL SPFCLX(SPB,SPBOT)                                            00024280
C                                                                       00024290
      CALL GETCUM(CUMMIL)                                               00024300
C                                                                       00024310
C***********************************************************************00024320
C                                                                       00024330
177   CONTINUE                                                          00024340
C                                                                       00024350
      CALL SPFCLX(SPD,SPBACK)                                           00024360
C                                                                       00024370
C***********************************************************************00024380
C                                                                       00024390
      FCO = PCCO*.01                                                    00024400
      FHC = PCHS*.01                                                    00024410
      FCC = PCCC*.01                                                    00024420
C                                                                       00024430
C**FRACTION COLD OP(NON-CAT): FCO                                       00024440
C**FRACTION HOT START(CAT):  FHC                                        00024450
C**FRACTION COLD OP(CAT)  :   FCC                                       00024460
C**FRACTION HOT START(NON-CAT): FHO                                     00024470
      FHO = (FCC-FCO) + FHC                                             00024480
C                                                                       00024490
      DO 500 I = 1,20                                                   00024500
C                                                                       00024510
         MY = CY - (20-I)                                               00024520
         MYC = MY - 50                                                  00024530
         IAGE = CY - MY                                                 00024540
C                                                                       00024550
      DO 500 IMODE = 1,3                                                00024560   06/07/78
C                                                                       00024570
      IAGEM = IAGE                                                      00024580
         IF(IAGEM .EQ. 0) VMTAGE = 0.0                                  00024590   06/07/78
         IF(IAGEM .GT. 0) VMTAGE = CUMMIL(IAGEM,IMODE) * .0001          00024600   06/07/78
C                                                                       00024610
      IGX = G(MYC,IMODE)                                                00024620   01/15/81
C                                                                       00024630
      IEQN = IEQNAR(MYC,IMODE)                                          00024640   01/15/81
C                                                                       00024650
      FACL = FCO                                                        00024660
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      FACM = FHO                                                       00024670
      IF(IEQN .LE. 2) GO TO 888                                        00024680    01/16/81
      FACL = FCC                                                       00024690
      FACM = FHC                                                       00024700
888   FACR = (1.0 - FACL - FACM)                                       00024710
C                                                                      00024720
C**********************************************************************00024730
C*****   COMPUTE DENOMINATOR OF SPEED-TEMP.-HOT/COLD CORRECTION FACTOR 00024740    06/07/78
C                                                                      00024750
      DENOM = D1(IEQN) + D2(IEQN) * VMTAGE                             00024760    01/15/81
C                                                                      00024770
      LEFT = FACL * (EXP(C(IEQN,1) + T*C(IEQN,2)) + C(IEQN,3) +        00024780    01/15/81
     *        C(IEQN,4) * VMTAGE) * SPBACK(2,1) / SPBOT(2,1)           00024790    01/15/81
C                                                                      00024800
      MIDDLE = FACM * (C(IEQN,5) + C(IEQN,6) * VMTAGE) * SPBACK(IGX,3) 00024810    01/15/81
     *          / SPBOT(IGX,3)                                         00024820    01/15/81
C                                                                      00024830
      RIGHT = FACR * (C(IEQN,7) + C(IEQN,8) * VMTAGE) * SPBACK(IGX,2)  00024840    01/15/81
     *          / SPBOT(IGX,2)                                         00024850    01/15/81
C                                                                      00024860
      TOP = LEFT + MIDDLE + RIGHT                                      00024870
C                                                                      00024880
C*****   FACTOR = SPEED-TEMP.-HOT/COLD CORRECTION FACTOR               00024890    06/07/78
C                                                                      00024900
      FACTOR = TOP/DENOM                                               00024910
C                                                                      00024920
      CFRET(I,IMODE) = FACTOR                                          00024930    01/15/81
C                                                                      00024940
500   CONTINUE                                                         00024950
C                                                                      00024960
C********************************************************************** 00024970
C                                                                      00024980
C   FOR MODES 4 AND 5                                                  00024990
C                                                                      00025000
C*****   SPEED CORRECTION FACTOR COEFFICIENTS FOR GAS & DIESEL         00025010    06/07/78
C*****          HEAVY DUTY VEHICLES.  TABLES III-6 & IV-6.             00025020    06/07/78
      DATA ATR / 1.74, 1.54, 1.24, 0.62,                               00025030    01/15/81
     *           1.44, 1.44, 1.20, 1.44  /                             00025040    01/15/81
C                                                                      00025050
      DATA BTR / -.117, -.097, -.078, -.039,                           00025060    01/15/81
     *           -.092, -.092, -.072, -.088  /                         00025070    01/15/81
C                                                                      00025080
      DATA CTR / .0015, .0010, .0008, .0004,                           00025090    01/15/81
     *           .0010, .0010, .0006, .0008  /                         00025100    01/15/81
C                                                                      00025110
      SPAV = SPD(2)                                                    00025120    06/15/78
C                                                                      00025130
      DO 700 IMODE = 4,5                                               00025140
      IM = IMODE-3                                                     00025150
      IMY1 = CY-19                                                     00025160
C                                                                      00025170    01/16/81
              DO 700 IMY = IMY1,CY                                     00025180
      IMYP = IMY - 50                                                  00025190
      IF(IMYP.LT.1) IMYP=1                                             00025200
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C                                                                  00025210
            IX = 20-(CY-IMY)                                       00025220
C                                                                  00025230
      INDX = HDINDX(IMYP)                                          00025240   01/15/81
C                                                                  00025250
      CFRET(IX,IMODE) = EXP(ATR(INDX,IM) + BTR(INDX,IM) * SPAV +   00025260   01/15/81
     *                  CTR(INDX,IM) * SPAV * SPAV)                00025270   01/15/81
C                                                                  00025280
700   CONTINUE                                                     00025290
      RETURN                                                       00025300
      END                                                          00025310
      SUBROUTINE TFCALX                                            00025320
C                                                                  00025330
C*****   COMPUTES TRAVEL FRACTIONS                                 00025340   06/07/78
C                                                                  00025350   06/07/78
      COMMON/MYMCOM/MYM,MYR,TF                                     00025360
      REAL TFNORM(5), MYM(20,5), MYR(20,5), TF(20,5)               00025370   01/16/81
C                                                                  00025380
C*****   TFNORM = TOTAL MILES                                      00025390   06/07/78
C*****   TF = TRAVEL FRACTION                                      00025400   06/07/78
      DO 850 M = 1,5                                               00025410   06/07/78
            TFNORM(M) = 0.0                                        00025420
         CO 810 I = 1,20                                           00025430
810         TFNORM(M) = TFNORM(M) + MYM(I,M)*MYR(I,M)              00025440
         CO 820 I = 1,20                                           00025450
820         TF(21-I,M) = ( MYM(I,M)*MYR(I,M) )/TFNORM(M)           00025460
C                                                                  00025470
850   CONTINUE                                                     00025480
C                                                                  00025490
      RETURN                                                       00025500
      END                                                          00025510
      SUBROUTINE SPFCLX(SPARA,SPBACK)                              00025520
C                                                                  00025530   06/07/78
C*****   COMPUTES SPEED CORRECTION FACTORS AT SPEED S (SPARA)      00025540   06/07/78
C                                                                  00025550   06/07/78
      COMMON/ACOM/A                                                00025560
      REAL SPARA(3), SPBACK(18,3), A(6,18)                         00025570   01/15/81
      INTEGER NIND(18)                                             00025580   11/13/81
      DATA NIND / 0, 1, 0, 4*1, 6*0, 1, 2*0, 2*1 /                 00025590   11/13/81
C                                                                  00025600
C*****   A = SPEED CORRECTION FACTOR COEFFICIENTS.  FOUND IN APPENDIX B 00025610   06/07/78
C*****   NIND = INDICATES WHICH OF THE 18 GROUPS IN APPENDIX B WE  00025620   11/13/81
C*****           WANT TO USE (1=YES, 0=NO).                        00025630   11/13/81
C                                                                  00025640   11/13/81
      DO 20 IG = 2,18                                              00025650   11/13/81
      IF(NIND(IG) .EQ. 0) GO TO 20                                 00025660   11/13/81
            IGG = IG                                               00025670
          DO 10 IS = 1,3                                           00025680
              SUM = A(6,IGG)                                       00025690   01/15/81
              S = SPARA(IS)                                        00025700
            DO 5 I = 1,5                                           00025710
            SUM = SUM * S + A(6-I,IGG)                             00025720   01/15/81
5           CONTINUE                                               00025730
          SCF=EXP(SUM)                                             00025740
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            SPBACK(IG,IS) = SCF                                      00025750   01/15/81
 10         CONTINUE                                                 00025760
 20       CONTINUE                                                   00025770
       RETURN                                                        00025780
       END                                                           00025790
       SUBROUTINE BEFGEN                                             00025800
 C                                                                   00025810
 C*****   GENERATES EMISSION FACTORS (BASIC)                         00025820   06/07/78
 C                                                                   00025830   06/07/78
       COMMON/BEFCOM/BEF                                             00025840
       COMMON/BASECM/BASE3R                                          00025850
       COMMON/DELCOM/DEL3R                                           00025860
       COMMON/INDXCM/INDX3R                                          00025870
 C                                                                   00025880
       REAL BASE3R(10,5), DEL3R(10,5)                                00025890   01/16/81
       REAL CUMMIL(20,5), BEF(20,26,5)                               00025900   01/16/81
       INTEGER INDX3R(30,5)                                          00025910   01/16/81
 C                                                                   00025920
 C*******************************************************************00025930
 C                                                                   00025940
       CALL GETCUM(CUMMIL)                                           00025950
 C                                                                   00025960
 C**********************************************                     00025970
 C                                                                   00025980
       DO 100 IMODE=1,5                                              00025990   06/07/78
 C                                                                   00026000
       DO 100 ICY = 70,95                                            00026010
         IMY1=ICY-19                                                 00026020
         IMY13=ICY                                                   00026030
         ICYP=ICY-69                                                 00026040
 C                                                                   00026050
       DO 100 MY = IMY1,IMY13                                        00026060
         IAGE=ICY - MY                                               00026070
 C                                                                   00026080
         IA2=ICY-MY+1                                                00026090
         IA3=21-IA2                                                  00026100
 C                                                                   00026110
       INDX = 1                                                      00026120   02/06/81
       IF(MY .GE. 66) INDX = INDX3R(MY-65,IMODE)                     00026130   01/15/81
 C                                                                   00026140
       VMTAGE = CUMMIL(IAGE+1,IMODE)*.0001                           00026150
 C                                                                   00026160
       BEF(IA3,ICYP,IMODE) = BASE3R(INDX,IMODE)+VMTAGE*DEL3R(INDX,IMODE) 00026170   01/15/81
 C                                                                   00026180
 100   CONTINUE                                                      00026190
 C                                                                   00026200
       RETURN                                                        00026210
       END                                                           00026220
       SUBROUTINE GETCUM(CUMMIL)                                     00026230
 C                                                                   00026240
       COMMON/MYMCOM/MYMOUM,MYR,TF                                   00026250
 C                                                                   00026260
       REAL CUMMIL(20,5), MYM(20,5), MYMOUM(20,5), MYR(20,5)         00026270   01/16/81
       REAL TF(20,5), FRAC(4,5)                                      00026280   01/15/81
```

```
      DATA FRAC/
     *              .75 , .375 , .25 , .875 ,
     *              .75 , .375 , .25 , .875 ,
     *              .75 , .375 , .25 , .875 ,
     *              .50 , .25  , .50 , .75  ,
     *              .50 , .25  , .50 , .75     /
C
      DO 10 I1=1,5                                        C6/07/78
      DO 10 I2=1,20
   10 MYM(I2,I1) = MYMDUM(I2,I1)*1CCOCO.
C
      DO 100 IM=1,5                                       C6/07/78
         CUMMIL(1,IM)=MYM(1,IM)*FRAC(2,IM)
      DO 90 I=2,20
         SUM=0.
         SUM2=0.
         II=I-1
      DO 80 J=1,II
   80 SUM=SUM+MYM(J,IM)
         III=II-1
         IF(III.EQ.0) GO TO 74
      DO 70 L=1,III
   70 SUM2=SUM2+MYM(L,IM)
C
   74 CONTINUE
         T1=SUM+MYM(I,IM)*FRAC(2,IM)
         T2=SUM2+MYM(II,IM)*FRAC(4,IM)
         T1=T1*FRAC(1,IM)
         T2=T2*FRAC(3,IM)
         TSUM=T1+T2
   90 CUMMIL(I,IM)=TSUM
  100 CONTINUE
C
C
      RETURN
      END
      BLOCK DATA
C
      COMMON/ACOM/AIN2                                    01/15/81
C
      REAL AIN2(6,18)                                     C1/15/81
C*****   APPENDIX B-1 AND B-2 FOR ALL POLLUTANTS.         C6/C7/78
C
C
C**CO SPEED CORRECTION FACTOR COEFFICIENTS
      DATA AIN2/
     *  1.8198,-.25466,.015235,-.48740E-03,.75821F-05,-.44951E-07,
     *  2.3399,-.29698,.016C07,-.47740E-03,.70675F-05,-.40398E-07,
     *  2.4415,-.29147,.014296,-.38785E-03,.52978E-05,-.28244E-07,
     *  2.4655,-.30502,.016C5C,-.47397E-03,.699C8E-C5,-.39976E-C7,
     *  2.7780,-.31913,.015318,-.42233E-03,.58495F-05,-.31497E-07,
     *  2.7890,-.32711,.016294,-.46757E-03,.67191E-05,-.37440E-07,
     *  2.7074,-.33131,.017618,-.53858E-03,.81740F-C5,-.47780E-07,
     *  1.8692,-.27668,.017233,-.55828E-03,.87168E-C5,-.51698E-C7,
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     * 1.8213,-.27205,.017030,-.55202E-03,.86254E-05,-.51144E-07,    00026830
     * 2.0142,-.29519,.018635,-.62161E-03,.99366E-05,-.59978E-07,    00026840
     * 2.0453,-.31062,.020485,-.70853E-03,.11621E-04,-.71569E-07,    00026850
     * 2.3187,-.34115,.020945,-.66589E-03,.10223E-04,-.59827E-07,    00026860
     * 2.5752,-.32889,.018975,-.62826E-03,.10092E-04,-.61273E-07,    00026870
     * 2.6845,-.33282,.017628,-.52412E-03,.77222E-05,-.43702E-07,    00026880
     * 2.1549,-.32912,.021011,-.68906E-03,.10839E-04,-.64712E-07,    00026890
     * 2.5456,-.36285,.023277,-.81504E-03,.13623E-04,-.85591E-07,    00026900
     * 2.8393,-.36876,.021078,-.67644E-03,.10627E-04,-.63641E-07,    00026910
     * 2.4875,-.39156,.027072,-.97618E-03,.16527E-04,-1.0432E-07/    00026920
C                                                                    00026930
C                                                                    00026940
      COMMON/MYMCOM/MYM,MYR,TF                                       00026950
      COMMON/LNKCOM/SPD,TEMP,PCCC,PCHS,PCCC,MS                       00026960   06/21/78
C                                                                    00026970
      REAL SPD(3), MS(5), MYM(20,5), MYR(20,5), TF(20,5)             00026980   01/16/81
C                                                                    00026990
C*****    TABLES I-5, II-5A & B, III-5, IV-5 AND V-5.                00027000   06/07/78
C                                                                    00027010
C**ANNUAL AVERAGE MILEAGE ACCUMULATION (DIVIDED BY 100000)           00027020
      DATA MYM/                                                      00027030
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,   00027040
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,   00027050
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,   00027060
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,   00027070
     *0.157,0.157,0.141,0.126,0.113,0.102,0.094,0.086,0.080,0.075,   00027080
     *0.071,0.066,0.063,0.060,0.055,0.052,0.050,0.047,0.044,0.041,   00027090
     *0.190,0.190,0.179,0.165,0.150,0.135,0.120,0.106,0.095,0.086,   00027100
     *0.078,0.070,0.063,0.059,0.053,0.049,0.047,0.046,0.044,0.042,   00027110
     *0.736,0.736,0.699,0.633,0.566,0.500,0.456,0.412,0.382,0.360,   00027120
     *0.346,0.338,0.331,0.324,0.309,0.287,0.257,0.213,0.184,0.154/   00027130   01/16/81
C                                                                    00027140
C**VEHICLE REGISTRATION DISTRIBUTIONS                                00027150
      DATA MYR/                                                      00027160
     *0.075,0.107,0.107,0.106,0.100,0.092,0.085,0.077,0.066,0.052,   00027170
     *0.039,0.027,0.018,0.014,0.009,0.006,0.005,0.005,0.005,0.004,   00027180
     *0.061,0.095,0.094,0.103,0.083,0.076,0.076,0.063,0.054,0.043,   00027190
     *0.036,0.024,0.030,0.028,0.026,0.024,0.022,0.020,0.018,0.016,   00027200
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,   00027210
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,   00027220
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,   00027230
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,   00027240
     *0.077,0.135,0.134,0.131,0.099,0.090,0.082,0.062,0.045,0.033,   00027250
     *0.025,0.015,0.013,0.011,0.010,0.008,0.007,0.006,0.005,0.004/   00027260   01/16/81
C                                                                    00027270
C                                                                    00027280
      COMMON/INDXCM/INDX49                                           00027290   01/15/81
      COMMON/BASECM/BASE49                                           00027300   01/15/81
      COMMON/DELCOM/ DEL49                                           00027310   01/15/81
C                                                                    00027320
      INTEGER INDX49(30,5)                                           00027330   01/16/81
      REAL BASE49(10,5)                                              00027340   01/16/81
      REAL  DEL49(10,5)                                              00027350   01/16/81
C                                                                    00027360
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C       6 6 6 6 7 7 7 7 7 7 7 7 7 7 8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9    00027370
C       6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5    00027380
      DATA INDX49/                                                     00027390
     *1,1,2,2,2,2,2,2,2,2,3,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,    00027400
     *1,1,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,    00027410
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,    00027420
     *1,1,1,1,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,    00027430
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4/    00027440   01/16/81
C                                                                      00027450
C*****   TABLES I-1, II-1A, II-1B, III-1, IV-1 AND V-1.                00027460   06/07/78
C***EXHAUST EMISSION FACTOR INTERCEPT: 49 STATE                        00027470
      DATA BASE49/                                                     00027480
     * 68.30, 31.14, 18.60,  3.00,  1.40,  1.40, 0.0 , 0.0 , 0.0 , 0.0 ,00027490
     * 68.30, 31.14, 16.10, 14.50,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,00027500
     * 78.70, 32.40, 14.50,  3.87,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,00027510
     *272.90,212.70,218.80,191.90, 15.38, 15.38, 0.0 , 0.0 , 0.0 , 0.0 ,00027520
     * 35.10, 27.00, 27.00, 27.00, 27.00, 27.00, 0.0 , 0.0 , 0.0 , 0.0/ 00027530   01/16/81
C                                                                      00027540
C*****   TABLES I-1, II-1A, II-1B, III-1, IV-1 AND V-1.                00027550   06/07/78
C***EXHAUST EMISSION FACTOR SLOPE: 49 STATE                            00027560
      DATA DEL49/                                                      00027570
     * 3.06, 6.15, 2.80, 2.30, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,     00027580
     * 3.06, 6.15, 5.34, 5.34, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,     00027590
     * 3.06, 6.15, 5.34, 2.00, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,     00027600
     * 3.06, 6.15, 6.15, 6.15,10.54,10.54, 0.0 , 0.0 , 0.0 , 0.0 ,     00027610
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0/      00027620   01/16/81
C                                                                      00027630
      END                                                              00027640
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