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Carbon Monoxide Hot Spot Guidelines

Volume V: User's Manual for Intersection-Midblock Model

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Volume V: User's Manual for Intersection-Midblock Model

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ABSTRACT

As an aid to the identification and analysis of carbon monoxide hot spot locations the Intersection-Midblock Model (IMM) has been developed for the calculation of hourly carbon monoxide concentrations at user specified locations near streets or intersections. The IMM calculates carbon monoxide emissions due to vehicle cruising, acceleration-deceleration and idling by use of the EPA Modal Analysis Model. These emissions are then assigned to traffic links or portions of links based upon calculated intersection parameters such as cycle time, green time, queue length and delay time. After the emissions have been calculated and distributed among the individual lanes of each link, the EPA HIWAY Model is called to calculate carbon monoxide concentrations at each receptor location based upon input values of hourly wind speed, wind direction and atmospheric stability. If the street-building configuration, the wind speed and the atmospheric stability is such that a street canyon vortex will develop, the "Street Canyon Model" is used to calculate the concentration of a street oriented receptor.

This manual documents version 2 of the IMM (IMM-2). The principal changes from version 1 is the incorporation of the Motor Vehicle Emission Factors released in 1978 and the Modal Analysis Model coefficients and deterioration released in late 1977. Otherwise IMM-2 is substantially the same as the first version written by Victor Corbin and Michael T. Mills.

PREFACE

This document is the fifth in a series comprising the Carbon Monoxide Hot Spot Guidelines. The purpose of this series is to provide state and local agencies with a relatively simple yet accurate procedure for assessing carbon monoxide hot spot potential on urban street networks. Included in the Hot Spot Guideline series are:

Volume I:	Techniques
Volume II:	Rationale
Volume III:	Summary Workbook
Volume IV:	Documentation of Computer Programs to Generate Volume I Curves and Tables
Volume V:	Intersection-Midblock Model User's Manual
Volume VI:	Modified ISMAP User's Manual
Volume VII:	Example Applications at Waltham/Providence/Washington, D.C.

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SECTION 1

DESCRIPTION OF THE MODEL

INTRODUCTION

This manual describes the first of two computer programs developed by GCA/Technology Division for the analysis of carbon monoxide hot spots. The calculations performed by the Intersection-Midblock Model (IMM) are virtually identical to those used to generate the nomographs presented in the Carbon Monoxide Hot Spot Guidelines, Volumes I and II. While this model is not intended to replace these guidelines, it does provide added flexibility in carrying out the analysis. In the first place, it will enable the user to carry out hot spot screening and verification for a large number of receptor locations not necessarily identical to those assumed in the guidelines. The model can be used to calculate carbon monoxide concentrations at actual monitoring locations for comparison with measured values.

In the another manual of this series, Volume 6, a modified version of the Stanford Research Institute ISMAP Model (Indirect Source Model for Air Pollution)[3] is introduced and documented. This model extends the analysis procedures used in IMM to a large number of intersections, provides for left and right turning traffic and allows traffic volumes to be generated within the link network in response to trip attractions and productions within various traffic zones.

The IMM was developed for use on an IBM 370/158 computer but has also been successfully tested on the UNIVAC 1110 computer at Research Triangle Park, North Carolina and should run on other computer facilities with little or no modifications to the code. Job control language requirements for the IMM are quite simple in that only card input and line printer output are required in addition to a FORTRAN compilation step. Unit numbers are easily modified within the program to provide input from tape or disk.

The remainder of this section contains a discussion of the model formulation and presents some of the more important equations used in the program. A detailed listing and discussion of the program input cards is given in Section 2 followed in Section 3 by a description of each subroutine found in the program. A discussion of the format of the output is in Section 4. Section 5 contains a discussion of the steps required to use the APRAC Model for calculation of background at the model receptor locations. A program listing, flow charts and input-output for a sample case are given in Appendices A, B and C, respectively.

MODEL FORMULATION

Overview

The IMM is designed to estimate the impact of automobile traffic upon carbon monoxide concentrations at selected receptor locations. It is a combination of state-of-the-art emissions calculations (Modal Model),[4] dispersion modeling (HIWAY)[5] and the determination of signal cycle times, delays and queue lengths through application of traffic engineering principles. The model is able to handle receptors located near intersections, at midblock locations and along street canyons. In Figure 1 we present a generalized flow chart of the IMM. Complete flow charts for the main program and subroutines are given in Appendix B. The first part of IMM is devoted to the calculation of average queue lengths and delay times based upon input signalization characteristics, lane volumes and lane capacities. The queue length and delay times together with input cruise speeds, accelerations and decelerations are used by the Modal Model for calculation of cruise and excess emissions. These emissions are then corrected for vehicle population characteristics and assigned to traffic links as line source emission rates, which along with receptor locations and meteorological data are input to a dispersion model for calculation of hourly carbon monoxide concentrations.

The intersection serves as the primary focus for model input and intermediate calculations. As the model now stands, it has the capability of handling a network of up to two intersections, but that number may be easily increased by modification of the appropriate DIMENSION statements. Each intersection is currently restricted to having two signal phases. Although the number of allowable phases may be increased by changing the applicable DIMENSION and READ statements this action would only have the effect of allowing more than four links to approach an intersection since left turning phases are not explicitly treated within the program. In any case, for each of the two phases per intersection currently allowed in the program there are two intersection approaches.

Each combination of intersection, phase and approach uniquely defines a link approaching an intersection. In IMM a link is directional; consequently, a two-way street consists of two links. Input parameters for each of these links include traffic volume (vehicles/hour) for the link as a whole, west to east and south to north coordinates (km) of the endpoints of the link center lines, effective emission height (m) for the link, width of the link (m), number of lanes for the link (one, two or four), cruise speed on the link (mi/hr), deceleration into the queue (mi/hr/sec) (must be input as a negative acceleration), and acceleration out of the queue (mi/hr/sec). The link centerline endpoints need not be numbered in any particular order since the coordinates of the approximate center of the intersection (a set of variables input earlier) serve to fix the orientation of the link. An option is provided for consideration of the link as a cut section of a specified width (m). The fractional portion of the link emissions assigned to each lane is also input to the program, and used to input into the dispersion submodel; however, the volume of traffic per link used in the calculation of cycle time, green time, delay and queue length is calculated within the program simply by dividing

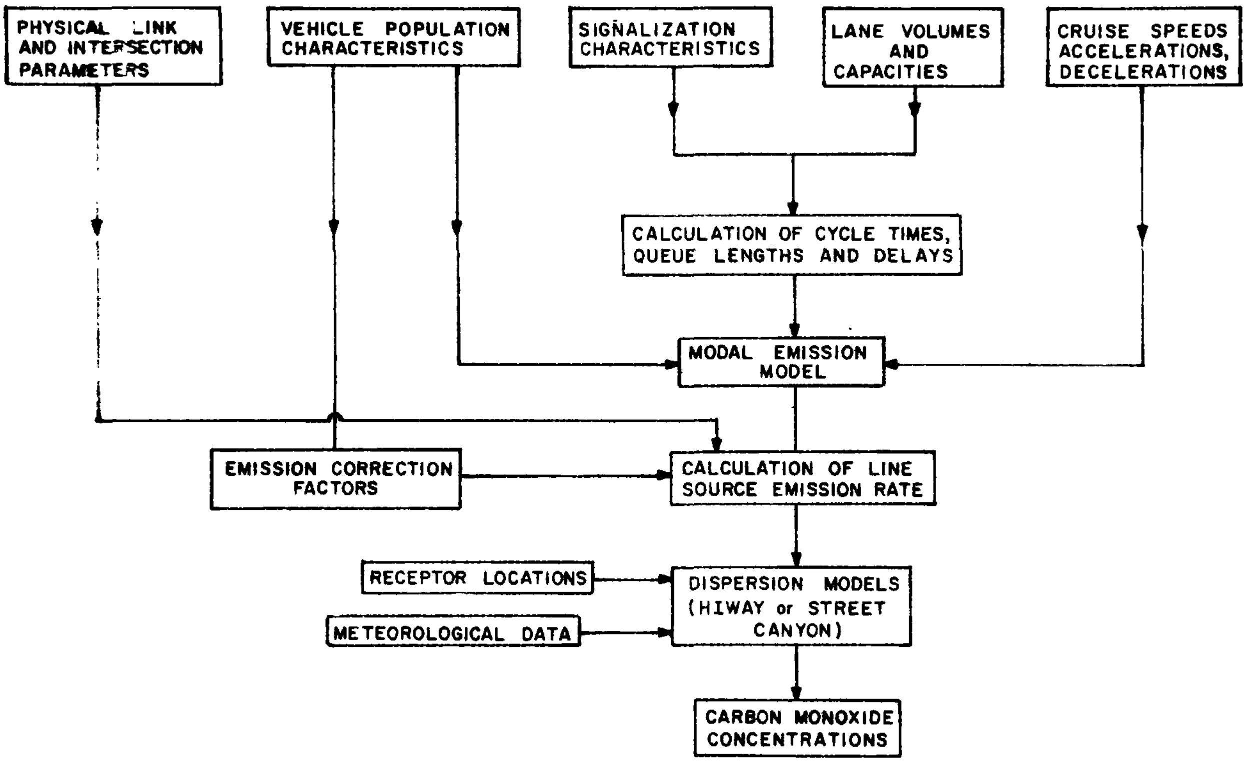

Figure 1. General flow diagram for the IMM.

the total link volume by the number of lanes. For specifying the fractional emissions for each lane within a link, the order of the lanes is from left to right when looking along the link from the first specified endpoint to the second. Finally, an hourly adjustment of the volume on all links is also input to the program.

Parameters for those links not approaching an intersection are input after all the data pertaining to the links that do approach an intersection are read into the program. The same parameters are input for these links except for the accelerations into and out of the queue. Also, only a single vehicle speed is specified. For these links the queue lengths and delay times are set equal to zero by the program. In setting up the coordinates for these two different types of links, the links approaching an intersection should terminate at the intersection stop line while the link not approaching the intersection (leaving the intersection) should originate at the terminus of the first link to ensure that the emissions from the actual intersection are realistic.

Emissions Calculations

After the link parameters have been input, the emissions for the three different modes (cruise, idle and acceleration-deceleration) are calculated. The cruise and acceleration-deceleration emissions are calculated by use of the EPA Modal Analysis Model,[4] parts of which have been incorporated as subroutines in the IMM. Idle emissions are calculated by use of the MOBILE1 program.[11]

In the Modal Analysis Model, instantaneous emission rate, $\dot{e}_A$ (g/vehicle/sec), during deceleration and acceleration modes is a function of speed, v (mi/hr), and acceleration or deceleration, a (mi/hr/sec):

$$\dot{e}_A (v,a) = b_1 + b_2 v + b_3 a + b_4 av + b_5 v^2 + b_6 a^2 + b_7 v^2 a + b_8 a^2 v + b_9 v^2 a^2 \quad (1)$$

During cruise mode it is a function of speed only:

$$\dot{e}_s (v,o) = b_{10} + b_{11} v + b_{12} v^2 \quad (2)$$

The modal emissions calculation is also designed to reflect a user-specified vehicle age mix. The effect of the vehicle age mix is to change the b_i coefficients of Equations (1) and (2).

The total acceleration-deceleration emissions per vehicle, E_{AD} (g/vehicle), corrected for the cruise emissions that would have occurred had the vehicle not stopped are:

$$E_{AD} = \int_{o}^{T_{IN}} \dot{e}_A \, (v_I(t),\ a_{IN}) \ dt + \int_{o}^{T_{OUT}} \dot{e}_A \, (v_O(t),\ a_{OUT}) \ dt \tag{3}$$

$$- \int_{o}^{T_{IN/2}} \dot{e}_s \, (v_I(t),\ o) \ dt - \int_{o}^{T_{OUT/2}} \dot{e}_s \, (v_O(t),\ o) \ dt$$

The variables, T_{IN} and T_{OUT}, are the times spent decelerating and accelerating, respectively, and are given by:

$$T_{IN} = \frac{V_{IN}}{-a_{IN}} \tag{4}$$

$$T_{OUT} = \frac{V_{OUT}}{a_{OUT}} \tag{5}$$

where V_{IN} = speed into the queue (mi/hr)

V_{OUT} = speed out of the queue (mi/hr)

a_{IN} = acceleration into the queue (mi/hr/sec) (must be negative to correspond to a deceleration)

a_{OUT} = acceleration out of the queue (mi/hr/sec) (must be positive)

The speed functions for deceleration, $v_I(t)$, and acceleration, $v_O(t)$, are given by:

$$v_I(t) = v_{IN} + a_{IN} t \tag{6}$$

$$v_O(t) = a_{OUT} \ t \tag{7}$$

Traffic Calculations

Once the cruise, idling and acceleration-deceleration emissions rates have been determined, the traffic calculations are carried out.* If the "free flow" program option has been specified by the user, no traffic calculations are performed and cruise emissions are assumed everywhere. If the signal for a particular intersection is fixed time, then the green time, G, and the cycle time, Cy, are specified by the user. For a demand actuated signal, IMM uses the following formula for Cy (sec):

$$Cy = \frac{(9\ Np + 5)}{1 - \sum_{\text{all } j} \text{Max}\ (V_{i,j}/Cs_{i,j})} \tag{8}$$

where Np is the number of amber intervals per signal cycle during which there is no simultaneous green phase, assumed to equal 2;

9 is a weighted lost time factor which assumes 3 seconds of amber time and 3 seconds of startup time;

$V_{i,j}$ is the volume in the i^{th} approach that moves during the j^{th} signal green phase;

$Cs_{i,j}$ is the capacity per hour of green to vehicles on the i^{th} approach moving during the j^{th} signal phase, assumed to be 1,800 vehicles per hour of green.

The green phase length, G_j, is a fraction of the signal cycle time minus the total amber time. A 3-second amber time is assumed for all green phases. The green phase length (sec) of phase j is calculated by the following equation:

$$G_j = Cy \frac{\text{Max}_i\ (V_{i,j}/Cs_{i,j})}{\sum_{\text{all } j}\ \text{Max}_i\ (V_{i,j}/Cs_{i,j})} - 3 \tag{9}$$

where $\text{Max}_i\ (V_{i,j}/Cs_{i,j})$ is the maximum V/Cs ratio on all approaches i moving on green phase j;

3 is an assumed 3-second amber time;

---

* The users should consult Volumes I and II for the Carbon Monoxide Hot Spot Guidelines for a more detailed discussion of the following formulae.

$\sum_{\text{all } i} \text{Max } (V_{i,j}/Cs_{i,j})$ is the sum of the V/Cs ratios that control the green phase durations.

The approach capacity, C_i, is found by multiplying the approach capacity service volume by the appropriate green to cycle ratio and summing for all applicable phases. The capacity of an approach is calculated as follows:

$$C_i = \sum_j Cs_{i,j}\, G_j/Cy \tag{10}$$

The proportion $P_{i,j}$ of vehicles which stop on phase j and approach i of the intersection is given by:

$$P_{i,j} = \frac{1 - \dfrac{G_j}{Cy}}{1 - \dfrac{V_{i,j}}{Cs_{i,j}}} \tag{11}$$

The number, $N_{i,j}$, of vehicles that must stop is then:

$$N_{i,j} = \frac{P_{i,j}\, V_{i,j}\, Cy}{3600} + \frac{V_{i,j}}{C_i - V_{i,j}} \tag{12}$$

The second term becomes important only as volume approaches capacity. It provides a measure of the "residue" of vehicles that may require more than one signal cycle to clear the intersection. The queue length, $Lq_{i,j}$, is calculated as:

$$Lq_{i,j} = 8N_{i,j} \tag{13}$$

where 8 is the distance in meters occupied by a queued vehicle. Finally, the idle delay time, $R_{qi,j}$ (sec), is calculated by:

$$R_{qi,j} = 0.5\, P_{i,j}\, (Cy - G_j) + \frac{3600\, V_{i,j}}{C_i(C_i - V_{i,j})} \tag{14}$$

At unsignalized intersections, the number of queued vehicles, $N_{i,2}$, is calculated simply by:

$$N_{i,2} = \frac{V_{i,2}}{C_i - V_{i,2}} \tag{15}$$

In the traffic calculations for the unsignalized intersection, queue length and delay time for the major street (j = 1) are assumed to be zero so that queues and traffic delays occur only on the minor street which is controlled by a stop sign. This distinction between the major and minor streets for an unsignalized intersection must be recognized when specifying link numbers and reading in link parameters.

The queue length for the minor street is calculated using Equation (13) and the idle time is:

$$R_{qi,2} = \frac{3600\ N_{i,2}}{C_i} \tag{16}$$

The calculation of approach capacity, C_i, for an unsignalized intersection differs from that of a signalized intersection. It is a function of the traffic flow on the cross street and the time gap between cross street vehicles that is acceptable to a driver wanting to cross or turn onto the cross street. In this case C_i is calculated from:

$$C_i = \frac{(V_m + V_n)\ e^{-T \frac{(V_m + V_n)}{3600}}}{1 - e^{-T \frac{(V_m + V_n)}{3600}}} \tag{17}$$

where V_m = volume on one direction of the major street (vehicles/hr);

V_n = volume on the other direction of the major street (vehicles/hr);

T = gap acceptance between cross street vehicles (sec)(assumed to be 4 seconds for the development of the guidelines but still classified as a model input parameter).

Based upon the traffic calculations just described, queue lengths are assigned to all links except those not approaching an intersection and those approaching unsignalized intersections. Corresponding to these queue lengths another set of links ("pseudolinks") are constructed. These pseudolinks lie along the actual link, have the same termination point (at the intersection end of the link) for their centerlines as the actual link and have a length equal to the calculated queue length. The only type of emissions assigned to the physical links are the cruise emissions E_c (g/m/sec) is calculated by:

$$E_c = \frac{\dot{e}_s \; V/3600}{v \; 1609.344/3600} \qquad (18)$$

where $\dot{e}_s$ = cruise emission rate for vehicle speed v given by Equation (2) (g/vehicle/sec)

V = link volume (vehicles/hr)

v = vehicle speed (mi/hr)

1609.344 = number of meters in a mile

3600 = number of seconds in an hour.

In Equation (18) the subscripts (i,j) have been dropped for simplicity. It should also be noted that emissions from both links and pseudolinks are allocated to the individual lanes of the link according to the fractional breakdown specified by the model input. The pseudolink emission rate, E_p (g/m/sec), is given by the following expression:*

$$E_p = \left[\frac{E_{AD} \; N}{Cy} + \frac{E_{ID} \; R_q V}{3600} - \frac{(\dot{e}_s) \; (T_{IN} + T_{OUT}) \; N}{Cy}\right] / Lq \qquad (19)$$

EMISSION CORRECTION

Since the emissions obtained from the Modal Analysis Model correspond to 1977 emission rates for light-duty vehicles, corrections must be made to account for the actual calendar year emission rates and the effects of vehicle mix, temperature, altitude, percent cold-start operation, percent hot-start operation, and state (California or other).

The MOBILE1[11] program is used to calculate correction factors to accomplish this correction. Since the MOBILE1 program is well described elsewhere, it is not presented here. The MOBILE1 program was modified to allow the correction of idle emissions; this modification is described in Volume IV of the Hot Spot Guidelines. The idle, cruise, deceleration, and acceleration emissions are calculated according to the following equations:

*If the acceleration deceleration emissions (i.e., the first term of equation 19) are greater than the idle emissions (i.e., the second term), the distance required by a vehicle to decelerate to a stop and then accelerate back to speed is used as the denominator in equation 19 rather than the actual queue length, Lq.

E_I^S = modified MOBILE1 composite idle emission factor for specified scenario S, (i.e., specified year cold starts and hot starts, temperature, vehicle mix, etc.)

$$E_C^S = E_C \frac{E_{FTP}^S}{F_{FTP}^{base}}$$

$$E_D^S = E_D \frac{E_{FTP}^S}{E_{FTP}^{base}}$$

$$E_A^S = E_A \frac{E_{FTP}^S}{E_{FTP}^{base}}$$

where E_{FTP}^{base} = the MOBILE1 composite emission estimate at the average speed for which E_C, E_A, or E_D were calculated and a stabilized 100 percent LDV vehicle mix for 1977 low altitude.

E_{FTP}^S = the MOBILE1 composite emission estimate for the specified scenario.

These equations multiply the Modal Model emission estimate by the ratio of two MOBILE1 emission estimates, one for the scenario of interest and one at the same conditions as the Modal Model.

Dispersion Calculations

The lane-by-lane emissions for each link are used by the EPA HIWAY Model[5] or the Street Canyon Model[6] for the calculation of hourly carbon monoxide concentrations at selected receptor locations.

Since the EPA HIWAY Model has been described in detail elsewhere,[5] we will present here only a brief discussion of its operational characteristics. The contribution of each small element of roadway to the concentration at a receptor location is calculated as a function of wind direction, windspeed and stability by use of the gaussian plume formula. The contribution of the entire length of the roadway is obtained by line integration of the expression. Since the HIWAY Model was designed originally to accept emissions input for an entire street (both directions of travel), it will accept only the following numbers of lanes: 1, 2, 4, etc. It also requires the input of a median strip width. Since we desired to input data to HIWAY (now a subroutine of the IMM) on a link-by-link basis the median width was set equal to zero, but the lane number restriction still remained so that three lanes per link could not be used. One way to circumbent this problem is to assume a fourth lane with zero volume and increase the link volume so that the link volume divided by the new number of lanes gives the same volume per lane. This will ensure that the queue lengths and delays will be calculated properly. Then the fraction of link emissions assigned to each lane must be multiplied by the ratio of the number of old lanes to the number of new lanes with the fraction assigned to the new lane equal to zero. This second step will ensure that the emissions per lane will not be affected. In any case, the user must remember to locate the link centerline at the physical centerline of the link. The HIWAY Model will assume that all lanes have the same width and that the width of each lane is equal to the link width divided by the number of lanes. Another complication that may arise is the fact that the IMM requires that each intersection have four approaches - two for each of the two phases. If an actual intersection has fewer than four approaches, then a dummy approach must be specified with a very small volume (i.e., some fraction of a vehicle per hour) or the program will end execution with an error.

The Street Canyon Model is used only for those link-receptor combinations for which the user has indicated a potential of a street canyon, and for which the following test in IMM holds on an hourly basis.[13]

$$H > 7\sqrt{\frac{KW}{u}} \tag{20}$$

where H = building height (m)

W = street canyon width (m)

u = windspeed (m/sec)

K = turbulent diffusivity (m^2/sec)

Values for K are 25.5, 5.5, 1.75, 1.0, 0.5 and 0.5 m^2/sec for atmospheric stabilities 1 through 6 (A through F), respectively. Once both of the conditions for a street canyon configuration are met, the concentration assigned to a street canyon receptor will depend upon which side of the street the receptor is located and the direction of the wind with respect to the street orientation. The assignment of a receptor to either the windward or leeward side of the street canyon is illustrated by Figures 2 and 3. For a receptor located at the leeward side of the street canyon the concentration, C_L (g/m^3), is given by:

$$C_L = \frac{KQ}{(u + 0.5)\left[(x^2 + z^2)^{\frac{1}{2}} + L_o\right]} \tag{21}$$

where K = empirical nondimensional constant (≃ 7)

Q = line source emission rate for a particular lane of a link (g/m/sec)

L_o = approximate vehicle size (≃ 2 m).

The windward concentration, C_W (g/m^3), is calculated by the following expression:

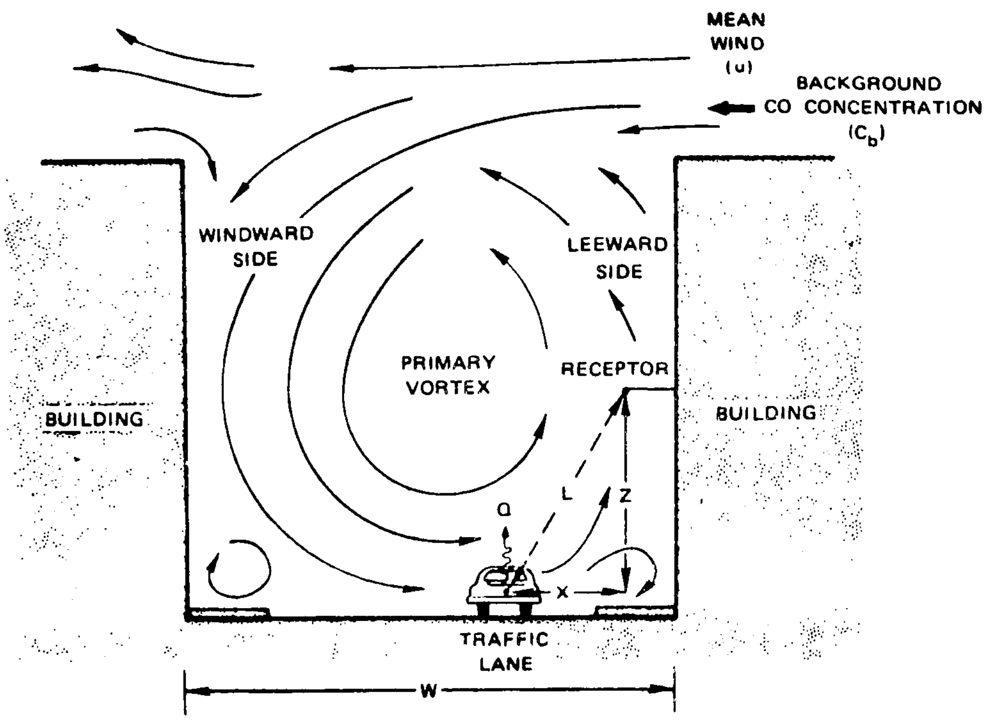

Figure 2. Schematic of cross-street circulation between buildings.

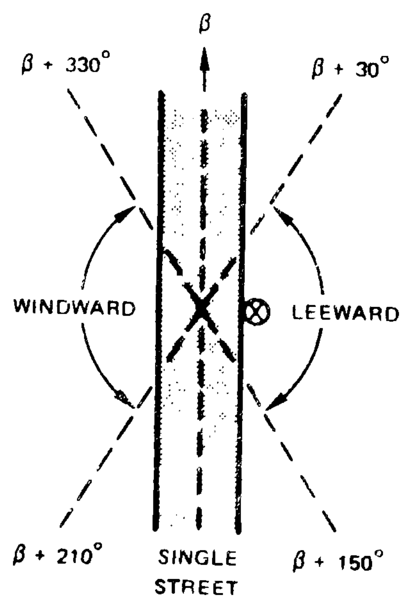

Figure 3. Specification for leeward and windward cases on the bases of receptor location, street orientation, and wind direction.

$$C_W = \frac{KQ\ (H-z)}{W\ (u + 0.5)\ H} \tag{22}$$

If the wind direction for a given hour does not place the receptor either on the windward or leeward side of the street canyon, then the concentration is calculated by:

$$C_I = \frac{1}{2}\ (C_L + C_W) \tag{23}$$

The lane emission rates for the pseudolink will be included in the line source emission rate, Q, for the street canyon configuration, if a perpendicular from the receptor to the physical link crosses the pseudolink. Otherwise, only physical link emission rates are included.

SECTION 2

PROGRAM INPUT DESCRIPTION

The IMM Model will currently accept data for two intersections with a maximum of two phases per intersection.* The program can handle up to four lanes of traffic on each link into or out of the intersection, and the CO concentration for up to 10 receptors can be calculated for 24 hourly observation times. All the above limitations can be removed by appropriately changing the dimensioned variables in the main program, and in subroutine PTHWY. In order to determine on which side of the street a receptor is located, and be consistent with the convention for lane assignment in "HIWAY," it has to be realized that the lane assignments are from left to right when looking from the initial link coordinates to the end coordinates of the link, and the side of the street is determined when looking from the initial link coordinates to the end link coordinates. This lane assignment scheme is shown in Figure 4. For consistency, it is desirable to have the second y coordinate greater than or equal to the first y coordinate.

When preparing the input to IMM, the first step should be the generation of a detailed drawing of the intersections to be modeled, and defining a localized coordinate system with one axis parallel to the north-south direction, and the second axis parallel to the east-west direction. Once the intersection has been defined, the traffic data should be obtained along with the speed limits for each traffic link, the typical deceleration into and acceleration out of the intersection. If the intersection has a fixed cycle time, the cycle time and green times for all phases of the intersection are required. The local meteorological data should be obtained for the days being modeled. It is desirable to have a local measurement of wind speed, direction and temperature if it is available; otherwise, the closest weather bureau station can be utilized. If the mixing height data is available, it should be utilized, but in general unless the mixing height is very low, (<100 m) the plume will not reach the mixing height in the region being studied. From the meteorological data, and solar elevation, the stability index for each hour must be calculated.

The input sequence of the data is given in Table 1. The first card contains the number of hours to be simulated up to 24, the number of receptors up to 10, and the number of intersections up to two. Only one case can be run at a time; that is, if there is more than one intersection, they are assumed to

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*The program assumes four links approach each intersection. Further, the total number of links leaving intersections must be equal to 8 + (Number of Intersections - 1)*6 - Number of Links Approaching an Intersection.

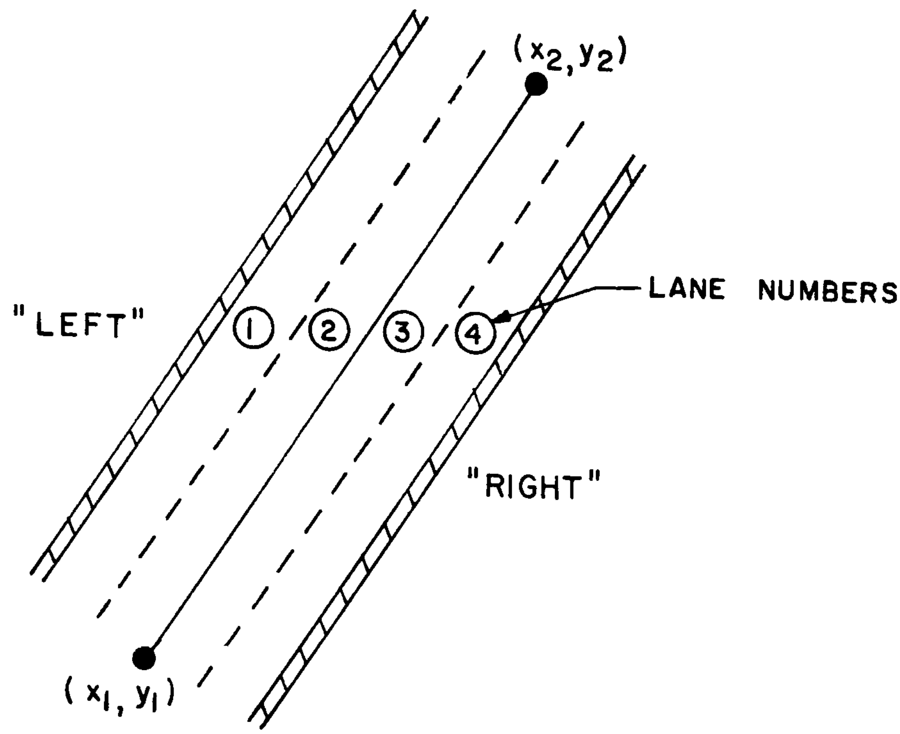

Figure 4. Lane assignment and left-right configuration used in the IMM.

TABLE 1. INPUT DATA TO INTERSECTION MIDBLOCK MODEL (IMM)

	Column	Format	Variable	Description	Units
	1-5	I5	IPRSW1	If 1 print intermediate emission data	
	6-10	I5	IPRSW2	If 1 print SOA, HOA, EMAD	
	11-15	I5	IPRSW3	If 1 read in observed queue and delay	
	16-20	I5	IPRSW4	If 1 print MOBILE1 emission estimates	
Card 1,	1-5	I5	NHOURS	Number of hours	
	6-10	I5	NREC	Number of receptors	
	11-15	I5	NINSEC	Number of intersections	
Card 2,	1-10	I10	IFREE(INS)	0 = free flow; 1 = interrupted flow	
	11-20	F10.0	XC(INS)	X Coordinate of the center of the intersection	km
	21-30	F10.0	YC(INS)	Y Coordinate of the center of the intersection	km
Card 3,	1-5	I5	ISIG(INS)	Type of intersection 0 = unsignalized 1 vehicle actuated 2 fixed time	
	6-10	I5	NPHASE(INS)	Number of phases	
	11-15	F5.0	GAP(INS)	Gap acceptance time for unsignalized intersection	seconds
Card 3a,	1-10	F10.0	CY(INS)	Cycle time for fixed time intersection	seconds
	11-20	F10.0	G(INS,J)	Green time for each phase – Approach 1	seconds
	21-30	F10.0	G(INS,J)	Green time for each phase – Approach 2	seconds
Card 4,	1-5	I5	LINK(I,J,INS)	Link identification code	
Card 5,	1-10	F10.0	X1(L)*	X Coordinate of the beginning of the link	km
	11-20	F10.0	Y1(L)*	Y Coordinate of the beginning of the link	km
	21-30	F10.0	X2(L)*	X Coordinate of end of the link	km
	31-40	F10.0	Y2(L)*	Y Coordinate of end of the link	km
	41-50	F10.0	WLINK(L)*	Width of the link	meters
	51-60	F10.0	HLINK(L)*	Emission height	meters
	61-70	F10.0	ICUT(L)*	0 = grade section 1 = cut section	
	71-75	F5.0	WIDTC(L)*	Width of top of cut section	meters
Card 6,	1-10	F10.0	CS(I,J,INS)	Lane capacity	vehicles/hour
	11-20	F10.0	VOL(I,J,INS)	Volume of link	vehicles/hour
	21-30	F10.0	VIN(I,J,INS)	Velocity into intersection	miles/hour
	31-40	F10.0	VOUT(I,J,INS)	Velocity out of intersection	miles/hour
	41-50	F10.0	AIN(I,J,INS)	Deceleration into intersection	miles/hour/sec
	51-60	F10.0	AOUT(I,J,INS)	Acceleration out of intersection	miles/hour/sec
Card 7,	1-10	F10.0	NL(L)	Number of lanes for the link	
	11-50	4F10.0	VFRACT(LANE,L)	Fraction of volume for each lane	
	Repeat cards 4 to 7 for each phase, and for the two approaches to the intersection				
	Repeat cards 2 to 7 for each intersection				
Card 8,	Same as card 5				

(continued)

TABLE 1 (continued).

	Column	Format	Variable	Description	Units
Card 9	1-10	F10.0	VOLP(L)	Volume	vehicles/hour
	11-20	F10.0	VP(L)	Velocity	miles/hour
Card 10,	Same as card 7				
	Repeat cards 8 to 10 for each link departing from the intersection				
Card 11,	1-10	F10.0	XX(IR)	X - Coordinate of receptor	km
	11-20	F10.0	YX(IR)	Y Coordinate of receptor	km
	21-30	F10.0	Z(IR)	Z - Coordinate of receptor	m
	31-40	I10	ISTR(IR)	1 = street canyon	
Card 11a,	1-5	I5	NLDUM	Number of links adjacent to street canyon	
	6-15	2I5	ISTLIN(IR,M)	Link adjacent to street canyon	
Card 11b,	1-10	F10.0	AST(IR)	Street heading from North	degrees
	11-20	F10.0	WST(IR)	Canyon width	meters
	21-30	F10.0	BUILDH(IR)	Building height	meters
	31-40	I10	IRSIDE(IR)	1 = Right side of street 2 = Left side of street	
				Repeat cards 11 to 11b from all receptors	
Card 12,	1-10	F10.0	THETA(K)	Wind direction	degrees
	11-20	F10.0	U(K)	Wind speed	meters/s
	21-30	F10.0	HL(K)	Height of mixing layer	meters
	31-40	I10	KST(K)	Stability code	
	41-50	F10.0	TEMPF(K)	Ambient temperature	°F
	51-60	F10.0	FHOT(K)	Percentage of hot starts	
	61-70	F10.0	FCOL(K)	Percentage of cold starts	
				Repeat card 12 for each hour of simulation	
Card 13,	1-80	7F10.0, F5.0	FAC(K)	Ratio of hourly volume to volume specified on card 6	
Card 14	1-5	I5	NYEAR†	Year being modeled	
	6-10	I5	IREG†	Region (1 = low, 2 = Calif., 3 high)	-
	11-20	F10.0	MS(1)†	Proportion of LDV	
	21-30	F10.0	MS(2)†	Proportion of LDT1	
	31-40	F10.0	MS(3)†	Proportion of LDT2	
	41-50	F10.0	MS(4)†	Proportion of HDV-G	
	51-60	F10.0	MS(5)†	Proportion of HDV-D	
	61-70	F10.0	MS(6)†	Proportion of MC	
Card 15	1-5	I5	ALHFLG†	Flag for optional data on card (1=YES,0=NO)	
	6-15	F10.0	AC†	Fracion of vehicles using air-conditioning	
	16-25	F10.0	XLOAD(1)†	Fraction of LDV with additional 500 lbs load	
	26-35	F10.0	XLOAD (2)†	Fraction of LDT1 with additional 500 lbs load	
	36-45	F10.0	XLOAD(3)†	Fraction of LDT2 with additional 500 lbs load	
	46-55	F10.0	TRAILR†	Fraction of LDV with 1000 lbs trailer	
	56-65	F10.0	ABSHUM†	Absolute humidity	gr/lb

(continued)

TABLE 1 (continued).

	Column	Format	Variable	Description	Units
Card 16	1-5	I5	TRKFLG[†]	Flag for optional data on card (1=YES,0=NO)	
	6-15	F10.0	HGHGT[†]	Vehicle weight, gas HDV	pounds
	16-25	F10.0	HDWGT[†]	Vehicle weight, diesel HDV	pounds
	26-35	F10.0	HGCID[†]	Displacement, gas HDV	$in.^3$
	36-45	F10.0	HDCID[†]	Displacement, diesel HDV	$in.^3$
Card 17	1-5	I5	IMFLG[†]	Flag for optional data on card (1=YES,0=NO)	
	6-10	I5	ICYIM[†]	Year of implementation of I/M	Last two digits
	11-15	I5	ISTRIN[†]	I/M stringency	Percentage
	16-20	I5	IMTFLG[†]	Mechanics training	1=Yes,0=No
	21-25	I5	MODYR1[†]	First model year I/M applies to	Last two digits
	26-30	I5	MODYR2[†]	Last model year I/M applies to	Last two digits
	If IPRSW3 1, repeat Card 18 for each approach I during phase J at intersection INS. Otherwise omit.				
Card 18	1-10	F10.0	QLENGTH (I,J,INS)	Queue length	meters
	11-20	F10.0	DELAY (I,J,INS)	Delay	seconds

[*] See HIWAY for more detail.

[†] See MOBILE1 for more detail.

be linked, and all traffic link emissions are utilized to calculate the receptor concentrations. If one wished to analyze a single intersection for a variety of different design characteristics, the model would have to be run in an iterative fashion.

The second input card specifies whether the intersection is signalized, and approximate coordinates for the center of the intersection. These coordinates need not be exact since they are only used to determine which end of the link is closest to the intersection.

The third input card requires the data to determine the type of signalization, the number of phases for the intersection, and the gap acceptance time of the intersection if it is unsignalized. For fixed cycle time intersections, card 3A contains the cycle time and the green time for each phase. If the intersection is unsignalized, or demand actuated, the card is omitted. For unsignalized intersections, the first phase is considered the main street and has the right of way, thus experiencing no queues or delays. It should be pointed out that the unsignalized intersection refer only to two-way stops, not four-way stops.

Cards 4 to 7 detail all the parameters that define each traffic link approaching the intersection. Card 4 contains the link number, which should start with one, and be incremented for each successive link. On Card 5, the parameters defining the physical link are entered: the beginning and end points of the link, the width of the link, the emission height, whether the link is at grade or a cut section, and the width of the top of the cut section. If a cut section is specified, no receptors may be located within the cut (see Reference 5). Card 6 contains the average lane capacity for all lanes in the link, the volume for the link, the velocity into and out of the intersection, and the deceleration and acceleration at the intersection. Card 7 contains the number of lanes, and the fractional volume per lane.

The input stream requires that all links approaching an intersection be read before data for another intersection is read in. Additionally, the two approaches for each phase at an intersection must be read before the data for the next phase are read.

After all links approaching the intersections have been read, the remaining links going away from the intersections are read in. Card 8 specifies the physical parameters of the link, and the input format is the same as Card 5. In defining the length of the links, links approaching the intersection should terminate at the curb of the crossing street, and the links going away from the intersection should originate at the end point of the approaching link.* In this way cruise emissions are emitted from the center of the intersection. The next card is Card 9 and contains the link volume and speed limit for the

*The links need not necessarily be connected. While a standard intersection should be setup as described above, the links need not be connected and can be located anywhere. In this manner, more complex configuration can be modeled.

link. Card 10 contains the number of lanes and the fractional volume per lane. Cards 8 to 10 are read for each link going away from the intersection.

When all the link data have been read, the receptor data are read in. Card 11 contains the coordinates of the receptor and a code signifying whether the site has the potential of developing a street canyon vortex. If the site is a potential street canyon site, two additional data cards are required. Card 11a specifies the number of physical links adjacent to the receptor and the link identification number for those links. Card 11b tabulates the street heading, the canyon width, the building height and a code to signify the side of the street the receptor is on when looking down the street along the street heading. The street heading can refer to either direction; it is only important that the street heading and variable IRSIDE be consistent.

When all receptors have been defined, the meteorological data are read for each hour of the simulation. The input data for Card 12 contains the wind direction, windspeed, height of mixing layer, stability index, temperature, fraction of hot starts and fraction of cold starts. The fraction hot/cold starts is required to calculate the correction factor to the CO concentration.

After the meteorological data have been read, the next set of data cards contains the fraction of the volume for each link that is to be used for each hour. The cases that have been run with IMM have put the average daily traffic (ADT) for the link volume, and on Card 13 the fraction of ADT that occurs in each hour is tabulated. In other words, the link volumes that were input on Card 6 are distributed on an hourly basis using the fraction input on Card 13; these fractions apply to all links.

In order to correct the CO emissions for the year being modeled, the following data are required: (1) year being modeled, (2) the region, and (3) distribution of vehicles as light-duty, light-duty trucks, heavy-duty gasoline powered trucks and heavy-duty diesel powered trucks. These data appear on Card 14.

Cards 15, 16, and 17 describe supplemental information for correcting the emissions estimates. They are identical to the factors used in MOBILE1. Before using Card 17 one should verify that the most recent version of the I/M credits are implemented in the program.

Card 18 is used to input observed queue lengths and delay, thereby overriding the traffic models calculations.

The program was designed to be applied to the analysis of one or two intersections. However, it can handle any configuration that can be adapted to the above input format. For example, since the program expects four approaching links per intersection, the analysis of an intersection of two one-way streets can be accommodated by entering two dummy approaching links with volumes of zero. T-intersections can be handled in a similar manner. Freeway locations are handled in a similar manner, that is, a dummy intersection is setup with zero cross volumes. The links departing from the intersection can then be used for other freeway segments located elsewhere. The flag IFREE should be set equal to 0 so that the emissions of the pseudolink are ignored (i.e., only cruise emissions are calculated.) In this manner, a complex network of two intersections, an interchange between two freeways, and several on-off ramps were analyzed by the author with only two executions of IMM.

IMM is not well suited to analyze a single line source. Such situations will, in most cases, be more easily handled by running MOBILE1 and HIWAY separately.

SECTION 3

SUBROUTINE DESCRIPTION

SUBROUTINE ACDC

The purpose of this subroutine is to calculate the total emissions of CO by a vehicle accelerating from stop to a terminal velocity at a constant rate. Alternatively, the emissions generated by decelrating from a specific speed to stop at a fixed rate can be determined. The integrated Model Model equtions were utilized to calculate the total CO emission for the acceleration or deceleration mode.

SUBROUTINE CRUZ

This subroutine utilizes the Modal Model emission coefficients to calculate the CO emission for vehicles traveling at a fixed rate of speed.

SUBROUTINE DECIDE

The purpose of this subroutine is to determine if a receptor is adjacent to a queue at a signalized intersection when the street canyon effect has developed. If the queue is not adjacent to the receptor, it is not included in the determination of the CO concentration at the receptor.

SUBROUTINE INITMM

This subroutine utilizes the composite vehicle age and mileage distribution calcualted in SUP8 to calcualte the vehicle distribution in the 20 modal model vehicle groupings. It also sets up the array of modal model coefficients.

SUBROUTINE PTHWY

This subroutine is basically the model "HIWAY" where all the input data is transmitted through the subroutine argument list. All subroutines associated with "HIWAY" have not been altered, and a complete description of the model can be found in Reference 1. This subroutine calls DBTLNE, DBTRCX, and DBTSIG.

SUBROUTINE SUP8

This subroutine calculates the average driving cycle emission factors and idle emission factors based on the parameters supplied to it. It, in turn, calls subrotuine OUTPUT, EFCALX, BIGCDX, INITEX, TFCALX, SPFCLX, BEFGEN, GETCUM, EFALTX, CCEVAX, LDVIMX, ALUH, TRKOPC.

SUBROUTINE STREET

This subroutine utilizes the "Street Canyon" model to determine the CO concentration when a street canyon vortex develops at a monitor site. The leeward and windward CO values are calculated, and the appropriate value is returned to the calling program, depending on the angle between the wind direction and the street heading.

SUBROUTINE TRAFIC

Subroutine TRAFIC calculates the cycle and green times for demand actuated signalized intersections. The cycle time and green times for signalized intersections and the gap acceptance time for unsignalized intersection are then utilized to calculate the queue lengths and delay times for all phases of the intersection.

SECTION 4

DESCRIPTION OF OUTPUT

The output of IMM consists of three sections:

- a description of input data
- intermediate calculations of emission flux on each link
- the resulting concentrations at each receptor, with the contribution from each link.

A sample output listing is shown in Appendix C. The sample output listing and description of it below corresponds to the output when IPRSW1 equals 1. If this equals zero, most of the intermediate data is not printed.

INPUT DATA

The first part of this section of the output lists the number of hours, receptors, and intersections. Then, for each intersection, the signal characteristics and intersection coordinates are printed. The input data for each link approaching this intersection is printed. After data on all the intersections have been printed, the input data for all the links not approaching an intersection is printed. The program then prints out the total number of actual links (i.e., not including pseudolinks) in the input stream.

The next part of the output is a listing of the coordinates of each receptor in the input stream. If the receptor has been flagged by the user as having street canyon potential, the additional input data necessary for the street canyon calculation is printed. After the data on each receptor, the meteorological data for each hour is printed. In addition, since hot and cold starts and temperature are input on an hourly basis, this data is also printed in this section.

The last part of the input data that is printed is the hourly traffic volume ratios and the emission correction factor data. The year, region, and modal split are always printed. If any of the supplemental corrections are indicated (i.e., ALHFLG, TRKFLG, or IMFLG equal 1), the corresponding input data is also printed.

INTERMEDIATE CALCULATIONS

The next section of output is concerned with the emission calculation. First, the idle emission factor calculated by the program is printed. Then the deceleration, acceleration, and cruise emission factors are printed for each link approaching an intersection. Next, the cruise emission factors for links not approaching an intersection are printed.

The next part of the output shows the calculations from subroutine TRAFFIC. For each link approaching an intersection, the following information is presented: approach, phase, and intersection index numbers, volume, capacity, signal code number, queue length in meters, delay time in seconds, number of signal phases, gap acceptance time for unsignalized intersections, link number, a flag NQND (1 meaning no queue, no delay), the signal cycle time, and the green time.

The final part of this segment of the output lists the emission rates for each link and pseudolink.

CONCENTRATIONS

The final segment of the output lists the concentrations at each receptor and the contribution from each link. First, for each link, its contribution to each receptor is printed. If a link has a potential street canyon receptor associated with it and a street canyon circulation does develop, the program prints out certain additional information.

First, it prints the horizontal distance between the center of the left-most lane and the right-hand side of the street canyon (XLL) and the angle between the link and a line constructed between the initial coordinates of the link and the receptor (THETPP). If the link is a pseudolink, the results of subroutine DECIDE are printed (IANS equal to 1 means the pseudolink is next to the receptor). Next, XLL is printed for every lane in the link. Finally, the results of subroutine street are printed. The concentration is in micrograms per cubic meter.

The last section of the output summarizes the concentrations for the hour at each receptor. The total concentration is the sum of the contributions from each link. Where the street canyon concentration was calculated from any of the links at a receptor, the street canyon concentration replaced the concentration calculated by HIWAY. Thus the total concentration is the sum of the contributions from all the links, calculated by either the HIWAY or street canyon models.

SECTION 5

USE OF THE INTERSECTION-MIDBLOCK MODEL (IMM) IN CONJUNCTION WITH APRAC-1A OR APRAC-2

Since the IMM will handle no more than two intersections, the concentrations calculated for the model receptor locations will certainly not reflect the carbon monoxide contributions from the rest of the urban area. If application of the model shows that concentrations close to the standard might be expected, then some means must be found to include the remaining links of the traffic network in the analysis. For those receptors located quite close to roadways or intersections the contribution of other link emissions to the carbon monoxide concentration is often small in comparison to the contribution of the roadway or intersection in question. On the other hand, for those receptors not immediately adjacent to the roadway or intersection, this contribution can become a much greater fraction of the total concentration, especially in a large urban area and when a low mixing prevails for an extended period of time.

One method to obtain quantitative estimates of the contributions of links not included in the IMM is by use of the APRAC-1A[7-10] or APRAC-2[12] computer models, which are designed for the prediction of hourly CO concentrations at specific receptor locations based upon traffic link emissions and meteorological data. The concentrations contribution at a particular receptor location from links other than the receptor street is calculated by means of a receptor oriented Gaussian plume model. For a given hour the model sets up a series of area sources upwind of the receptor point. Each of these area sources is assigned an emission strength based upon the link elements contained within each. The vertical dispersion of the CO plume occurring between the area source and receptor will depend upon a vertical dispersion parameter, which is in turn a function of windspeed, cloud cover, and time of day. The dilution factor of CO along the axis of the plume is proportional to the windspeed.

For the most part, the differences between APRAC-1A and APRAC-2 are insignificant when the models are used to estimate the intraurban background or mesoscale component. Most users will find APRAC-1A preferable in that it costs one-quarter to one-half as much as APRAC-2 to execute. The principal differences between the models and their importance in the application considered here are reviewed below:

- <u>Emissions Calculations</u> - In the APRAC-1A program emissions, E, are parameterized simply in the form of an emission factor power law as:

$$E = \alpha S^{-\beta}$$

where E = emission factor (gm/veh/mi)

α, β = average traffic speed (mi/hr)

The speed S is available for the emission factor calculation since each link in the data set is characterized by one of eight speed classes.

This formulation, compared to APRAC-2 is very inexpensive in terms of computer time. One minor complication is that the α and β constants must be calcualted for the emission characteristics of the vehicle population. This implies that only one value of cold starts and the other emission parameters are applied universally. A different year or time period would require new constants.

APRAC-2, on the other hand, explicitly calculates the emission factors according to Supplement 5 of AP-42. Different cold starts proportions can be applied to separate locations in a region and different time periods. A unique speed on each link can be input or speed can be calculated using a capacity restraint model. Consequently, APRAC-2 can calculate emissions with much greater sensitivity. The effect of such an enhancement on the calculation of the mesoscale component is unknown. (IMM, of course, is sensitive to these parameters and they are considered in the calculation of the microscale component.) APRAC-2 can be updated to reflect the new motor vehicle emission factors.[15] Although this modification has been performed, no documentation is currently published.

- Multiple Wind Field - APRAC-2 can accommodate wind measurements from multiple locations in the regions; unique values of speed and directions are then interpolated for each receptor. Where such data are available and show significant variation, the use of APRAC-2 should be considered.

- Local Source Models - APRAC-1A and APRAC-2 provide for the use of a street canyon submodel; APRAC-2 also provides for the use of an intersection submodel. Since IMM already treats these situations, these options should not be used again when APRAC is used to calculate the mesoscale component.

- Dispersion Model Options - The following options are available to the user of the APRAC-1A model:

  - Synoptic Calculation - Source receptor relationships are recalculated for each new hour of meteorological data. This option should be used if the program is being run to simulate only a limited number of hours (e.g., 24 hours).

- Climatological Calculation - Source receptor relationships are calculated at the beginning of the program for a wide range of meteorological configurations and written on a direct access device. The appropriate normalized concentrations for each source-receptor pair are then reread for the meteorological configuration which prevails at a given hour. The climatological option should be used for the simulation of a large number of hours. The final decision as to whether the synoptic or climatological options should be used must also depend upon the relative cost of CPU time and direct access I/O at the facility where the model is being run.

- Grid Point Calculation - Carbon monoxide concentrations are calculated at up to 625 receptor locations for a specified hour of the day. This option would not be especially useful in conjunction with the application of the IMM since the user would be more interested in the concentration at a small number of receptors for more than a single hour.

The APRAC-2 model has retained these options; however, their use is implicit depending on the input data supplied to APRAC-2. APRAC-2 limits a user to 10 receptors for a 24-hour execution and one receptor for a multiday execution.

• Traffic Volume Data - The basic traffic input for the APRAC-1A model is the number of vehicles per day for an array of links whose end point coordinates are specified on a rectangular system in units of 0.01 miles. To account for the curvature of a particular link, the actual length of the roadway between the end point is input. Each link is also assigned an appropriate speed classification. Nonlink traffic volumes may be assigned to grid squares superimposed upon the traffic network. The daily traffic flow volume is apportioned for each hour of the day according to hourly traffic flow distributions specific to weekdays, Saturdays, and Sundays. There is also the option in the program of selecting a given hour of the day as a peak hour.

APRAC-2 treats link-based traffic data in a similar manner. In addition, APRAC-2 has an option for accepting FHWA type binary link file via a preprocessor. Nonlink traffic volume can be assigned the same way as APRAC-1A or can automatically be computed by the model. Daily traffic flow is apportioned for each hour according to diurnal distributions as in APRAC-1A. However, instead of diurnal factors for five facility types as in APRAC-1A, APRAC-2 requires diurnal distributions for two facility types, for two directions, for five locales (i.e., CBD, commercial, residential, industrial and rural) - a total of 20. There is no peak-hour factor.

Once the IMM has been run for a group of selected receptor locations for a particular set of hours, the APRAC should run for the same set of receptor and hours and the APRAC mesoscale concentrations added to the microscale concentrations calculated by the IMM. The user should make sure that the links included in the IMM simulation are not used for the APRAC-1A network. In practice, it would be better to run the APRAC before the IMM is run so that stability classes calculated by APRAC could be input to the IMM.

SECTION 6

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APPENDIX A

PROGRAM LISTING OF INTERSECTION MIDBLOCK MODEL

```
C           DATA SET PTIMM3     AT LEVEL 007 AS OF 06/07/78
C***  INTERSECTION MIDBLOCK MODEL
C*******************
C*******************
C
C     VERSION 2 JANUARY 1978
C        MODIFIED BY ADDITION OF 1975 MODAL MODEL COEFFICIENTS
C        WITH DETERIORATION TO JULY 1977
C        AND EMISSION CORRECTION ACCORDING TO SUPPLEMENT 8
C*******************
C
C     GCA/TECHNOLOGY DIVISION
C     BURLINGTON ROAD
C     BEDFORD, MASSACHUSETTS
C     (617) 275-9000
C
C     VERSION 1 WRITTEN BY DR. R. PATTERSON AND DR. M. MILLS
C     VERSION 2 PREPARED BY FRANK BENESH
C     FOR QUESTIONS, CALL F. BENESH OR VICTOR CORBIN
C
C     PREPARED UNDER CONTRACT FOR U.S. E.P.A.
C     GEORGE SCHEWE PROJECT OFFICER
C     SOURCE RECEPTOR ANALYSIS BRANCH
C     OFFICE OF AIR QUALITY PLANNING AND STANDARDS
C     RESEARCH TRIANGLE PARK, NORTH CAROLINA
C
C
C     THIS PROGRAM CALCULATES CO CONCENTRATIONS AT SELECTED
C     RECEPTOR LOCATIONS BASED UPON LINE SOURCE EMISSION
C     RATES AND HOURLY METEOROLOGICAL DATA.  EXCESS(IDLING PLUS
C     ACCELERATION/DECELERATION) EMISSIONS AND CRUSE EMISSIONS
C     ARE CALCULATED FROM VALUES OF CRUSE SPEED, ACCELERATION/
C     DECELERATION, AND APPROACH VOLUMES BY USE OF THE EPA MODAL
C     ANALYSIS MODEL.  ACCELERATION/DECELERATION AND IDLING EMISSIONS
C     ARE ASSIGNED TO THE QUEUE LENGTH PORTION OF THE LINK WHILE
C     CRUSE EMISSIONS ARE DISTRIBUTED UNIFORMLY ALONG THE LENGTH OF THE
C     LINK.  QUEUE LENGTHS AND DELAY TIMES MAY BE CALCULATED FOR
C     UNSIGNALIZED,DEMAND ACTUATED AND FIXED TIME INTERSECTIONS.
C     THE LINE SOURCE CALCULATION IS CARRIED OUT BY USE OF THE EPA
C     HIGHWAY MODEL.  LINKS MUST BE NUMBERED CONSEQUTIVELY WITH THOSE
```

```
C     LINKS NOT APPROACHING ANY INTERSECTION INPUT LAST
C     THE PROGRAM ALSO PROVIDES THE OPTION OF A STREET CANYON SUBMODEL
C*******************
C*******************
      DIMENSION CS(2,2,2),VOL(2,2,2),VIN(2,2,2),VOUT(2,2,2),
     &AIN(2,2,2),AOUT(2,2,2),VOLP(22),VP(22),ISIG(2),NPHASE(2),GAP(2),
     &X1(22),X2(22),Y1(22),Y2(22),NL(22),VFRACT(4,22),WLINK(22),
     &HLINK(22),ICUT(22),WIDTC(22)
      DIMENSION THETA(24),U(24),HL(24),KST(24)
     1,TEMPF(24),FHOT(24),FCOLD(24)
      DIMENSION XX(10),YY(10),Z(10),ISTR(10),AST(10),NLKST(10),
     &WST(10),BUILDH(10),ISTLIN(10,2),IRSIDE(10)
      DIMENSION CONC(24,10),VOLHR(2,2,2,24),
     &FAC(24),EMAOUT(2,2,2),EMAIN(2,2,2),EMCRUZ(2,2,2),
     &QLENTH(2,2,2),DELAY(2,2,2),LINK(2,2,2),NQND(22),EMCRNI(22),
     &CY(2),G(2,2),EMLN(22,4),IFREE(2),XC(2),YC(2)
      DIMENSION RK(5),ISTRH(10),EMLNP(22),C(10)
      DIMENSION XLOAD(3),MS(6),STABL5(6)
      INTEGER STABL6,STABL7,STABL8,TRKFLG,ALHFLG
      REAL MS
C***  INPUT VARIABLES
C*******************
C*******************
C     NHOURS=NUMBER OF HOURS INCLUDED IN THE SIMULATION
C     NREC=NUMBER OF RECEPTORS
C     NINSEC=NUMBER OF INTERSECTIONS(4 APPROACH LINKS ASSUMED FOR EACH
C             INTERSECTION)
C     NLNAI=NUMBER OF LINKS NOT APPROACHING ANY INTERSECTION
C     IFREE(INS)=0(FREE FLOW,IGNORE IDLING AND ACCELERATION/DECELERATION
C             EMISSIONS),=1(NO FREE FLOW)
C     XC(INS) = EAST COORDINATE OF THE INTERSECTION (KM)
C     YC(INS) = NORTH COORDINATE OF THE INTERSECTION (KM)
C     CS(I,J,INS)=CAPACITY PER HOUR OF GREEN TO VEHICLES ON APPROACH
C             LINK I MOVING DURING SIGNAL PHASE J FOR INTERSECTION
C             INS(VEHICLES/HOUR)
C     VOL(I,J,INS)=AVERAGE VOLUME ON APPROACH LINK I WHICH MOVES DURING
C             SIGNAL PHASE FOR INTERSECTION INS(VEHICLES/HOUR)
C     A LINK MAY HAVE MORE THAN ONE LANE.
C     AIN(I,J,INS)=ACCELERATION INTO THE INTERSECTION(MUST BE NEGATIVE)
C             (MI/HR/SEC)
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C     AOUT(I,J,INS)=ACCELERATION OUT OF THE INTERSECTION(MUST BE POSTIVE
C             )(MI/HR/SEC)
C     VIN(I,J,INS)=INTERSECTION APPROACH SPEED FOR INTERSECTION INS,
C             SIGNAL PHASE J, AND APPROACH I(MI/HR)
C     VOUT(I,J,INS)=INTERSECTION DEPARTURE SPEED FOR INTERSECTION INS
C             ,SIGNAL PHASE J, AND APPROACH I(MI/HR)
C     VOLP(L)=VOLUME FOR LINK L IF LINK L DOES NOT APPROACH ANY
C     INTERSECTION(VEHICLES/HOUR)
C     VP(L)=SPEED FOR LINK L IF LINK L DOES NOT APPROACH ANY
C             INTERSECTION(VEHICLES/HR)
C     ISIG(INS)=INTERSECTION TYPE(0=UNSIGNALIZED,1=VEHICLE ACTUATED,
C             2=FIXED TIME)
C     CY(INS)=SIGNAL PHASE FOR FIXED TIME INTERSECTION(SEC)
C     G(INS,J)=GREEN TIME FOR FIXED TIME INTERSECTION INS AND PHASE J(SE
C             C)
C     GAP(INS)=GAP ACCEPTANCE FOR UNSIGNALIZED INTERSECTION INS(SEC)
C     NPHASE(INS)=NUMBER OF PHASES FOR INTERSECTION INS
C     X1(L),Y1(L)=EAST AND NORTH COORDINATES OF ENDPOINT 1 OF LINK L
C             (KM)
C     X2(L),Y2(L)=EAST AND NORTH COORDINATES OF ENDPOINT 2 OF LINK L
C             (KM)
C     LINK(I,J,INS)=LINK NUMBER FOR APPROACH I FOR PHASE J AT
C             INTERSECTION INS
C     NL(L)=NUMBER OF TRAFFIC LANES FOR LINK L
C     VFRACT(LANE,L) FRACTION OF TOTAL VOLUME OF LINK L ASSIGNED TO
C             LANE 'LANE'.  LANES FOR A LINK ARE ORDERED LEFT TO RIGHT
C             WHEN LOOKING FROM POINT 1 TO POINT2.
C     WLINK(L)=WIDTH OF LINK(NOT THE ENTIRE STREET) L(METERS)
C     HLINK(L)=EMISSION HEIGHT FOR LINK L(METERS)
C     ICUT(L)=1(CUT SECTION),0(AT GRADE SECTION)
C     WIDTC(L)=WIDTC(L)=WIDTH AT THE TOP OF THE CUT SECTION(M)
C     THETA(K),U(K),HL(K),KST(K)=WIND DIRECTION(DEGREES),WINDSPEED
C             (METERS/SEC), MIXING HEIGHT(METERS),AND STABILITY CLASS
C             FOR HOUR K
C     FAC(K)=RATIO OF VOLUME TO AVERAGE VOLUME FOR HOUR K
C     XX(IR)=EAST COORDINATE FOR RECEPTOR IR(KM)
C     YY(IR)=NORTH COORDINATE OF RECEPTOR IR(KM)
C     Z(IR)=HEIGHT OF RECEPTOR IR ABOVE GROUND(M)
C     ISTR(IR)=0(EXCLUDE STREET CANYON MODEL),1(USE STREET CANYON
C             MODEL)
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C     AST(IR)=DIRECTION OF STREET FROM NORTH(DEGREES)(0-180)
C     NLKST(IR)=NUMBER OF LINKS INFLUENCING THE STREET CANYON RECEPTOR
C             IR
C     WST(IR)=RECEPTOR STREET WIDTH(M)
C     BUILDH(IR)=BUILDING HEIGHT(M)
C     ISTLIN(IR,M=1,NLKST(IR))=IDENTIFICATION NUMBERS FOR THOSE LINKS
C             ADJACENT TO RECEPTOR IR
C     IRSIDE(IR)=SIDE OF THE STREET ON WHICH RECEPTOR IR IS
C             LOCATED(1=RIGHT,2=LEFT) WITH RESPECT TO THE STREET
C             HEADING SPECIFIED BY AST(IR)
      INTEGER OUT
      DATA CONC/240*0./,RK/25.5,5.5,1.75,1.0,0.5/
      IN=5
      OUT=6
      IPRSW=1
C***  SELECTED INTERMEDIATE AND OUTPUT VARIABLES
C*******************
C*******************
C     VOLHR(I,J,INS,K)=VOLUME FOR HOUR K ON APPROACH LINK I WHICH
C             MOVES DURING SIGNAL PHASE J FOR INTERSECTION INS
C             (VEHICLES/HOUR)
C     QLENTH(I,J,INS)=QUEUE LENGTH(M) FOR INTERSECTION INS FOR
C             APPROACH I AND PHASE J
C     DELAY(I,J,INS)=INTERSECTION DELAY FOR INTERSECTION INS FOR
C             APPROACH I AND PHASE J(SEC)
C     NQND(L)=0(IF LINK L APPROACHES A SIGNALIZED INTERSECTION OR
C             APPROACHES AN UNSIGNALIZED INTERSECTION AND IS NOT ON THE
C             MAIN STREET),=1(IF LINK L APPROACHES AN UNSIGNALIZED
C             INTERSECTION AND IS ON A MAJOR STREET)
C     EMCRNI(L)=CRUSE EMISSION RATE(GM/VEHICLE/SEC) FOR LINK L IF
C             LINK L DOES NOT APPROACH AN INTERSECTION
C     CY(INS)=CYCLE LENGTH(SEC) FOR INTERSECTION INS(DEMAND ACTUATED)
C     EMLN(L,LANE)=EMISSION RATE(GM/M/SEC) FOR LANE 'LANE' OF LINK L
C     CONC(K,IR)=CARBON MONOXIDE CONCENTRATION (PPM) AT RECEPTOR IR
C     RK(KST(K))=STABILITY DEPENDENT DIFFUSIVITIES FOR USE IN THE
C             STREET CANYON DECISION MODEL(M**2/SEC)
C     ISTRH(IR)=0(EXCLUDE STREET CANYON MODEL FOR THE HOUR IN QUESTION)
C             =1(USE STREET CANYON MODEL FOR THE HOUR IN QUESTION)
C     EMLNP(LANE)=EMLN(L,LANE)
C     C(IR)=RECEPTOR CONCENTRATIONS FOR A GIVEN LINK AND HOUR UPON
```

```
C               RETURN FROM SUBROUTINE HIWAY
      L=0
      NLK=0
      NPHM=0
C*****IPRSW1=1(PRINT INTERMEDIATE EMISSION DATA)
C     IPRSW2=1(PRINT SOA,HOA,EMAD,ETC)
C     IPRSW3=1(READ IN QUEUE & DELAY)
C     IPRSW4=1(PRINT OUT MOBILE1 EMISSION FACTOR CALCULATIONS)
C
      READ(IN,5) IPRSW1,IPRSW2,IPRSW3,IPRSW4
    5 FORMAT(4I5)
      WRITE(OUT,591)
      READ(IN,10) NHOURS,NREC,NINSEC
   10 FORMAT(5I5)
      WRITE(OUT,20) NHOURS,NREC,NINSEC
   20 FORMAT(1X,'NUMBER OF HOURS FOR THE SIMULATION=',I5,/,1X,'NUMBER OF
     & RECEPTORS=',I5,/,1X,'NUMBER OF INTERSECTIONS',I5,/)
      DO 50 INS=1,NINSEC
      READ(IN,48) IFREE(INS),XC(INS),YC(INS)
   48 FORMAT (I10,2F10.0)
      IF(IFREE(INS).EQ.0) GO TO 30
      WRITE(OUT,25) INS
   25 FORMAT (/,10X,'FOR INTERSECTION',I3,2X,
     &'NO FREE FLOW CONDITIONS ASSUMED',//)
      GO TO 40
   30 WRITE(OUT,35) INS
   35 FORMAT (/,10X,'FOR INTERSECTION',I3,2X,
     &    'FREE FLOW CONDITIONS ASSUMED',//)
   40 CONTINUE
C
C     INPUT INTERSECTION DATA
C
      READ(IN,52) ISIG(INS),NPHASE(INS),GAP(INS)
   52 FORMAT(2I5,F5.0)
      NPHM=MAX0(NPHM,NPHASE(INS))
      NPH=NPHASE(INS)
      IF(ISIG(INS).EQ.2) GO TO 421
      GO TO 46
  421 READ(IN,42) CY(INS),(G(INS,J),J=1,NPH)
   42 FORMAT(8F10.0)
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      WRITE(OUT,43) INS,CY(INS)
   43 FORMAT(/,10X,'FIXED CYCLE TIME FOR INTERSECTION',I5,1X,'=',F10.2,
     &1X,'SEC')
      DO 45 J=1,NPH
      WRITE(OUT,44) INS,J,G(INS,J)
   44 FORMAT (//,10X,'GREEN TIME FOR INTERSECTION',I3,1X,'PHASE',I3,1X,
     &'=',F10.2,1X,'SEC')
   45 CONTINUE
   46 CONTINUE
      IF(ISIG(INS).EQ.0) WRITE(OUT,461) INS,NPHASE(INS),GAP(INS)
  461 FORMAT(//,1X,'INTERSECTION',I3,1X,'IS UNSIGNALIZED',
     12X,'NPHASE =',I3,1X,'GAP =',F7.1,//)
      IF(ISIG(INS).EQ.1) WRITE(OUT,462) INS
  462 FORMAT(/,1X,'INTERSECTION',I5,1X,'IS CONTROLLED BY A DEMAND ACTUAT
     &ED SIGNAL')
      WRITE(OUT,47) XC(INS),YC(INS)
   47 FORMAT (/,10X,'CENTER OF INTERSECTION IS',F7.3,' KM EAST AND',
     1F7.3,' KM NORTH')
      NPH=NPHASE(INS)
      DO 11 J=1,NPH
      DO 11 I=1,2
C
C     READ LINK CODE.
C
      L=L+1
      READ(IN,555) LINK(I,J,INS)
  555 FORMAT (I5)
C
C     READ PHYSICAL LINK PARAMETERS.
C
      READ(IN,556) X1(L),Y1(L),X2(L),Y2(L),WLINK(L),HLINK(L),
     1ACUT,WIDTC(L)
  556 FORMAT (7F10.0,F5.0)
      ICUT(L)=ACUT+0.001
C
C     READ CAPACITY,VOLUME, VELOCITIES, AND ACCELERATION FOR EACH LINK.
C
      READ(IN,556) CS(I,J,INS),VOL(I,J,INS),VIN(I,J,INS),VOUT(I,J,INS),
     2AIN(I,J,INS),AOUT(I,J,INS)
      IF(AIN(I,J,INS).GE.0.0) GO TO 5010
```

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      IF(AOUT(I,J,INS).LE.0.0) GO TO 5020
C
C     READ THE NUMBER OF LANES FOR THE LINK, AND THE FRACTION
C     OF VOLUME ON EACH LANE.
C
      READ(IN,556) ANL,(VFRACT(LANE,L),LANE=1,4)
      NL(L)=ANL+0.001
C***  INPUT TRAFFIC LINK DATA.  A LINK IS ONE DIRECTION
C***  OF TRAFFIC FLOW ON A STREET.  EACH
C***  LINK WILL HAVE ONE OR MORE LANES OF TRAFFIC
      WRITE(OUT,280) LINK(I,J,INS)
  280 FORMAT(///,20X,'INPUT DATA FOR LINK',I5,/)
      WRITE(OUT,290) X1(L),Y1(L),X2(L),Y2(L)
  290 FORMAT (10X,'X1 =',F8.3,5X,'Y1 =',F8.3,5X,'X2 =',F8.3,
     15X,'Y2 =',F8.3,1X,'KM')
      WRITE(OUT,300) NL(L)
  300 FORMAT (/,10X,'NUMBER OF LANES =',I3)
      NLP=NL(L)
      DO 320 LANE=1,NLP
      WRITE(OUT,310) L,LANE,VFRACT(LANE,L)
  310 FORMAT (/,10X,'FRACTION OF LINK',I3,1X,'VOLUME ON LANE',I3,
     11X,'=',F5.2)
  320 CONTINUE
      WRITE(OUT,330) WLINK(L),HLINK(L)
  330 FORMAT (/,10X,'LINK WIDTH =',F7.2,1X,'METERS',
     110X,'EMISSION HEIGHT =',F5.2,1X,'METERS')
      IF(ICUT(L).EQ.0) GO TO 350
      WRITE(OUT,340) WIDTC(L)
  340 FORMAT(/,10X,'LINK IS A CUT SECTION-WIDTH AT THE TOP=',
     &F7.2,1X,'METERS')
      GO TO 358
  350 WRITE(OUT,355)
  355 FORMAT(/,10X,'LINK IS AT GRADE')
  358 CONTINUE
      WRITE(OUT,260) CS(I,J,INS),VOL(I,J,INS),VIN(I,J,INS),
     1VOUT(I,J,INS),AIN(I,J,INS),AOUT(I,J,INS)
  260 FORMAT (/,10X,'CAPACITY =',F7.1,' VECHICLES/HOUR',5X,
     1'VOLUME =',F7.1,' VECHICLES/HOUR',/10X,'SPEED INTO INTERSECTION ='
     2,F5.1,' MI/HR',5X,'SPEED OUT OF INTERSECTION =',F5.1,
     3' MI/HR',/,10X,'ACCELERATION INTO INTERSECTION =',F6.2,
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```
     4' MI/HR/SEC',5X,'ACCELERATION OUT OF INTERSECTION =',F6.2,
     5' MI/HR/SEC',/)
   11 CONTINUE
      WRITE(OUT,591)
   50 CONTINUE
      NLNAI=8+(NINSEC-1)*6-L
      NLK=L
      WRITE(OUT,591)
      WRITE(OUT,275)
  275 FORMAT(/,1X,'THE FOLLOWING DATA APPLIES TO THOSE LINKS WHICH DO NO
     &T APPROACH ANY INTERSECTION',/)
C
C     READ DATA FOR LINKS LEAVING AN INTERSECTION.
C
      DO 31 LL=1,NLNAI
      L=L+1
      WRITE(OUT,280) L
      READ(IN,556) X1(L),Y1(L),X2(L),Y2(L),WLINK(L),HLINK(L),
     1ACUT,WIDTC(L)
      ICUT(L)=ACUT+0.001
      READ(IN,556) VOLP(L),VP(L)
      READ(IN,556) ANL,(VFRACT(LANE,L),LANE=1,4)
      NL(L)=ANL+0.001
      WRITE(OUT,290) X1(L),Y1(L),X2(L),Y2(L)
      WRITE(OUT,330) WLINK(L),HLINK(L)
      IF(ICUT(L).EQ.0) GO TO 151
      WRITE(OUT,340) WIDTC(L)
      GO TO 152
  151 WRITE(OUT,355)
  152 CONTINUE
      WRITE(OUT,300) NL(L)
      NLP=NL(L)
      DO 180 LANE=1,NLP
      WRITE(OUT,310) L,LANE,VFRACT(LANE,L)
  180 CONTINUE
      WRITE(OUT,360) VOLP(L),VP(L)
  360 FORMAT(/,10X,'VOLUME=',F10.2,1X,'VEHICLES/HOUR',1X,'SPEED=',
     &F10.2,1X,'MI/HR')
   31 CONTINUE
      NLTOT=L
```

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      WRITE(OUT,270) NLTOT,NLNA1
  270 FORMAT(///,1X,'TOTAL NUMBER OF LINKS IS',I5,/,1X,'OF WHICH',I5,1X,
     &'ARE LINKS WHICH DO NOT APPROACH ANY INTERSECTION',/)
C***  INPUT RECEPTOR DATA
      DO 415 IR=1,NREC
      READ(IN,410)  XX(IR),YY(IR),Z(IR),ISTR(IR)
  410 FORMAT(3F10.0,I10)
      IF(ISTR(IR).EQ.0) GO TO 415
      READ(IN,420) NLDUM,(ISTLIN(IR,M),M=1,NLDUM),IRSIDE(IR)
  420 FORMAT(16I5)
      NLKST(IR)=NLDUM
      READ(IN,430)  AST(IR),WST(IR),BUILDH(IR),IRSIDE(IR)
  430 FORMAT(3F10.0,I10)
  415 CONTINUE
      WRITE(OUT,591)
      DO 500 IR=1,NREC
      WRITE(OUT,435) IR
  435 FORMAT(//,1X,'DATA FOR RECEPTOR',I5,/)
      WRITE(OUT,440) XX(IR),YY(IR),Z(IR)
  440 FORMAT(1X,'XX=',F10.3,1X,'YY=',F10.3,1X,'Z=',F10.2)
      IF(ISTR(IR).EQ.0) GO TO 500
      NLDUM=NLKST(IR)
      WRITE(OUT,450) (ISTLIN(IR,M),M=1,NLDUM)
  450 FORMAT(1X,'LINKS ADJACENT TO THE STREET CANYON RECEPTOR=',2I5)
      WRITE(OUT,460) AST(IR),WST(IR),BUILDH(IR)
  460 FORMAT(1X,'STREET HEADING FROM NORTH=',F10.2,1X,'DEGREES',/,1X,
     &'STREET WIDTH=',F10.2,1X,'METERS',/,1X,'BUILDING HEIGHT=',F10.2,
     &1X,'METERS')
      IF(IRSIDE(IR).EQ.1) WRITE(OUT,465)
      IF(IRSIDE(IR).EQ.2) WRITE(OUT,466)
  465 FORMAT(1X,'IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADING
     &',/,1X,'THE RECEPTOR IS ON THE RIGHT SIDE OF THE STREET')
  466 FORMAT(1X,'IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADING
     &',/,1X,'THE RECEPTOR IS ON THE LEFT SIDE OF THE STREET')
  500 CONTINUE
      WRITE(OUT,65)
   65 FORMAT(//)
C***  INPUT HOURLY METEOROLOGICAL DATA
      WRITE(OUT,591)
      DO 550 K=1,NHOURS
```

```
      READ(IN,510) THETA(K),U(K),HL(K),KST(K),TEMPF(K),FHOT(K),FCOLD(K)
  510 FORMAT(3F10.0,I10,3F10.0)
      WRITE(OUT,520) K,THETA(K),U(K),HL(K),KST(K),
     1TEMPF(K),FHOT(K),FCOLD(K)
  520 FORMAT(///,1X,'METEOROLOGICAL INPUTS FOR HOUR',I5,/,
     &1X,'WIND DIRECTION',F10.2,1X,'DEGREES',/,1X,'WIND SPEED=',
     &F10.2,1X,'METERS/SEC',/,1X,'MIXING HEIGHT=',F10.2,1X,
     &'METERS',/,1X,'STABILITY CLASS=',I3,
     &/,1X,'TEMPERATURE =',F5.1,/,1X,'HOT STARTS =',F5.2,
     &5X,'COLD STARTS =',F5.2)
  550 CONTINUE
      WRITE(OUT,65)
C***  INPUT HOURLY RATIOS OF VOLUME TO AVERAGE VOLUME
      READ(IN,556) (FAC(K),K=1,NHOURS)
      WRITE(OUT,570)
  570 FORMAT(//,10X,'HOURLY RATIOS OF VOLUME TO AVERAGE VOLUME',/)
      WRITE(OUT,580) (FAC(K),K=1,NHOURS)
  580 FORMAT(1X,8F10.2)
C
C     READ YEAR, REGION, MODAL SPLIT, ALH., TRK.,  AND IM SPECIFICATIONS
C
      READ(IN,565) NYEAR,IREG,(MS(I),I=1,6),
     &             ALHFLG,AC,(XLOAD(I),I=1,3),TRAILR,ABSHUM,
     &             TRKFLG,HGWGT,HDWGT,HGCID,HDCID,
     &             IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2
  565 FORMAT(2I5,6F10.0/I5,6F10.0/I5,4F10.0/6I5)
      WRITE(OUT,566) NYEAR,IREG,(MS(I),I=1,6)
  566 FORMAT(/,5X,I5,5X,'REGION=',I2,' MODAL SPLIT=',6(F4.2,', '))
      IF(ALHFLG.EQ.1) WRITE(OUT,567) AC,(XLOAD(I),I=1,3),TRAILR,ABSHUM
  567 FORMAT(' ALH PARAMETERS=',6F10.2)
      IF (TRKFLG.EQ.1) WRITE(OUT,568) HGWGT,HDWGT,HGCID,HDCID
  568 FORMAT(' TRK PARAMETERS=',4F10.2)
      IF(IMFLG.EQ.1) WRITE(OUT,569) ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2
  569 FORMAT(' IM PARAMETERS=',5I10)
C
      WRITE(OUT,65)
  590 CONTINUE
C***  CALCULATE HOURLY TRAFFIC VOLUMES
      WRITE(OUT,591)
  591 FORMAT(1H1,//)
```

```
      DO 600 K=1,NHOURS
      DO 600 INS=1,NINSEC
      NPH=NPHASE(INS)
      DO 600 J=1,NPH
      DO 600 I=1,2
      VOLHR(I,J,INS,K)=VOL(I,J,INS)*FAC(K)
  600 CONTINUE
C
C
C     BEGIN LOOP ON HOURS
C
C
      IYR10=77
      IREG10=1
      STABL1=75.
      STABL2=0.0
      STABL3=0.0
      STABL4=0.0
      STABL5(1)=1.0
      DO 601 JJ=2,6
  601 STABL5(JJ)=0.0
      STABL6=0
      STABL8=0
      STABL7=0
      INIFLG=1
C
      DO 2000 K=1,NHOURS
      PCCC=FCOLD(K)
C***  CALCULATE(FOR THOSE LINKS APPROACHING INTERSECTIONS) EMISSION
C***  RATES FOR DECELERATION(GM/VEHICLE),ACCELERATION(GM/VEHICLE),
C***  CRUSING(GM/VEHICLE/SEC) AND IDLING(GM/VEHICLE/SEC)
      WRITE(OUT,65)
      SPED=5.0
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,
     &          MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,EMCZ5,EMIDLE)
      IF(IMFLG.EQ.0) GO TO 609
      CALL SUP8(0,IREG,NYEAR,SPED,STABL1,STABL2,STABL3,
     *STABL4,STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,
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     *HGWCT,HDWGT,HGCID,HDCID,STABL8,ICYIM,ISTRIN,
     *IMTFLG,MODYR1,MODYR2,IPRSW4,STABCZ,STABID)
      EMIDLE=STABID*EMCZ5/STABCZ
      WRITE(OUT,6099)
 6099 FORMAT(' CAUTION: IM,TRUCK,OR ALH CORRECTION CALLED FOR',/
     *  ' IDLE EMISSIONS CALCULATED BY ALTERNATE METHOD')
  609 CONTINUE
      EMIDLE=EMIDLE/60.0
      IF(INIFLG.EQ.1) CALL INITMM
      INIFLG=0
      IF(IPRSW1.GE.1)
     1WRITE(OUT,610) EMIDLE
  610 FORMAT(1X,'IDLING EMISSIONS=',E15.4,1X,'GM/VEHICLE/SEC',/)
      DO 700 INS=1,NINSEC
      NPH=NPHASE(INS)
      DO 700 J=1,NPH
      DO 700 I=1,2
      CALL ACDC(VIN(I,J,INS),AIN(I,J,INS),EMAIN(I,J,INS),
     1IPRSW2)
      SPED=VIN(I,J,INS)*0.5
      IF (SPED.LT.5.0) SPED=5.0
      CALL  SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,
     &          MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,SCENCZ,SCENID)
      CALL  SUP8(INIFLG,IREG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4,
     &          STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,STABCZ,STABID)
      EMAIN(I,J,INS)=EMAIN(I,J,INS)*SCENCZ/STABCZ
      IF(IPRSW1.GE.1)
     1WRITE(OUT,620) INS,J,I,EMAIN(I,J,INS)
  620 FORMAT(1X,'DECELERATION EMISSIONS FOR INTERSECTION',
     &I5,1X,'PHASE',I5,1X,'APPROACH',I5,1X,'=',E15.4,1X,
     &'GM/VEHICLE')
      CALL ACDC(VOUT(I,J,INS),AOUT(I,J,INS),EMAOUT(I,J,INS),
     1IPRSW2)
      SPED=VOUT(I,J,INS)*0.5
      IF (SPED.LT.5.0) SPED=5.0
      CALL  SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,
```

```
     &          MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,SCENCZ,SCENID)
      CALL SUP8(INIFLG,IREG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4,
     &          STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,STABCZ,STABID)
      EMAOUT(I,J,INS)=EMAOUT(I,J,INS)*SCENCZ/STABCZ
      IF(IPRSW1.GE.1)
     1WRITE(OUT,630) INS,J,I,EMAOUT(I,J,INS)
  630 FORMAT(1X,'ACCELERATION EMISSIONS FOR INTERSECTION',
     &I5,1X,'PHASE',I5,1X,'APPROACH',I5,1X,'=',E15.4,1X,
     &'GM/VEHICLE')
      CALL CRUZ(VIN(I,J,INS),EMCRUZ(I,J,INS))
      SPED=VIN(I,J,INS)
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,
     &          MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,SCENCZ,SCENID)
      CALL SUP8(INIFLG,IREG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4,
     &          STABL5,STABL6,AC,XLOAD,TRAILR,ABSHUM,STABL7,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,STABCZ,STABID)
      EMCRUZ(I,J,INS)=EMCRUZ(I,J,INS)*SCENCZ/STABCZ
      IF(IPRSW1.GE.1)
     1WRITE(OUT,640) INS,J,I,EMCRUZ(I,J,INS)
  640 FORMAT(1X,'CRUISE EMISSIONS FOR INTERSECTION',I5,1X,
     &'PHASE',I5,1X,'APPROACH',I5,1X,'=',E15.4,1X,'GM/VEHICLE/SEC')
  700 CONTINUE
      WRITE(OUT,65)
C***  CALCULATE CRUISE EMISSION RATES(GM/VEHICLE/SEC) FOR THOSE
C***  LINKS NOT APPROACHING INTERSECTIONS
      NLKP1=NLK+1
      DO 705 L=NLKP1,NLTOT
      CALL CRUZ(VP(L),EMCRNI(L))
      SPED=VP(L)
      CALL SUP8(INIFLG,IREG,NYEAR,SPED,TEMPF(K),FCOLD(K),FHOT(K),PCCC,
     &          MS,ALHFLG,AC,XLOAD,TRAILR,ABSHUM,TRKFLG,HGWGT,HDWGT,
     &         HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &         IPRSW4,SCENCZ,SCENID)
```

```
      CALL SUP8(INIFLG,IPEG10,IYR10,SPED,STABL1,STABL2,STABL3,STABL4,
     &            STABL5,STABL6,AC,XLOAD,TRAILP,ABSHUM,STABL7,HGWGT,HDWGT,
     &           HGCID,HDCID,IMFLG,ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2,
     &           IPRSW4,STABCZ,STABID)
      EMCRNI(L)=EMCRNI(L)*SCENCZ/STABCZ
      IF(IPRSW1.GE.1)
     1WRITE(OUT,708) L,EMCRNI(L)
  708 FORMAT(1X,'FOR LINK',I5,1X,'(NOT APPROACHING AN INTERSECTION)---CR
     &UISE EMISSION RATE=',E15.4,1X,'GM/VEHICLE/SEC')
  705 CONTINUE
C***  CALCULATE QUEUE LENGTHS AND DELAY TIMES
C     DIVIDE LINK VOLUMES BY THE NUMBER OF LANES IN THE LINK.
      L=0
      DO 710 INS=1,NINSEC
      NPH=NPHASE(INS)
      DO 710 J=1,NPH
      DO 710 I=1,2
      L=L+1
      LNP=NL(L)
      VOL(I,J,INS)=VOLHR(I,J,INS,K)/LNP
  710 CONTINUE
      CALL TRAFIC(NPHM,VOL,CS,ISIG,QLENTH,DELAY,NINSEC,NPHASE,GAP,
     1LINK,NQND,CY,G)
      IF(IPRSW1.LT.1) GO TO 703
      DO 714 INS=1,NINSEC
      NPH=NPHASE(INS)
      DO 713 J=1,NPH
      DO 712 I=1,2
      IF(IPRSW3.NE.1) GO TO 4005
C********REDEFINE QUEUE LENGHT & DELAY
      READ(5,4000)  QLENTH(I,J,INS),DELAY(I,J,INS)
 4000 FORMAT(2F10.0)
 4005 LOUT=LINK(I,J,INS)
      WRITE(OUT,711) I,J,INS,VOL(I,J,INS),CS(I,J,INS),ISIG(INS),
     &QLENTH(I,J,INS),DELAY(I,J,INS),NPHASE(INS),GAP(INS),
     &LINK(I,J,INS),NQND(LOUT),CY(INS),G(INS,J)
  711 FORMAT(1X,'I=',I5,1X,'J=',I5,1X,'INS=',I5,1X,
     &'VOL=',E15.4,1X,'CS=',E15.4,1X,'ISIG=',I5,/,
     &1X,'QLENTH=',E15.4,1X,'DELAY=',E15.4,1X,'NPHASE=',I5,/,
     &1X,'GAP=',F10.1,1X,'LINK=',I5,1X,'NQND=',I5,1X,
```

```
     &'CY=',F10.2,1X,'G=',F10.2)
  712 CONTINUE
  713 CONTINUE
  714 CONTINUE
C     RECALCULATE LINK VOLUMES.
  703 DO 702 INS=1,NINSEC
      NPH=NPHASE(INS)
      DO 702 J=1,NPH
      DO 702 I=1,2
      VOL(I,J,INS)=VOLHR(I,J,INS,K)
  702 CONTINUE
C***  CONSTRUCT PSEUDOLINKS(LINK WITH A LENGTH EQUAL TO AN AVERAGE QUEUE
C***  LENGTH ON THE PHYSICAL LINK)
C***  AND CALCULATE EMISSION RATES (GM/M/SEC) FOR ALL OF THOSE
C***  LINKS AND PSEUDOLINKS WHICH APPROACH INTERSECTIONS
      WRITE(OUT,65)
      DO 750 INS=1,NINSEC
      NPH=NPHASE(INS)
      DO 750 J=1,NPH
      DO 750 I=1,2
      LK=LINK(I,J,INS)
      DIS=SQRT((X2(LK)-X1(LK))**2+(Y2(LK)-Y1(LK))**2)
      DIS=1000.*DIS
      QQQ=QLENTH(I,J,INS)
      IF(QLENTH(I,J,INS).GT.DIS) GO TO 5030
      IF(QLENTH(I,J,INS).LT.1.0) QLENTH(I,J,INS)=1.0
      IF(ISIG(INS).EQ.0) QQQ=6.*VOL(I,J,INS)
      QLN=0.5*(VIN(I,J,INS)**2./(-AIN(I,J,INS))+
     .VOUT(I,J,INS)**2./AOUT(I,J,INS))*0.4694
      IF(QLN.GT.DIS) QLN=DIS
      IF(QLENTH(I,J,INS).LT.1.0) QLENTH(I,J,INS)=1.0
      XCES=IFREE(INS)*(EMAIN(I,J,INS)+EMAOUT(I,J,INS)-
     .EMCRUZ(I,J,INS)*0.5*(-VIN(I,J,INS)/AIN(I,J,INS)+
     .VOUT(I,J,INS)/AOUT(I,J,INS)))*(QQQ/6.0)/CY(INS)
      TILDE=IFREE(INS)*EMIDLE*DELAY(I,J,INS)*VOL(I,J,INS)/3600.
      IF(XCES.GT.TILDE) QLENTH(I,J,INS)=QLN
      RATIO=QLENTH(I,J,INS)/DIS
      IF(IPRSW1.GT.1)
     1WRITE(OUT,715) I,J,INS,QLENTH(I,J,INS),DIS,RATIO
  715 FORMAT(1X,'I=',I5,1X,'J=',I5,1X,'INS=',I5,1X,'QLENTH=',E15.4,1X,
```

```
     &'DIS=',E15.4,1X,'RATIO=',E15.4)
      DIST1=(X1(LK)-XC(INS))**2+(Y1(LK)-YC(INS))**2
      DIST2=(X2(LK)-XC(INS))**2+(Y2(LK)-YC(INS))**2
      IF(DIST1.GT.DIST2) GO TO 716
      X1(LK+NLTOT)=X1(LK)
      Y1(LK+NLTOT)=Y1(LK)
      X2(LK+NLTOT)=X1(LK)+RATIO*(X2(LK)-X1(LK))
      Y2(LK+NLTOT)=Y1(LK)+RATIO*(Y2(LK)-Y1(LK))
      GO TO 717
  716 X1(LK+NLTOT)=X2(LK)-RATIO*(X2(LK)-X1(LK))
      Y1(LK+NLTOT)=Y2(LK)-RATIO*(Y2(LK)-Y1(LK))
      X2(LK+NLTOT)=X2(LK)
      Y2(LK+NLTOT)=Y2(LK)
  717 CONTINUE
      NL(LK+NLTOT)=NL(LK)
      NLKP=NL(LK)
      WLINK(LK+NLTOT)=WLINK(LK)
      HLINK(LK+NLTOT)=HLINK(LK)
      ICUT(LK+NLTOT)=ICUT(LK)
      WIDTC(LK+NLTOT)=WIDTC(LK)
      EMLNP(LK)=(EMCRUZ(I,J,INS)*VOL(I,J,INS)/3600.)/
     &(VIN(I,J,INS)*1609.344/3600.)
      EMLNP(LK+NLTOT)=(XCES+TILDE)/QLENTH(I,J,INS)
      DO 730 LANE=1,NLKP
      EMLN(LK,LANE)=EMLNP(LK)*VFRACT(LANE,LK)
      EMLN(LK+NLTOT,LANE)=EMLNP(LK+NLTOT)*VFRACT(LANE,LK)
      IF(IPRSW1.GE.1)
     1WRITE(OUT,725) INS,J,I,LK,LANE,EMLN(LK,LANE)
  725 FORMAT(1X,'INTERSECTION=',I5,1X,'PHASE=',I5,1X,
     &'APPROACH=',I5,1X,'LINK=',I5,1X,'LANE=',I5,/,1X,
     &'EMISSION RATE=',E15.4,1X,'GM/METER/SEC')
      LKP=LK+NLTOT
      IF(IPRSW1.GE.1)
     1WRITE(OUT,727) INS,J,I,LKP,LANE,EMLN(LKP,LANE)
  727 FORMAT(1X,'INTERSECTION=',I5,1X,'PHASE=',I5,1X,
     &'APPROACH=',I5,1X,'LINK(PSEUDOLINK)=',I5,1X,'LANE=',I5,/,1X,
     &'EMISSION RATE=',E15.4,1X,'GM/METER/SEC')
  730 CONTINUE
  750 CONTINUE
      WRITE(OUT,65)
```

```
      DO 800 L=NLKP1,NLTOT
      NLKP=NL(L)
      DO 800 LANE=1,NLKP
      EMLN(L,LANE)=VFRACT(LANE,L)*EMCRNI(L)*(VOLP(L)*FAC(K)/
     &3600.)/(VP(L)*1609.344/3600.)
      IF(IPRSW1.GE.1)
     1WRITE(OUT,775) L,LANE,EMLN(L,LANE)
  775 FORMAT(1X,'LINK(NOT APPROACHING INTERSECTION)=',I5,1X,
     &'LANE=',I5,1X,'EMISSION RATE=',E15.4,1X,'GM/METER/SEC')
  800 CONTINUE
      NLTOTT=NLTOT+NLK
C***  SELECT STREET CANYON RECEPTORS FOR HOUR K THROUGH APPLICATION
C***  OF THE STREET CANYON DECISION MODEL
      DO 900 IR=1,NREC
      IF(ISTR(IR).EQ.0) GO TO 900
      KSTK=KST(K)
      DELTA=7.0*SQRT(RK(KSTK)*WST(IR)/U(K))
      IF(DELTA.GT.BUILDH(IR)) GO TO 850
      ISTRH(IR)=1
      GO TO 900
  850 ISTRH(IR)=0
  900 CONTINUE
      GS=1.0
      XKST=KST(K)
      CNTR=0.
      DO 1000 L=1,NLTOTT
      XNL=NL(L)
      CUT=ICUT(L)
      NLKP=NL(L)
      DO 910 LANE=1,NLKP
      EMLNP(LANE)=EMLN(L,LANE)
  910 CONTINUE
      LP=L-NLTOT
      IF(LP.LT.1) GO TO 912
      IF(NQND(LP).EQ.1) GO TO 1000
  912 CONTINUE
      WRITE(OUT,920) L
  920 FORMAT (//,13X,'CONTRIBUTION FROM LINK',I3)
      CALL PTHWY(X1(L),Y1(L),X2(L),Y2(L),HLINK(L),
     &WLINK(L),CNTR,XNL,EMLNP,CUT,WIDTC(L),THETA(K),
```

```
     &U(K),HL(K),XKST,GS,NREC,XX,YY,Z,C,IPRSW)
      DO 975 IR=1,NREC
      IF(ISTR(IR).EQ.0) GO TO 940
      NLKSTP=NLKST(IR)
      IF(ISTRH(IR).NE.1) GO TO 940
      SIGN=1.0
      IF(IRSIDE(IR).NE.1) SIGN=-1.0
      WLN=WLINK(L)/NLKP
      XX1=X1(L)-XX(IR)
      YY1=Y1(L)-YY(IR)
      XX2=X1(L)-X2(L)
      YY2=Y1(L)-Y2(L)
      A=SQRT(XX1*XX1+YY1*YY1)
      B=SQRT(XX2*XX2+YY2*YY2)
      CCS=(XX1*YY2-XX2*YY1)/(A*B)
      XLL=ABS(A*CCS*1000.0)+(WLINK(L)/2.0-0.5*WLN)*SIGN
      THETPP=ASIN(CCS)*57.296
      IF(IPRSW1.GE.1)
     1WRITE(6,9030) XLL,THETPP
 9030 FORMAT (10X,'XLL =',F10.3,10X,'THETPP =',F7.1)
      DO 955 M=1,NLKSTP
      IF(L.LE.NLTOT.AND.L.EQ.ISTLIN(IR,M)) GO TO 960
  955 CONTINUE
      GO TO 970
  960 DO 901 LANE=1,NLKP
      XL=XLL-(LANE-1)*WLN*SIGN
      IF(IPRSW1.GE.1)
     1WRITE(OUT,9030) XL
      CALL STREET(EMLNP(LANE),THETA(K),U(K),AST(IR),WST(IR),XL,
     &BUILDH(IR),Z(IR),IRSIDE(IR),CST)
      WRITE(OUT,9920) IR,K,CST,L,LANE
 9920 FORMAT (/,1X,'STREET CANYON RECEPTOR',I3,5X,'HOUR =',I3,
     15X,'CONCENTRATION =',E12.3,5X,'LINK =',I5,5X,'LANE =',I5)
      CONC(K,IR)=CONC(K,IR)+CST
  901 CONTINUE
      GO TO 975
  970 DO 971 M=1,NLKSTP
      IF(LP.EQ.ISTLIN(IR,M)) GO TO 972
  971 CONTINUE
      GO TO 940
```

```
C***  DETERMINE WHETHER THE STREET CANYON RECEPTOR IS ADJACENT TO A
C***  QUEUE
  972 CALL DECIDE(XX(IR),YY(IR),X1(L),Y1(L),X2(L),Y2(L),IANS)
      IF(IPRSW1.GE.1)
     1WRITE(OUT,973) IR,L,XX(IR),YY(IR),X1(L),Y1(L),X2(L),Y2(L),IANS
  973 FORMAT(1X,'IR=',I5,1X,'L=',I5,1X,'XX=',F10.3,1X,'YY=',F10.3,1X,
     &'X1=',F10.3,1X,'Y1=',F10.3,1X,'X2=',F10.3,1X,'Y2=',F10.3,1X,'IANS=
     &',I5)
      IF(IANS.EQ.0) GO TO 940
      DO 911 LANE=1,NLKP
      XL=XLL-(LANE-1)*WLN*SIGN
      IF(IPRSW1.GE.1)
     1WRITE(OUT,9030) XL
      CALL STREET(EMLNP(LANE),THETA(K),U(K),AST(IR),WST(IR),XL,
     &BUILDH(IR),Z(IR),IRSIDE(IR),CST)
      WRITE(OUT,9920) IR,K,CST,L,LANE
      CONC(K,IR)=CONC(K,IR)+CST
  911 CONTINUE
      GO TO 975
  940 CONC(K,IR)=CONC(K,IR)+C(IR)
  975 CONTINUE
 1000 CONTINUE
      WRITE(OUT,65)
      FACT=1.0
      DO 1900 IR=1,NREC
      CONC(K,IR)=CONC(K,IR)*0.00087*FACT
      WRITE(OUT,1010) K,IR,CONC(K,IR)
 1010 FORMAT(1X,'CONCENTRATION FOR HOUR',I5,1X,'AT RECEPTOR',I5,1X,
     &'=',E15.4,1X,'PPM')
 1900 CONTINUE
      WRITE(OUT,65)
 2000 CONTINUE
      GO TO 8000
C***  ERROR MESSAGES FOR INTERSECTION-MIDBLOCK MODEL
 5010 WRITE(OUT,5015) INS,J,I,AIN(I,J,INS)
 5015 FORMAT(///,1X,'POSITIVE APPROACH ACCELERATION',1X,'INS=',I5,1X,
     &'J=',I5,1X,'I=',I5,1X,'AIN=',F10.2)
      GO TO 8000
 5020 WRITE(OUT,5025) INS,J,I,AOUT(I,J,INS)
 5025 FORMAT(///,1X,'NEGATIVE DEPARTURE ACCELERATION',1X,'INS=',I5,1X,
```

```
     &'J=',I5,1X,'I=',I5,1X,'AOUT=',F10.2)
      GO TO 8000
 5030 WRITE(OUT,5035) INS,J,I,LK,DIS,QLENTH(I,J,INS)
 5035 FORMAT(///,1X,'QUEUE LENGTH LONGER THAN LINK',/,1X,
     &'INTERSECTION=',I5,1X,'PHASE=',I5,1X,'APPROACH=',I5,1X,
     &'LINK NUMBER =',I5,1X,
     &'LINK LENGTH=',E15.3,1X,'QLENTH=',E15.3)
 8000 CONTINUE
      STOP
      END
```

```
      SUBROUTINE INITMM
      COMMON/AGEMM/DEC
      COMMON/COCOEF/COEF
      COMMON/COEFMM/BAD
      COMMON/DET/DETER
      COMMON/MYMCOM/MYM,MYP,TF
      REAL MYM(120),MYR(120)
      REAL DEC(20),TF(20,6),COEF(20,12),BAD(12,20),DETER(20)
C
C
C     SET UP ARRAY OF VMT (OR TRAVEL FACTOR) BY MODEL YEAR GROUP
C
C
      DEC(20)=TF(20,1)
      DEC(19)=TF(19,1)
      DEC(18)=TF(18,1)
      DEC(17)=TF(17,1)+TF(16,1)
      DEC(16)=TF(15,1)
      DO 5 I=8,15
    5 DEC(I)=0.0
      DEC(7)=TF(14,1)
      DEC(6)=TF(13,1)
      DEC(5)=TF(12,1)
      DEC(4)=TF(11,1)
      DEC(3)=0.0
      DEC(2)=0.0
      DO 10 I=1,10
   10 DEC(2)=DEC(2)+TF(I,1)
      DEC(1)=0.0
C
C
C     DETERIORATE MODAL MODEL COEFFICIENTS TO 1977
C
C
      DO 100 J=1,20
      DO 100 K=1,12
  100 COEF(J,K)=BAD(K,J)*(1.0+DETER(J))
      WRITE(6,200)((BAD(IE,I1),IE=1,12),I1=1,20),
     &(DETER(I1),I1=1,20),
     &((COEF(I1,IE),IE=1,12),I1=1,20),
```

```
     &(TF(I1,1),I1=1,20),(DEC(I1),I1=1,20)
 200 FORMAT (60(1X,4E15.8/),'1',/20(1X,F15.5/),
     &'1'/60(1X,4E15.8/),'1'/20(1X,F15.5/))
      RETURN
      END
```

```
      SUBROUTINE CRUZ(V,EMCRUZ)
      COMMON/AGEMM/DEC
      COMMON/COCOEF/COEF
      DIMENSION COEF(20,12),DEC(20),X(12)
      FACTOR=1.0
      EMCRUZ=0.
      X(10)=1.
      X(11)=V
      X(12)=V**2
      DO 100 I1=1,20
      IF(DEC(I1).EQ.0.) GO TO 100
      DO 50 I2=10,12
      EMCRUZ=EMCRUZ+X(I2)*COEF(I1,I2)*FACTOR*DEC(I1)
   50 CONTINUE
  100 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE TRAFIC(NP,VOL,CAP,ISIG,QLENTH,DELAY,IN,NPHASE,
     &GAP,LINK,NGND,CY,G)
      DIMENSION VOL(2,2,2),CAP(2,2,2),ISIG(1),QLENTH(2,2,2),
     1DELAY(2,2,2),NPHASE(1),GAP(1),G(2,2),LINK(2,2,2),
     2NGND(1),CY(1)
      INTEGER OUT
      OUT=6
      NUM=12+(IN-1)*10
      DO 11 J=1,NUM
      NGND(J)=0
   11 CONTINUE
      DO 500 INS=1,IN
      IF(ISIG(INS).NE.0) GO TO 200
      CY(INS)=3600.
C***  ASSUME ZERO QUEUE LENGTH AND DELAY TIME FOR THE
C***  MAJOR STREET(PHASE). VOL(I=(1,2),1,INS) ARE CONSIDERED VOLUMES
C***  FOR THE MAJOR STREET(PHASE)
C***  INPUT CAPACITIES ARE NOT USED FOR UNSIGNALIZED INTERSECTIONS
C***  NGND(LK)=1('NO QUEUE,NO DELAY FOR LINK LK')
      DO 50 I=1,2
      LK=LINK(I,1,INS)
      NGND(LK)=1
      QLENTH(I,1,INS)=0.
      DELAY(I,1,INS)=0.
   50 CONTINUE
      EGAP=GAP(INS)*(VOL(1,1,INS)+VOL(2,1,INS))/3600.
      EGAP=EXP(-EGAP)
      C=(VOL(1,1,INS)+VOL(2,1,INS))*EGAP/(1.-EGAP)
      DO 100 I=1,2
      SKIP=C-VOL(I,2,INS)
      IF(SKIP.LE.0.) GO TO 300
      QLENTH(I,2,INS)=VOL(I,2,INS)/SKIP
      QLENTH(I,2,INS)=QLENTH(I,2,INS)*8.
      DELAY(I,2,INS)=QLENTH(I,2,INS)*3600./C
  100 CONTINUE
      GO TO 400
  200 NPH=NPHASE(INS)
      IF(ISIG(INS).EQ.2) GO TO 285
      SKIP=0.
      DO 220 J=1,NPH
```

```
      R1=VOL(1,J,INS)/CAP(1,J,INS)
      R2=VOL(2,J,INS)/CAP(2,J,INS)
      SKIP=SKIP+AMAX1(R1,R2)
  220 CONTINUE
      SKIP=1.-SKIP
      IF(SKIP.LE.0.) GO TO 310
      CY(INS)=(9.*NPH+5.)/SKIP
  222 CONTINUE
      DO 230 J=1,NPH
      SKIPP=1.-SKIP
      R1=VOL(1,J,INS)/CAP(1,J,INS)
      R2=VOL(2,J,INS)/CAP(2,J,INS)
      G(INS,J)=CY(INS)*AMAX1(R1,R2)/SKIPP-3.
  225 CONTINUE
      IF(G(INS,J).LE.0.) GO TO 320
  230 CONTINUE
  285 CONTINUE
      DO 270 J=1,NPH
      DO 270 I=1,2
      P=(1.-G(INS,J)/CY(INS))/(1.-VOL(I,J,INS)/CAP(I,J,INS))
      IF(P.LT.0.) GO TO 330
      C3=CAP(I,J,INS)*G(INS,J)/CY(INS)
      IF(C3.LE.VOL(I,J,INS)) GO TO 340
      QLENTH(I,J,INS)=P*VOL(I,J,INS)*CY(INS)/3600.
     &+VOL(I,J,INS)/(C3-VOL(I,J,INS))
      QLENTH(I,J,INS)=QLENTH(I,J,INS)*8.
      DELAY(I,J,INS)=0.5*P*(CY(INS)-G(INS,J))+3600.*VOL(I,J,INS)/
     &(C3*(C3-VOL(I,J,INS)))
  270 CONTINUE
      GO TO 400
  300 WRITE(OUT,305) SKIP,C,I,INS,VOL(I,2,INS)
  305 FORMAT(//,1X,'***ERROR*** CAPACITY LESS THAN VOLUME FOR AN UNSIGNA
     &LIZED INTERSECTION',/,1X,'SKIP=',E15.3,1X,
     &'C=',E15.3,1X,'I=',I5,1X,'INS=',I5,1X,'VOL=',E15.3)
      GO TO 350
  310 WRITE(OUT,315) INS,SKIP
  315 FORMAT(//,1X,'***ERROR*** FOR SIGNALIZED INTERSECTION',I5,1X,
     &'SKIP=',E15.3)
      GO TO 350
  320 WRITE(OUT,325) INS,J,G(INS,J)
```

```
325 FORMAT(//,1X,'***ERROR*** NEGATIVE GREEN TIME FOR SIGNALIZED INTERTRA00810
   &SECTION',I5,1X,'PHASE=',I5,1X,'G=',E15.3,1X,'SEC')                 TRA00820
    GO TO 350                                                          TRA00830
330 WRITE(OUT,335) INS,J,I,P                                           TRA00840
335 FORMAT(//,1X,'***ERROR*** NEGATIVE P VALUE FOR SIGNALIZED INTERSECTRA00850
   &TION',I5,1X,'PHASE=',I5,1X,'APPROACH=',I5,'P=',E15.3)              TRA00860
    GO TO 350                                                          TRA00870
340 WRITE(OUT,345) INS,J,I,C3,VOL(I,J,INS)                             TRA00880
345 FORMAT(//,1X,'***ERROR*** CAPACITY LESS THAN VOLUME FOR SIGNALIZEDTRA00890
   & INTERSECTION',I5,1X,'PHASE=',I5,1X,'APPROACH=',I5,/,             TRA00900
   &1X,'C3=',E15.3,1X,'VEHICLES/HOUR',1X,'VOL=',E15.3,1X,'VEHICLES/HOUTRA00910
   &R')                                                                TRA00920
350 CONTINUE                                                           TRA00930
    STOP                                                               TRA00940
400 CONTINUE                                                           TRA00950
500 CONTINUE                                                           TRA00960
    RETURN                                                             TRA00970
    END                                                                TRA00980
```

```
      SUBROUTINE ACDC(V,A,EMAD,IPRSW)
      COMMON/AGEMM/DEC
      COMMON/COCOEF/COEF
      DIMENSION COEF(20,12),DEC(20),X(12)
      FACTOR=1.0
      EMAD=0.
      AMAX=1.0
      AMIN=-1.2
      A1=-1.0/AMIN
      A2=-1.0/AMAX
      IF(A.EQ.0.) GO TO 200
      T=ABS(V/A)
      AA=A*A
      TT=T*T
      X(1)=T
      X(2)=A*TT/2.0
      X(3)=A*T
      X(4)=AA*TT/2.0
      X(5)=AA*TT*T/3.0
      X(6)=AA*T
      X(8)=AA*A*TT*T/3.0
      X(7)=AA*A*TT/2.0
      X(9)=AA*AA*TT*T/3.0
      X(10)=X(1)
      X(11)=X(2)
      X(12)=X(5)
      IF(A.GE.AMAX) HOA=0.
      IF(A.LE.AMIN) HOA=0.
      IF(A.GE.0.0.AND.A.LT.AMAX) HOA=(A2*A)+1.0
      IF(A.LE.0.0.AND.A.GT.AMIN) HOA=(A1*A)+1.0
      SOA=1.-HOA
      IF(IPRSW.GE.1) WRITE(6,9010) X,SOA,HOA
 9010 FORMAT (5X,'X(I) =',12F8.2,/,5X,'SOA =',F5.1,10X,'HOA =',F5.1)
      DO 100 I1=1,20
      IF(DEC(I1).EQ.0.) GO TO 100
      DO 70 I2=1,9
      IF(A.LT.0.0.AND.I2.EQ.2) GO TO 50
      IF(A.LT.0.0.AND.I2.EQ.4) GO TO 50
      IF(A.LT.0.0.AND.I2.EQ.7) GO TO 50
      EMAD=EMAD+X(I2)*SOA*COEF(I1,I2)*FACTOR*DEC(I1)
```

```
      GO TO 65                                                          ACD00410
   50 EMAD=EMAD-X(I2)*SOA*COEF(I1,I2)*FACTOR*DEC(I1)                    ACD00420
   65 IF(IPRSW.GE.1) WRITE(6,9020) EMAD,I1,I2                           ACD00430
 9020 FORMAT (10X,'EMAD =',F12.3,2I5)                                   ACD00440
   70 CONTINUE                                                          ACD00450
      DO 80 I2=10,12                                                    ACD00460
      IF(A.LT.0.0.AND.I2.EQ.11) GO TO 75                                ACD00470
      EMAD=EMAD+X(I2)*HOA*COEF(I1,I2)*FACTOR*DEC(I1)                    ACD00480
      GO TO 80                                                          ACD00490
   75 EMAD=EMAD-X(I2)*HOA*COEF(I1,I2)*FACTOR*DEC(I1)                    ACD00500
   80 CONTINUE                                                          ACD00510
  100 CONTINUE                                                          ACD00520
      GO TO 250                                                         ACD00530
  200 EMAD=0.                                                           ACD00540
  250 CONTINUE                                                          ACD00550
      RETURN                                                            ACD00560
      END                                                               ACD00570
```

```
      SUBROUTINE STREET(E,THETA,WS,AST,W,X,BHT,RHT,IRS,CST)
      CK=7.0
      XLO=2.0
      CW=CK*E*(BHT-RHT)*1.0E6/(W*(WS+0.5)*BHT)
      CL=CK*E*1.0E6/((WS+0.5)*(SQRT((X)**2+RHT**2)+XLO))
      EPSIL=THETA-AST
      IF(EPSIL.LT.0.) EPSIL=360.+EPSIL
      IF(EPSIL.GT.30..AND.EPSIL.LE.150..AND.IRS.EQ.1) GO TO 50
      IF(EPSIL.GT.30..AND.EPSIL.LE.150..AND.IRS.EQ.2) GO TO 60
      IF(EPSIL.GT.210..AND.EPSIL.LE.330..AND.IRS.EQ.1) GO TO 60
      IF(EPSIL.GT.210..AND.EPSIL.LE.330..AND.IRS.EQ.2) GO TO 50
      CST=((CL+CW)/2.)
      GO TO 100
   50 CST=CL
      GO TO 100
   60 CST=CW
  100 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE DECIDE(XX,YY,X1,Y1,X2,Y2,IANS)
      AX=XX-X1
      AY=YY-Y1
      BX=X2-X1
      BY=Y2-Y1
      A=SQRT(AX**2+AY**2)
      B=SQRT(BX**2+BY**2)
      CS=(AX*BX+AY*BY)/(A*B)
      IF(CS.LT.0.) IANS=0
      IF(CS.GE.0.) IANS=1
      RETURN
      END
```

```
      SUBROUTINE SUP8 (INIFLG,I1,I2,A1,X1,X2,X3,X4,A2,
     &I5,X5,A3,X6,X7,I6,X8,X9,X10,X11,I7,I8,I9,I10,I11,I12,
     &I13,EMCRUZ,EMIDLE)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *                  UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM
      COMMON/REGCOM/IREJN
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,VMTMIX
      COMMON/ALTCOM/NMYALT,ALTKOD
      COMMON/MYMCOM/MYM,MYR,TF
      COMMON/JUNK1/AC,XLOAD,TRAILR,ABSHUM
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID
      COMMON/PROJCM/PROJID
      COMMON/IMCOM/ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2
      COMMON/SP1COM/SP1,SPAV
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,VMFLAG,SP3FLG,
     *          NMHFLG,IDLFLG,UNFFLG,PRTFLG
      REAL XLOAD(3),SPD(3),VMTMIX(6),MYM(20,6),MYR(20,6),TF(20,6)
      REAL EFRETM(3,6),WTEDEF(3),LNKDTA(7),PROJID(20)
      EQUIVALENCE (SPD(1),LNKDTA(1))
C     DATA VMTMIX/.803,.058,.058,.045,.031,.005/
      DATA IREAD,IWRI/5,6/
      REAL COMCCC(6),IDLRTM(3,6),IDLWTD(3)
      DIMENSION A2(6),A3(3)
      DATA IRJOLD/0/
      DATA IMOLD/0/
C
C
C
C
C
      IREJN=I1
      CY=I2
      TEMP=X1
      PCCO=X2
      PCHS=X3
      PCCC=X4
      DO 5 J=1,6
    5 VMTMIX(J)=A2(J)
```

```
      ALHFLG=I5
      AC=X5
      DO 6 J=1,3
    6 XLOAD(J)=A3(J)
      TRAILR=X6
      ABSHUM=X7
      TRKFLG=I6
      HGWGT=X8
      HDWGT=X9
      HGCID=X10
      HDCID=X11
      IMFLG=I7
      ICYIM=I8
      ISTRIN=I9
      IMTFLG=I10
      MODYR1=I11
      MODYR2=I12
      SPD(1)=A1
      SPD(2)=A1
      SPD(3)=A1
C
C
      IF(INIFLG.EQ.0) GO TO 100
      MYMRFG=0
      MSFLG=1
      ALTFLG=0
      SP3FLG=1
      NMHFLG=0
      IDLFLG=1
      UNFFLG=0
      ICEVFG=1
      IFORM=1
      PRTFLG=0
      INFLG=0
      IF(MYMRFG.EQ.1) READ(2,50) MYM,MYR
   50 FORMAT(20F4.1)
      CALL TFCALX
100   CONTINUE
C
C**CHECK CALENDAR YEAR
```

```
      IF(CY.GE.70) GO TO 505
      WRITE(IWRI,785)
785   FORMAT(' ***ERROR: CALENDAR YEAR RANGE IS 70 THRU 99')
      STOP
505   CONTINUE
      ICYPR = CY
      IF(CY.GT.95) CY = 95
C
C**CHECK AMBIENT TEMPERATURE
      IF(TEMP.GE.0.0.AND.TEMP.LE.110.) GO TO 697
      WRITE(IWRI,787)
787   FORMAT(' ***ERROR: VALID TEMPERATURE RANGE IS 0-110 DEG.(F)')
      STOP
697   CONTINUE
C
C**CHECK INPUT SPEED(S)
      IF(SP3FLG.EQ.1) GO TO 650
      IF(SP1.GT.0.) GO TO 620
      WRITE(IWRI,786)
786   FORMAT(' ***ERROR: SPEED MUST BE POSITIVE')
      STOP
620   IF(SP1.GT.60.) SP1 = 60.
      IF(SP1.LT.5.) WRITE(IWRI,788)
788   FORMAT(' **WARNING: AVG. ROUTE SPEED LESS THAN 5 M.P.H.')
      GO TO 695
C
650   CONTINUE
      IF(SPD(1).GT.0.0.AND.SPD(2).GT.0.0.AND.SPD(3).GT.0.) GO TO 670
      WRITE(IWRI,786)
      STOP
670   CONTINUE
      DO 671 I=1,3
      IF(SPD(I).LT.5.) WRITE(IWRI,788)
671   IF(SPD(I).GT.60.) SPD(I) = 60.
C
695   CONTINUE
C
C**END SPEED CHECK
C
      IF(SP3FLG.EQ.1) GO TO 520
```

```
C**HERE TO DECOMPOSE SINGLE ENTERED SPEED INTO BAG SPEEDS
C     SPD(1) = SP1*1.30
C     SPD(2) = SP1*.825
C     SPD(3) = SP1*1.30
      SPD(1) = SP1
      SPD(2) = SP1
      SPD(3) = SP1
C     SPD(1) = SP1*(1.3777386 - (PCCC*.30/79.42))
C     SPD(2) = SP1*(.75935 + (PCHS*.175/72.72))
C     SPD(3) = SPD(1)
C
C     PCHSNC = PCCC - PCCO + PCHS
C     PCHSTB = 100. - PCCC - PCHS
C     SPD(1) = SP1*(1.41114406 - .0041114406*PCCO)
C     SPD(2) = SP1*(.6162276026 + .003837724*PCHSTB)
C     SPD(3) = SP1*(1.44902449 - .0044902449*PCHSNC)
520   CONTINUE
C
C
      IF(IREJN.NE.IRJOLD.OR.IMOLD.NE.IMFLG) CALL INITEX(NMYALT,ALTKOD)
      IF(IMFLG.EQ.1.AND.(IMOLD.NE.IMFLG.OR.IREJN.NE.IRJOLD)) CALL LDVIMX
      IRJOLD=IREJN
      IMOLD=IMFLG
      CALL EFCALX(CY,LNKDTA,VMTMIX,EFRETM,WTEDEF,COMCCC,IDLRTM,IDLWTD)
      IF(I13.EQ.1) CALL OUTPUT(ICYPR,EFRETM,WTEDEF,COMCCC,IDLRTM,
     &IDLWTD)
      EMCRUZ=WTEDEF(2)
      EMIDLE=IDLWTD(2)
      RETURN
      END
```

```
      SUBROUTINE OUTPUT(CY,EFRETM,WTEDEF,COMCCC,IDLRTM,IDLWTD)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM
      COMMON/REGCOM/IREJN
      COMMON/BEFCOM/BEF
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,VMTMIX
      COMMON/ALTCOM/NMYALT,ALTKOD
      COMMON/MYMCOM/MYM,MYR,TF
      COMMON/JUNK1/AC,XLOAD,TRAILR,APSHUM
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID
      COMMON/RET1/ALHRET
      COMMON/RET2/TRKRET(20,3,2)
      COMMON/IMCOM/ICYIM,ISTRIN,IMTFLG,MODYR1,MODYR2
      COMMON/SP1COM/SP1,SPAV
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,VMFLAG,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG
      REAL VMTMIX(6),MYM(20,6),MYR(20,6),PNAM1(3),PNAM2(3),PNAM3(3)
      REAL SPD(3)
      REAL EVPNAM(3),EXHHDR(9),IDLNM1(3),IDLNM2(3),IDLNM3(3)
      REAL IDLRTM(3,6),IDLWTD(3),PNAMH(2)
      REAL IDLHDR(8),IDLHD2(4),REGN1(3),REGN2(3)
      REAL COMPEF(20,3,6)
      REAL ALHRET(20,4,3)
      REAL A(20,3,3),U(20,3,3),L(3,3),H(3),XLOAD(3)
      REAL EFRETM(3,6),WTEDEF(3),LNKDTA(7),PROJID(20)
      REAL COMCCC(6),TF(20,6)
      REAL BEF(20,26,3,6)
      REAL YESNO(2)
      EQUIVALENCE (SPD(1),LNKDTA(1))
C
      DATA PROJID/'EMIS','SION',' FAC','TOR ','CALC',
     &'ULAT','ION ','    ','SUPR','OUTI',
     &'NE S','UP8','(MOD','ILE1',' PRO',
     &'GRAM',' MOD','IFIE','D)  ','    '/
      DATA PNAMH/'NON-','METH'/
      DATA PNAM1/'   T','EXHA','EXHA'/
      DATA PNAM2/'OTAL','UST ','UST '/
      DATA PNAM3/' HC ',' CO ','NOX '/
```

```
      DATA IDLNM1/'   I','   I','   I'/
      DATA IDLNM2/'DLE ','DLE ','DLE '/
      DATA IDLNM3/' HC ',' CO ','NOX '/
      DATA EVPNAM/'   *','EVAP',' HC '/
      DATA IWRI,IWRUNF/6,9/
      DATA EXHHDR/'COMP','OSIT','E EM','ISSI','ON F','ACTO',
     *    'RS (','GM/M','ILE)'/
      DATA IDLHDR/'IDLE',' EMI','SSIO','N FA','CTOR','S (G',
     *   'M/MI','N)  '/
      DATA IDLHD2/'    ','  CO','RREC','TED '/
      DATA REGN1/'49-S','CALI','HI-A'/
      DATA REGN2/'TATE','F.  ','LT. '/
      DATA DASH/'----'/
      DATA INITFL/1/
      DATA YESNO/'NO  ','YES '/
C
C*************************************************************************
      IF(NMHFLG.EQ.0) GO TO 77
      PNAM1(1) = PNAMH(1)
      PNAM2(1) = PNAMH(2)
77    CONTINUE
C
      IF(INITFL.NE.1) GO TO 175
C**HERE FIRST TIME
      INITFL=0
      IF(IFORM.EQ.0) WRITE(IWRI,7011) PROJID
      IF(IFORM.EQ.1) WRITE(IWRI,701) PROJID
      IF(IFORM.EQ.1)
     *WRITE(IWRI,7017) PNAM1(1),PNAM2(1),PNAM3(1)
7017  FORMAT('0',2X,'*',2A4,A3,' EMISSION FACTORS INCLUDE ',
     *  'EVAP. HC EMISSION FACTORS')
C
      IF(IFORM.EQ.1) WRITE(IWRI,710)
175   CONTINUE
C
      IF(IFORM.EQ.0) GO TO 888
C*************************************************************************
C
      WRITE(IWRI,7029)
      IF(SP3FLG.EQ.1)
```

```
     *WRITE(IWRI,703) CY,TEMP,VMTMIX,REGN1(IREJN),REGN2(IREJN),SPD,SPAV,
     *  PCCO,PCHS,PCCC
      IF(SP3FLG.EQ.0)
     *WRITE(IWRI,7035) CY,TEMP,VMTMIX,REGN1(IREJN),REGN2(IREJN),SP1,SPD,
     *  SPAV,PCCO,PCHS,PCCC
      IF(ALHFLG.EQ.1) WRITE(IWRI,704) AC,XLOAD,TRAILR,ABSHUM
      IF(TRKFLG.EQ.1) WRITE(IWRI,705) HGWGT,HDWGT,HGCID,HDCID
      IF(IMFLG.EQ.1) WRITE(IWRI,7051) ICYIM,ISTRIN,YESNO(IMTFLG+1)
      IF(IMFLG.EQ.1) WRITE(IWRI,7052) MODYR1,MODYR2
C
      WRITE(IWRI,7059) EXHHDR
      WRITE(IWRI,706)
C
      IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.1)
     *WRITE(IWRI,707) PNAM1(1),PNAM2(1),PNAM3(1),(EFRETM(1,IM),IM=1,6),
     *  WTEDEF(1)
      IF(ICEVFG.EQ.1) WRITE(IWRI,708) EVPNAM,COMCCC,DASH
      IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.2)
     *WRITE(IWRI,707) PNAM1(2),PNAM2(2),PNAM3(2),(EFRETM(2,IM),IM=1,6),
     *  WTEDEF(2)
      IF(PRTFLG.EQ.0.OR.PRTFLG.EQ.3)
     *WRITE(IWRI,707) PNAM1(3),PNAM2(3),PNAM3(3),(EFRETM(3,IM),IM=1,6),
     *  WTEDEF(3)
C
      IF(IDLFLG.EQ.0) GO TO 200
      WRITE(IWRI,709) IDLHD2,IDLHDR
      WRITE(IWRI,707) (IDLNM1(IQ),IDLNM2(IQ),IDLNM3(IQ),(IDLRTM(IQ,IM),
     *  IM=1,6),IDLWTD(IQ),IQ=1,3)
200   CONTINUE
C
      WRITE(IWRI,710)
C
      GO TO 899
C
C***********************************************************************
C
888   CONTINUE
         IPP1=PRTFLG
         IPP2=PRTFLG
         IF(PRTFLG.EQ.0) IPP1=1
```

```
         IF(PRTFLG.EQ.0) IPP2=3
      DO 1203 IPNX=IPP1,IPP2
      WRITE(IWRI,79080) IREJN,CY,SPD,TEMP,PCCO,PCHS,PCCC,IPNX,
     *  (EFRETM(IPNX,IM),IM=1,6),VMTMIX,WTEDEF(IPNX)
1203  CONTINUE
79080 FORMAT(1X,I1,1X,I2,1X,F4.1,'/',F4.1,'/',F4.1,1X,
     *  F3.0,1X,F5.1,1X,F5.1,1X,F5.1,1X,I1,6F6.1,6F6.3,F7.2)
C
899   CONTINUE
C
C
C*************************************************************************
C
      IF(UNFFLG.EQ.1) WRITE(IWRUNF) EFRETM,WTEDEF
C
C*************************************************************************
701   FORMAT('1',20A4/)
7011  FORMAT('1',20A4)
C
7029  FORMAT(32X,'VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC')
C
703   FORMAT('  CAL. YEAR: 19',I2,5X,'TEMP: ',F4.1,
     *  '(F)',8X,5(F5.3,'/'),F5.3,
     *  /1X,' REGION: ',2A4,4X,F4.1,'/',F4.1,'/',F4.1,
     *  ' MPH ','(',F4.1,')',7X,' ',F5.1,'/',F5.1,'/',F5.1 )
C
7035  FORMAT('  CAL. YEAR: 19',I2,5X,'TEMP: ',F4.1,
     *  '(F)',8X,5(F5.3,'/'),F5.3,
     *  /1X,' REGION: ',2A4,4X,F4.1,':',F4.1,'/',F4.1,'/',F4.1,
     *  ' MPH ','(',F4.1,')',3X,' ',F5.1,'/',F5.1,'/',F5.1 )
704   FORMAT('   AC:',F6.2,2X,'XLOAD:',3F7.2,2X,'TRAILR:',
     *  F7.2,2X,'ABSHUM:',F7.2)
C
705   FORMAT('   HGWGT:',F7.0,2X,'HDWGT:',F7.0,2X,'HGCID:',
     *  F7.2,2X,'HDCID:',F7.2)
C
7051  FORMAT('   LDV I/M PROGRAM STARTING IN 19',I2,
     *  ', STRINGENCY LEVEL ',I2,'%, MECH. TRAINING: ',A4)
C
7052  FORMAT('   I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 19',
```

```
     *  I2,' THROUGH 10',I2)
 705  FORMAT('0',22X,9A4)
C
 706  FORMAT(' ',15X,'LDV       LDT1      LDT2      HDG       HDD      ',
     *  '      MC       ALL MODES')
C
 707  FORMAT((1X,2A4,A3,':',6(F7.2,2X),1X,F8.2))
C
 708  FORMAT(1X,2A4,A3,':',6(F7.2,2X),5X,A4)
C
 709  FORMAT('0',16X,4A4,8A4)
C
 710  FORMAT(' ---------------------------------------',
     *'---------------------------------------')
C
C
C     DEBUG SUBCHK
      RETURN
      END
```

```
      SUBROUTINE EFCALX(CY,LNKDTA,MS,EFRETM,WTEDEF,CCRETM,IDLRTM,IDLWTD)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM
      COMMON/CEVCOM/CCEV
      COMMON/REGCOM/IREJN
      COMMON/BEFCOM/BEF
      COMMON/IDLCOM/IDLBEF
      COMMON/MYMCOM/MYM,MYP,TF
C
      INTEGER MYP , P ,  CYP
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,MSFLG,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG
C
      REAL IDLBEF(20,26,3,6),IDLFAC(20,3,6),IDLCMP(3,6),IDLWTD(3)
      REAL IDLRTM(3,6)
      REAL COMPCC(20,6),CCRETM(6)
      REAL CFRET(20,3,6)
      REAL     BEF(20,26,3,6),      CCEV(45,6),
     *         CEFLDV(3),           CEFLT1(3),
     *         CEFLT2(3),           CEFHDG(3),
     *         CEFHDD(3),           CEFMCC(3),
     *         EFRETM(3,6),         COMPEF(20,3,6),
     *         COMPMY(3,6),         LNKDTA(7),
     *         MYM(20,6),           MYR(20,6),
     *         MS(6),               PCCO,
     *         PCCC,                PCHS,
     *         SPD(3),              TEMP,
     *         TF(20,6),            TFNORM(6),
     *         WTEDEF(3)
      DIMENSION R1(20,3,6),R2(20,3,6),XISPD(3)
C
C
C**************************************************************************
C
      SPD(1)  = LNKDTA(1)
      SPD(2)  = LNKDTA(2)
      SPD(3)  = LNKDTA(3)
      TEMP    = LNKDTA(4)
      PCCO    = LNKDTA(5)
```

```
      PCHS      = LNKDTA(6)
      PCCC      = LNKDTA(7)
C
C
            CALL BIGCFX(CY,TEMP,PCCO,PCHS,PCCC,SPD,CFRET)
C
      XISPD(1)=5.0
      XISPD(2)=5.0
      XISPD(3)=5.0
      XITEMP=75.0
      XIPCCO=0.0
      XIPCHS=0.0
      XIPCCC=0.0
      CALL BIGCFX(CY,TEMP,PCCO,PCHS,PCCC,XISPD,R1)
      CALL BIGCFX(CY,XITEMP,XIPCCO,XIPCHS,XIPCCC,XISPD,R2)
C
      CYP = CY - 69
C
C
      DO 500 P = 1,3
               WTFDEF(P) = 0.0
               IDLWTD(P) = 0.0
         DO 400 M = 1,6
               COMPMY(P,M) = 0.0
               IDLCMP(P,M) = 0.0
      IF(P.EQ.1) CCRETM(M)=0.
            DO 300 I = 1,20
C
      MYP = CY -(20-I) - 50
C
               IF (P.EQ.1)  GO TO 333
               GO TO 444
C
333   COMPEF(I,P,M)=(BEF(I,CYP,P,M)*CFRET(I,P,M)+ CCEV(MYP,M))*TF(I,M)
      COMPCC(I,M)  =CCEV(MYP,M)*TF(I,M)
      GO TO 555
444   COMPEF(I,P,M)=(BEF(I,CYP,P,M)*CFRET(I,P,M)              )*TF(I,M)
C
555   CONTINUE
C
```

```
 90   CONTINUE
C
      IF(IMODE.EQ.2) GO TO 15
C*****U:  TRAILER TOWING CORRECTION FACTOR
      DO 91 I=1,20
      IMY=CY-(20-I)-50
      IF(IMY.GT.24) GO TO 77
      CFA=TCFA(IP)
      GO TO 78
 77   CONTINUE
      CFA=(PCCOLD*TCFA(IP) + (1.-PCCOLD)*TCFB(IP))/
     *             (PCCOLD + (1.-PCCOLD)*TCFC(IP))
 78   CONTINUE
C
      U(I,IMODE,IP) = TRAILR*(CFA-1.) + 1.0
C
 91   CONTINUE
C
C
 15   CONTINUE
C*****L:  ADDITIONAL LOADING CORRECTION FACTOR
      L(IMODE,IP) = XLOAD(IMODE)*(CFLD(IP)-1.) + 1.
C
 400  CONTINUE
 500  CONTINUE
C*****H:  HUMIDITY CORRECTION FACTOR
      DO 675 IMODE=1,3
      H(IMODE) = 1. - .0047*(ABSHUM - 75.)
 675  CONTINUE
C
C
      DO 800 IP=1,3
      DO 800 IMODE=1,3
      DO 800 IY=1,20
      ALHTMP = A(IY,IMODE,IP)*U(IY,IMODE,IP)*L(IMODE,IP)
      IF(IP.EQ.3) ALHTMP = ALHTMP*H(IMODE)
      ALHRET(IY,IMODE,IP) = ALHTMP
 800  CONTINUE
C
      RETURN
```

```
      SUBROUTINE BIGCFX(CY,T,PCCO,PCHS,PCCC,SPD,CFRET)
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM
      COMMON/ALTCOM/NMYALT,ALTKOD
      COMMON/REGCOM/IREJN
      COMMON/JUNK1/AC,XLOAD,TRAILR,ABSHUM
      COMMON/JUNK2/HGWGT,HDWGT,HGCID,HDCID
      COMMON/RET1/ALHRET(20,4,3)
      COMMON/RET2/TRKRET(20,3,2)
      COMMON/SP1COM/SP1,SPAV
      COMMON/MYMCOM/MYM,MYR,TF
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,MSFLG,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG
      INTEGER INITFL,IEQNAR(45,3,3,4),HDINDX(45,3)
      INTEGER G(45,3,4)
C IN G, 1ST INDEX IS MY, 2ND IS REGION, AND 3RD IS MODE
C IN IEQNAR, 2ND INDEX IS POLLUTANT, 3RD IS REGION, 4TH IS MODE
C IN HDINDX, 2ND INDEX IS REGION (NOT FUNCTION OF POL. OR MODE)
C
      REAL COMCCC(6),A(20,3,3),U(20,3,3),
     *  L(3,3),H(3)
      REAL XLOAD(3)
      REAL COMPEF(20,3,6)
      REAL W,T,SPD(3),SPB(3),CFRET(20,3,6)
      REAL D1(4,3),D2(4,3)
      REAL MIDDLE,LEFT
      REAL SPBACK(18,3,3),SPROT(18,3,3)
      REAL ATR(4,3,2),BTR(4,3,2),CTR(4,3,2)
      REAL C(4,8,3)
      REAL CUMMIL(20,6),MYM(20,6),MYR(20,6),TF(20,6)
      INTEGER MAXAGE(4)
C
      DATA MAXAGE/19,19,19,19/
      DATA INITFL/1/
C
C*************************************************************************
C
C**COEFFICIENTS IN SPEED/TEMP/COLD START FACTOR: EQN,INDEX,POL.
```

```
      DATA C/
     *   2.931000, 2.931000, 2.433900, 1.993400,
     *  -0.014779,-0.014779,-0.023591,-0.022269,
     *   0.673,-2.410, 0.623,-0.032, 0.569, 0.863, 0.301, 0.445,
     *   4.750, 2.430, 1.110, 0.497, 0.393, 0.555, 0.284, 0.357,
     *   5.690, 2.610, 1.050, 0.243, 0.471, 0.597, 0.270, 0.175,
     *   5.654800, 5.654800, 5.546000, 4.239100,
     *  -0.015965,-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,
     *  -0.10E+03,-0.10E+03,-0.10E+03,-0.10E+03,
     *   0.0  , 0.0  , 0.0  , 0.0  , 1.140, 1.160,
     *   3.260, 3.050, 0.0  , 0.0  , 0.335, 0.318,
     *   1.250, 1.260, 2.990, 2.880, 0.0  , 0.0  ,
     *   0.184, 0.180, 0.810, 0.800, 1.890, 2.010,
     *   0.0  , 0.0  , 0.116, 0.126  /
C
C**COEFFICIENTS IN DENOMINATOR OF SPEED/TEMP/COLD START FACTOR
      DATA D1/5.67,2.8,1.38,.54,56.43,36.4,23.7,6.98,1.,1.,2.47,2.46/
      DATA D2/.47,.64,.28,.28,7.59,6.79,3.14,3.14,0.,0.,.18,.18/
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, 3, 3, 4, 5, 6, 7,13,16,16,18,18,18,18*18,
     *        15*1, 1, 1, 8, 9,10,11,12,15,15,18,18,18,18*18,
     *
     *        15*2, 2, 2, 4, 5, 6, 7,14,17,17,18,18,18,18*18,
     *        15*2, 2, 2, 4, 5, 6, 7,13,16,16,18,18,18,18*18,
     *        15*1, 1, 1, 8, 9,10,11,12,15,15,18,18,18,18*18,
     *
     *        28*14,17*18,
     *        27*13,18*18,
     *        28*12,17*18,
     *
     *        15*2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,18*17,
     *        15*2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,18*16,
     *        15*1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,18*15 /
C
```

```
      DATA IEQNAR/17*1,7*2,5*3,16*4,  17*1,7*2,5*3,16*4,
     *            17*1,7*2,2*3,19*4,  15*1,9*2,     21*4,
     *            15*1,9*2,     21*4, 15*1,9*2,     21*4,
     *            17*1,7*2,5*3,16*4,  17*1,7*2,5*3,16*4,
     *            17*1,7*2,2*3,19*4,
     *            17*1,7*2,21*3,      17*1,7*2,21*3,
     *            17*1,7*2,21*3,      17*1,7*2,     21*4,
     *            17*1,7*2,     21*4, 17*1,7*2,     21*4,
     *            17*1,7*2,21*3,      17*1,7*2,21*3,
     *            17*1,7*2,21*3,
     *            28*2,17*3,          28*2,17*3,
     *            28*2,17*3,          27*2,18*4,
     *            27*2,18*4,          27*2,18*4,
     *            28*2,17*3,          28*2,17*3,
     *            28*2,17*3,
     *            27*1,18*2,27*1,18*2,27*1,18*2,
     *            27*1,18*2,27*1,18*2,27*1,18*2,
     *            27*1,18*2,27*1,18*2,27*1,18*2  /
C
      DATA HDINDX/19*1,4*2,5*3,17*4,
     *            19*1,4*2,1*3,21*4,
     *            19*1,4*2,5*3,17*4   /
C
C
C***********************************************************************
C
      IF(INITFL.NE.1) GO TO 177
C  HERE 1ST TIME
      INITFL = 0
      SPB(1) = 26.0
      SPB(2) = 16.0
      SPB(3) = 26.0
      CALL SPFCLX(SPB,SPROT)
C
C
      CALL GETCUM(CUMMIL)
C
C
C***********************************************************************
C
```

```
177   CONTINUE
C
      CALL SPFCLX(SPD,SPPACK)
C
C
      IF(ALHFLG.EQ.1) CALL ALUH(CY,AC,XLOAD,TRAILR,PCCO,PCCC,ABSHUM)
C
C***********************************************************************
C
      FCO = PCCO*.01
      FHC = PCHS*.01
      FCC = PCCC*.01
C
C**FRACTION COLD OP(NON-CAT): FCO
C**FRACTION HOT START(CAT):  FHC
C**FRACTION COLD OP(CAT)  :   FCC
C**FRACTION HOT START(NON-CAT): FHO
      FHO = (FCC-FCO) + FHC
C
      DO 500 I = 1,20
C
         MY = CY - (20-I)
         MYC = MY - 50
         IAGE = CY - MY
         AGE = IAGE
C
C************************
      IF(MYC.LE.0) STOP
C>>>>>>>>>>>>>>>>>>>>>>>
C
      DO 500 IMODE = 1,4
C
      IMOD4 = IMODE
      IF(IMODE.EQ.4) IMOD4 = 6
      IAGEM = IAGE
         MAX = MAXAGE(IMODE)
      IF(IAGEM.GT.MAX) IAGEM = MAX
      IF(IAGEM.EQ.0) VMTAGE=0.0
      IF(IAGEM.GT.0) VMTAGE=CUMMIL(IAGEM,IMOD4)*.0001
C
```

```
          IGX = G(MYC,IREJN,IMODE)
C
      DO 500 IP = 1,3
C
C**DEFAULT
C
      IEQN = IEQNAR(MYC,IP,IREJN,IMODE)
C
C****************************************
C
      IF(ALTFLG.EQ.0) GO TO 777
C
      DO 450 ICH = 1,NMYALT
      IF(ALTKOD(1,ICH).EQ.MY) GO TO 877
450   CONTINUE
      GO TO 550
877   CONTINUE
C**HERE FOR ALTERATION
      IALT = ALTKOD(IP+1,ICH)
C
      IF(IALT.EQ.0) GO TO 777
      IF(IALT.EQ.1) IEQN = 3
      IF(IALT.GT.1) IEQN = 4
777   CONTINUE
C
C****************************************
C
550   CONTINUE
C
      FACL = FCO
      FACM = FHO
      IF(IEQN.LT.2) GO TO 888
      FACL = FCC
      FACM = FHC
888   FACR = (1.0 - FACL - FACM)
C
C***********************************************************************
C
      DENOM = D1(IEQN,IP) + D2(IEQN,IP)*VMTAGE
C
```

```
      LEFT = FACL * (EXP(C(IEQN,1,IP)+T*C(IEQN,2,IP)) + C(IEQN,3,IP) +
     *  C(IEQN,4,IP)*VMTAGE) * SPBACK(2,1,IP)/SPBOT(2,1,IP)
C
C
      MIDDLE=FACM*(C(IEQN,5,IP)+C(IEQN,6,IP)*VMTAGE)
     *     *SPBACK(IGX,3,IP)/SPBOT(IGX,3,IP)
C
C
      RIGHT=FACR*(C(IEQN,7,IP)+C(IEQN,8,IP)*VMTAGE)
     *      *SPBACK(IGX,2,IP)/SPBOT(IGX,2,IP)
C
      TOP = LEFT + MIDDLE + RIGHT
C
C
      FACTOR = TOP/DENOM
C
      IF(ALHFLG.EQ.1) FACTOR = FACTOR*ALHRET(I,IMODE,IP)
C
      IMOD2 = IMODE
C
      IF(IMODE.EQ.4) IMOD2 = 6
C
      CFRET(I,IP,IMOD2) = FACTOR
C
500   CONTINUE
C
C***********************************************************************
C
C
C    FOR MODES 4 AND 5
C
C
      DATA ATR/ 2.42, 1.14, 1.56, 1.54,
     *          1.74, 1.54, 1.24, 0.62,
     *          .851, .812, .820, .764,
     *          0.94, 0.94,  .820, 1.20,
     *          1.44, 1.44,  1.20, 1.44,
     *          0.62, 0.62,  0.72, 1.00  /
C
      DATA BTR/ -.153, -.065,  -.096, -.071,
```

```
     *              -.117, -.097,  -.078, -.039,
     *              .0074, .0094,  .0081, .0120,
     *              -.055, -.055,  -.051, -.072,
     *              -.092, -.092,  -.072, -.088,
     *              -.043, -.043,  -.054, -.074  /
C
      DATA CTR/ .0016, .0004, .0009, -.0003,
     *              .0015, .0010, .0008, .0004,
     *              .0000, .0000, .0000, .0000,
     *              .0004, .0004,  .0005, .0006,
     *              .0010, .0010,  .0006, .0008,
     *              .0006, .0006,  .0009, .0012  /
C
      IF(TRKFLG.EQ.1) CALL TRKOPC(CY,HGWGT,HDWGT,HGCID,HDCID)
C
C     IF(SP3FLG.EQ.0) SPAV = SPD(1)/(1.3777386 - (PCCC*.30/79.42))
      IF(SP3FLG.EQ.0) SPAV = SP1
C     IF(SP3FLG.EQ.1) SPAV = SPD(1)/(1.41114406 - (PCCO*.0041114406))
      IF(SP3FLG.EQ.1) SPAV = SPD(2)
C     IF(SP3FLG.EQ.1) SPAV = AMIN1(SPD(1),SPD(2))
C***ELIMINATE TWO LINES ABOVE
C
C
      DO 700 IMODE = 4,5
      IM = IMODE-3
         DO 700 IP = 1,3
C
      IMY1 = CY-19
                DO 700 IMY = IMY1,CY
      IMYP = IMY - 50
      IF(IMYP.LT.1) IMYP=1
C
                IX = 20-(CY-IMY)
C
           INDX = HDINDX(IMYP,IREJN)
C
      IF(IP.EQ.3.AND.IMODE.EQ.4) GO TO 720
C
      CFRET(IX,IP,IMODE) = EXP(ATR(INDX,IP,IM) +
     *  BTR(INDX,IP,IM)*SPAV + CTR(INDX,IP,IM)*SPAV*SPAV)
```

```
C
      GO TO 688
720   CONTINUE
C
      CFRET(IX,IP,IMODE) = ATR(INDX,IP,IM) + BTR(INDX,IP,IM)*SPAV
C
688   CONTINUE
C
      IF(TRKFLG.EQ.1) CFRET(IX,IP,IMODE) = CFRET(IX,IP,IMODE)*
     *                                     TRKRET(IX,IP,IM)
C
700   CONTINUE
      RETURN
C
C     DEBUG SUBCHK
      END
```

```
      SUBROUTINE INITEX( NMYALT , ALTKOD )
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,ALTKOD(4,20),CY,MSFLG,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG
C
      CALL BEFGEN
C
      CALL CCEVAX
C
      IF (ALTFLG.EQ.1) CALL EFALTX( NMYALT,ALTKOD )
C
C
      RETURN
C
      END
```

```
      SUBROUTINE TFCALX
C
      COMMON/MYMCOM/MYM,MYR,TF
      REAL TFNORM(6),MYM(20,6),MYR(20,6),TF(20,6)
C
      DO 850 M = 1,6
            TFNORM(M) = 0.0
         DO 810 I = 1,20
810         TFNORM(M) = TFNORM(M) + MYM(I,M)*MYR(I,M)
         DO 820 I = 1,20
820         TF(21-I,M) = ( MYM(I,M)*MYR(I,M) )/TFNORM(M)
C
850   CONTINUE
C
      RETURN
C
C     DEBUG SUBCHK
C
      END
```

```
      SUBROUTINE SPFCLX(SPARA,SPBACK)
      COMMON/ACOM/A
      REAL SPARA(3),SPBACK(18,3,3),A(6,18,3)
C
      DO 30 IP = 1,3
         DO 20 IG = 1,18
              IGG = IG
           DO 10 IS = 1,3
                SUM = A(6,IGG,IP)
                S = SPARA(IS)
              DO 5 I = 1,5
               SUM = SUM*S + A(6-I,IGG,IP)
5             CONTINUE
            SCF=EXP(SUM)
            IF(IP.EQ.3) SCF=SUM
            SPBACK(IG,IS,IP) = SCF
10         CONTINUE
20       CONTINUE
30    CONTINUE
      RETURN
C     DEBUG SUBCHK
      END
```

```
      SUBROUTINE BEFGEN
C
      COMMON/FLGCOM/ALTFLG,ALHFLG,TRKFLG,IRDFLG,SP3FLG,NMHFLG,IDLFLG,
     *              UNFFLG,MYMRFG,IMFLG,ICEVFG,PRTFLG,IFORM
      COMMON/REGCOM/IREJN
      COMMON/BEFCOM/BEF
      COMMON/BASECM/BASE3R
      COMMON/DELCOM/DEL3R
      COMMON/IDLBCM/IDLB3R
      COMMON/IDLDCM/IDEL3R
      COMMON/IDLCOM/IDLBEF
      COMMON/INDXCM/INDX3R
      COMMON/MYMCOM/MYM,MYR,TF
C
      REAL BASE3R(10,3,6,3),DEL3R(10,3,6,3)
      REAL IDLB3R(10,3,6,3),IDEL3R(10,3,6,3)
      REAL NONMTH(45,6)
      REAL BEF(20,26,3,6),IDLBEF(20,26,3,6)
      REAL CUMMIL(20,6),MYM(20,6),MYR(20,6),TF(20,6)
C
      INTEGER ALHFLG,TRKFLG,ALTFLG,MSFLG,SP3FLG,
     *        NMHFLG,IDLFLG,UNFFLG,MYMRFG,PRTFLG
      INTEGER INDX3R(30,3,6,3)
      INTEGER MAXAGE(6)
C
      DATA MAXAGE/19,19,19,19,19,19/
      DATA NONMTH/
     *              24*.95 , 21*.85 ,
     *              24*.95 , 21*.85 ,
     *              24*.95 ,  4*.95 , 17*.85 ,
     *              24*.95 ,  8*.95 , 13*.85 ,
     *              45*.98 ,
     *              45*.95                    /
C
C**********************************************************************
C
      CALL GETCUM(CUMMIL)
C
C*********************************************
C
```

```
      DO 100 IMODE=1,6
C
        MAX = MAXAGE(IMODE)
C
      DO 100 ICY = 70,95
      DO 100 IP = 1,3
        IMY1=ICY-19
        IMY13=ICY
        ICYP=ICY-69
C
      DO 100 MY = IMY1,IMY13
        IMYP =  MY - 50
C
        IAGE=ICY - MY
C
      IF(IAGE.GT.MAX) IAGE = MAX
C
        AGE = IAGE
        IA2=ICY-MY+1
        IA3=21-IA2
C
      IF(MY.LT.66) INDX=1
      IF(MY.GE.66) INDX=INDX3R(MY-65,IP,IMODE,IREJN)
C
      VMTAGE = CUMMIL(IAGE+1,IMODE)*.0001
C
      BEF(IA3,ICYP,IP,IMODE) =
     *            BASE3R(INDX,IP,IMODE,IREJN) +
     *               VMTAGE*DEL3R(INDX,IP,IMODE,IREJN)
C
      IDLBEF(IA3,ICYP,IP,IMODE) =
     *            IDLB3R(INDX,IP,IMODE,IREJN) +
     *               VMTAGE*IDEL3R(INDX,IP,IMODE,IREJN)
C
100   CONTINUE
C
C*********************************************
C
C     WRITE(6,444) CUMMIL
444   FORMAT(1X,10F8.0)
```

```
C
C     DEBUG SUBCHK
C
      RETURN
      END
```

```
      SUBROUTINE GETCUM(CUMMIL)
C
      COMMON/MYMCOM/MYMDUM,MYR,TF
C
      REAL CUMMIL(20,6),MYM(20,6),MYMDUM(20,6),MYR(20,6),TF(20,6)
      REAL FRAC(4,6)
      DATA FRAC/
     *           .75 , .375 , .25 , .875 ,
     *           .75 , .375 , .25 , .875 ,
     *           .75 , .375 , .25 , .875 ,
     *           .50 , .25  , .50 , .75  ,
     *           .50 , .25  , .50 , .75  ,
     *           .50 , .25  , .50 , .75     /
C
      DO 10 I1=1,6
      DO 10 I2=1,20
10    MYM(I2,I1) = MYMDUM(I2,I1)*100000.
C
      DO 100 IM=1,6
         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     WRITE(6,444) CUMMIL                                               GET00410
444   FORMAT(1X,10F8.0)                                                 GET00420
C                                                                       GET00430
      RETURN                                                            GET00440
C                                                                       GET00450
C     DEBUG SUBCHK                                                      GET00460
      END                                                               GET00470
```

```
      SUBROUTINE EFALTX( NMYALT , ALTKOD )
C
      COMMON/BEFCOM/BEF
C
      INTEGER ALTKOD(4,20),NMYALT,CYI,P,ISTD1(3),MYI1,ICY
C
      REAL BEF(20,26,3,6),EFREP(20,4,3)
C
      DATA EFREP/1.0,1.2.1.4.1.6,1.8,2.0.2.2,2.4.2.6,2.8,3.0,3.0.3.0,
     *  0.6,0.7,0.8,1.0,1.1,1.2,1.3,1.4,1.6,1.7, 3*1.8,
     *  0.27.0.32,0.38,0.43,0.49,0.54,0.59,0.65,0.70,0.76,3*0.81,13*0.,
     *  23.7,26.8,30.0.33.1,36.2.39.4,42.5,45.7,48.8,4*51.9,
     *  6.98,10.12,13.26,16.40.19.54,22.68,25.82,28.96.32.10,4*35.24.
     *  2.2,4.16.6.12,8.08,10.04,12.,13.96,15.92,17.88,4*19.84,
     *  13*0.0,
     *  2.00.2.06,2.12,2.18,2.24,2.30,2.36,2.42,2.48.2.54,3*2.60.
     *  1.50,1.56,1.62,1.68,1.74.1.80,1.86,1.92,1.98,2.04,3*2.10.
     *  1.00,1.04,1.08,1.12,1.16.1.20,1.24,1.28,1.32.1.36,3*1.40,
     *  0.24,0.29,0.34,0.40,0.56.0.73,0.90,1.1,1.3,1.5,3*1.7,84*0. /
C
      DO 200 I = 1,NMYALT
C
        MYI1     = ALTKOD(1,I) - 69
        ISTD1(1) = ALTKOD(2,I)
        ISTD1(2) = ALTKOD(3,I)
        ISTD1(3) = ALTKOD(4,I)
C
         DO 110 P = 1,3
               ICODE1 = ISTD1(P)
               IF(ICODE1.EQ.0) GO TO 110
            DO 100 K = 1,20
               IREV = 21-K
               IM1 = K-1
               ICY = MYI1 + IM1
               IF(ICY.GT.26) GO TO 100
               BEF(IREV,ICY,P,1) = EFREP(K,ICODE1,P)
100         CONTINUE
C
110      CONTINUE
C
```

```
200   CONTINUE                                                  EPA00410
C                                                               EPA00420
      RETURN                                                    EPA00430
C                                                               EPA00440
C     DEBUG SUBCHK                                              EPA00450
C                                                               EPA00460
      END                                                       EPA00470
```

```
      SUBROUTINE CCEVAX
C
      COMMON/CEVCOM/CCEVRT
      COMMON/REGCOM/IREJN
C
      INTEGER CY , MY
      REAL CCEV(45,6,3),CCEVRT(45,6),LDGSWD(45),CCCAL(45,4,3)
C     DATA LDGSWD/17*.80,.77,.77,3*.74,2*.72,21*.55/
C
      DATA CCEV/12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,
     *          12*6.63,5*3.33,3*2.53,7*1.76,2*0.60,16*0.15,
     *          17*7.70,11*2.00,1*0.60,16*0.15.
     *          17*7.70,28*2.00,
     *          45*0.,
     *          26*2.17,19*0.,
     *
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,
     *          10*6.63,3*3.33,7*2.53,7*1.76,2*0.60,16*0.15,
     *          17*7.70,11*2.00,1*0.60,16*0.15,
     *          17*7.70,7*2.00,21*1.19,
     *          45*0.,
     *          26*1.60,19*0.,
     *
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.60,16*0.15,
     *          12*9.00,5*4.52,3*3.44,6*2.39,1*1.76,2*0.60,16*0.15,
     *          17*10.46,9*2.72,2*2.00,1*0.60,16*0.15,
     *          17*10.46,28*2.72,
     *          45*0.,
     *          26*2.17,19*0.      /
C
C
      DO 100 IMODE = 1,6
      DO 90 MY = 1,45
C
      CCEVRT(MY,IMODE) = CCEV(MY,IMODE,IREJN)
C
90    CONTINUE
100   CONTINUE
C
C
```

```
      RETURN                                                            CCE00410
C     DEBUG SUBCHK                                                      CCE00420
      END                                                               CCE00430
```

```
      SUBROUTINE LDVIMX
C
      COMMON/BEFCOM/BEF(20,26,7,6)
      COMMON/IMCOM/ICYIM,ISTRN,IMTFLG,MODYR1,MODYR2
      COMMON/IMCRED/PCIM
C
      INTEGER CY,CYP,CYIMP,CYIP1,DELY,DEL2,DEL
      INTEGER PCIM(19,5,4,2,2)
C**IN PCIM: DEL,ISTRIN,ITECH,IPROGM,IPOL
C
C***********************************************************************
C
      IPROGM = 1 + IMTFLG
C     ISTRIN = .1*ISTRN
      IF(ISTRN.LT.10.OR.ISTRN.GT.50) STOP
      IREM = ISTRN - (ISTRN/10)*10
      REM=IREM*.1
C     ISTRIN = ISTRN*.1
      STRN = (ISTRN + 0.5)*0.1
      ISTRIN = STRN
      CYIMP = ICYIM
      CYIP1 = ICYIM + 1
C
      DO 100 IPOL=1,2
      DO 100 CY = CYIP1,95
C
           CYP = CY-69
           DELY = CY - CYIMP
C
      DO 90 I = 1,20
         MY = CY - (20-I)
         MYP = MY - 50
         DEL2 = MY - CYIMP
C
      IF(MY.LT.MODYR1.OR.MY.GT.MODYR2) GO TO 90
C
      IF(MY.LE.CYIMP) DEL = DELY
      IF(MY.GT.CYIMP) DEL = DELY - DEL2
      IF(DEL.GT.19) DEL = 19
C
```

```
C*TEST FOR TECH. I, II, III, OR IV
      IF(MY.LT.75) ITECH = 1
      IF(MY.GE.75.AND.MY.LE.79) ITECH = 2
      IF(MY.EQ.80) ITECH = 3
      IF(MY.GE.81) ITECH = 4
C
      IF(DEL.EQ.0) PCRED = 0.0
      IF(DEL.GT.0.AND.ISTRIN.LT.5)
     * PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01
     *   + REM*(PCIM(DEL,ISTRIN+1,ITECH,IPROGM,IPOL) -
     *           PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL) )*.01
C
      IF(DEL.GT.0.AND.ISTRIN.EQ.5)
     * PCRED = PCIM(DEL,ISTRIN,ITECH,IPROGM,IPOL)*.01
C
C*PERHAPS SKIP FOR LDT?
      PCLEFT = 1. - PCRED
C
      BEF(I,CYP,IPOL,1) = BEF(I,CYP,IPOL,1)*PCLEFT
C
90    CONTINUE
100   CONTINUE
C
      RETURN
C
C     DEBUG SUBCHK
C
      END
```

```
      SUBROUTINE ALUH(CY,AC,XLOAD,TRAILR,PCCO,PCCC,ABSHUM)
C
      COMMON/RET1/ALHRET(20,4,3)
C
      INTEGER CY
      REAL COMPEF(20,3,6)
      REAL XLOAD(3)
      REAL PCW(20),CFNIX(20,3,6),COMCCC(6),CFLET(20,3,6),TF(20,6)
      REAL A(20,3,3),U(20,3,3),L(3,3),H(3)
      REAL TCFA(3),TCFB(3),TCFC(3)
      REAL CFLD(3)
      REAL ACCF(3),PCWAC(45)
C
      DATA ACCF/1.13,1.18,1.18/
      DATA CFLD/1.06,1.20,1.03/
      DATA PCWAC/15*.54,3*.66,4*.75,2*.81,21*.81/
      DATA TCFA/1.32,2.15,1.16/,TCFB/.75,1.55,1.28/,TCFC/.43,.39,.92/
C   IN TCFA ABOVE, 2ND VALUE SHOULD BE 2.15..IT IS 1.15 FOR ORE. CF.
C
      PCCOLD=PCCC*.01
C
      DO 207 IP=1,3
      H(IP)=1.
      DO 207 IM=1,3
      L(IP,IM)=1.
      DO 207 IT=1,20
      A(IT,IP,IM)=1.
      U(IT,IP,IM)=1.
      ALHRET(IT,4,IP) = 1.
207   CONTINUE
C
      DO 500 IP = 1,3
C
      DO 400 IMODE=1,3
C
      IF(IMODE.EQ.3) GO TO 15
C*****A:  AIR CONDITIONING CORRECTION FACTOR
      DO 90 I=1,20
      IMY = CY - (20-I) - 50
      PCW(I)=PCWAC(IMY)
```

```
      A(I,IMODE,IP) = AC*PCWAC(IMY)*(ACCF(IP)-1.) + 1.0
90    CONTINUE
C
      IF(IMODE.EQ.2) GO TO 15
C*****U:  TRAILER TOWING CORRECTION FACTOR
      DO 91 I=1,20
      IMY=CY-(20-I)-50
      IF(IMY.GT.24) GO TO 77
      CFA=TCFA(IP)
      GO TO 78
77    CONTINUE
      CFA=(PCCOLD*TCFA(IP) + (1.-PCCOLD)*TCFB(IP))/
     *            (PCCOLD + (1.-PCCOLD)*TCFC(IP))
78    CONTINUE
C
      U(I,IMODE,IP) = TRAILR*(CFA-1.) + 1.0
C
91    CONTINUE
C
C
15    CONTINUE
C*****L:  ADDITIONAL LOADING CORRECTION FACTOR
      L(IMODE,IP) = XLOAD(IMODE)*(CFLD(IP)-1.) + 1.
C
400   CONTINUE
500   CONTINUE
C*****H:  HUMIDITY CORRECTION FACTOR
      DO 675 IMODE=1,3
      H(IMODE) = 1. - .0047*(APSHUM - 75.)
675   CONTINUE
C
C
      DO 800 IP=1,3
      DO 800 IMODE=1,3
      DO 800 IY=1,20
      ALHTMP = A(IY,IMODE,IP)*U(IY,IMODE,IP)*L(IMODE,IP)
      IF(IP.EQ.3) ALHTMP = ALHTMP*H(IMODE)
      ALHRET(IY,IMODE,IP) = ALHTMP
800   CONTINUE
C
```

```
      RETURN                                                            ALU00810
C     DEBUG SUBCHK                                                      ALU00820
      END                                                               ALU00830
```

```
      SUBROUTINE TRKOPC(CY,HGWGT,HDWGT,HGCID,HDCID)
C
      COMMON/RET2/TRKRET(20,3,2)
      INTEGER CY,INDXAR(45)
C**IN B0,B1,AND B2, 1ST INDEX IS YEAR GROUP, 2ND IS VEHTYPE,3RD IS POL
      REAL B0(3,2,3),B1(3,2,3),B2(3,2,3)
C
      DATA B0/1.302,-.584,.762,2.056,2.058,.893,
     *        .814,.354,.320,-.533,-.533,-.299,
     *        .869,.883,.943,.085,.085,.138      /
C
      DATA B1/.177,.124,.131,-.005,-.005,.015,
     *        -.036,.106,.149,-.03,-.03,.03,
     *        .172,.016,.008,.02,.02,.023        /
C
      DATA B2/-.065,-.01,-.047,-.014,-.014,-.006,
     *        .016,-.024,-.045,.043,.043,.003,
     *        -.054,-.003,-.012,.002,.002,.001   /
C
      DATA INDXAR/19*1,4*2,22*3/
C
      DO 100 IMY=1,20
C
         MY = CY - (20-IMY) - 50
         IX=INDXAR(MY)
C
      DO 100 IPOL = 1,3
C
      TRKRET(IMY,IPOL,1) = B0(IX,1,IPOL) + B1(IX,1,IPOL)*HGWGT*.001 +
     *                     B2(IX,1,IPOL)*HGWGT/HGCID
C
      TRKRET(IMY,IPOL,2) = B0(IX,2,IPOL) + B1(IX,2,IPOL)*HDWGT*.001 +
     *                     B2(IX,2,IPOL)*HDWGT/HDCID
C
100   CONTINUE
C
      RETURN
C     DEBUG SUBCHK
      END
```

```
      SUBROUTINE PTHWY(REP1,SEP1,REP2,SEP2,H,WIDTH,CNTR,XNL,QLS,
     1CUT,WIDTC,THETA,U,HL,XKST,GS,N,XXRR,XXSR,Z,CON,IPRSW)
C        HIWAY - NEW VERSION - JUNE 1974
C        THIS PROGRAM CALCULATES THE CONCENTRATION FROM A LINE SOURCE
C
C     IF IPRSW = 0   NO OUTPUT IS GENERATED
C     IF IPRSW = 1   ONLY THE CONCENTRATIONS ARE PRINTED
C     IF IPRSW = 2 ALL HIWAY OUTPUT IS PRINTED
C
      COMMON /SOL/ QLN(25),HLN(25), RAQ(25),SAQ(25),RBQ(25),SBQ(25),
     *SYON,SZON
      COMMON /REC/ RR(51),SR(51),ZR(51)
      DIMENSION XXRR(1),XXSR(1),Z(1),QLS(1),CON(1)
      IVERS=75128
      IWRI = 6
C         FORM OF INPUT TO HIWAY (BATCH)
C
C     VARIABLE
C      NAME
C          COLUMNS
C               FORMAT
C                    FORM     VARIABLE                               UNITS
C
C  CARD TYPE 1 (1 CARD) HEADER OR TITLE CARD
C     HEAD  1-80 20A4  AAAA         ALPHANUMERIC DATA FOR HEADING.
C
C  CARD TYPE 2 (1 CARD) SOURCE CARD
C     REP1   1-10 F10.0 XXXX.XXX EAST  COORD.,POINT 1        (MAP UNITS)
C     SEP1  11-20 F10.0 XXXX.XXX NORTH COORD.,POINT 1        (MAP UNITS)
C     REP2  21-30 F10.0 XXXX.XXX EAST  COORD.,POINT 2        (MAP UNITS)
C     SEP2  31-40 F10.0 XXXX.XXX NORTH COORD.,POINT 2        (MAP UNITS)
C     H     41-50 F10.0 XX.X     HEIGHT OF LINE SOURCE          (METERS)
C     WIDTH 51-60 F10.0 XX.      TOTAL WIDTH OF HIWAY           (METERS)
C     CNTR  61-70 F10.0 XX.      WIDTH OF CENTER STRIP (MEDIAN) (METERS)
C     XNL   71-80 F10.0 X.       NUMBER OF TRAFFIC LANES (DIMENSIONLESS)
C
C  CARD TYPE 3 (UP TO 3 CARDS) EMISSIONS FOR EACH LANE.
C       LANES ORDERED LEFT TO RIGHT WHEN LOOKING FROM POINT 1 TO POINT 2
C     QLS    1-80 F10.0 .XXXXXXXX EMISSION RATE FOR EACH LANE (G/SEC-M)
C
```

```
C  CARD TYPE 4 (1 CARD) AT-GRADE OR CUT? (CAN BE BLANK FOR AT-GRADE)
C     CUT    1-10 F10.0 X.        1. IF CUT; 0. IF AT-GRADE(DIMENSIONLESS)
C     WIDTC 11-20 F10.0 XX.        WIDTH AT TOP OF CUT SECTION     (METERS)
C
C  CARD TYPE 5 (1 CARD) METEOROLOGICAL CARD
C     THETA  1-10 F10.0 XXX.       WIND DIRECTION                 (DEGREES)
C     U     11-20 F10.0 XX.X       WIND SPEED                      (METERS)
C     HL    21-30 F10.0 XXXX.      HEIGHT OF MIXING LAYER          (METERS)
C     XKST  31-40 F10.0 X.         PASQUILL STABILITY CLASS(DIMENSIONLESS)
C
C  CARD TYPE 6 (1 CARD) SCALE FACTOR (MAP UNITS TIMES SCALE FACTOR = KM)
C     GS     1-10 F10.0 X.XXXX     SCALE FACTOR
C  CARD TYPE 7 (UP TO 50 CARDS) RECEPTOR CARDS
C     XXRR   1-10 F10.0 XXXX.XXX EAST  COORD. OF RECEPTOR     (MAP UNITS)
C     XXSR  11-20 F10.0 XXXX.XXX NORTH COORD. OF RECEPTOR     (MAP UNITS)
C     Z     21-30 F10.0 X.XX       HEIGHT OF RECEPTOR (ABOVE GROUND) (METE
C
C
C        READ HEADER CARD
C  10 READ(IRD,500,END=190)HEAD
C 500 FORMAT(20A4)
C     WRITE(IWRI,510)HEAD
C 510 FORMAT('0',/,20A4,/)
C     WRITE(IWRI,520)IVERS
C 520 FORMAT('0  HIWAY VERSION:',I6)
C     READ(IRD,540,END=190) REP1,SEP1,REP2,SEP2,H,WIDTH,CNTR,XNL
540   FORMAT(8F10.0)
C        REP1,SEP1 ARE THE COORDINATES OF AN END POINT OF THE LINE
C         SOURCE IN SOURCE COORDINATES.
C        REP2,SEP2 ARE THE COORDINATES OF THE OTHER END POINT OF THE
C         LINE SOURCE IN SOURCE COORDINATES.
C        H IS THE EFFECTIVE EMISSION HEIGHT OF THE SOURCE IN METERS.
C        WIDTH IS THE HIGHWAY WIDTH (M) FOR AT GRADE
C        CNTR IS THE WIDTH OF THE CENTER STRIP (M)
C        XNL IS THE NUMBER OF LANES FOR THE AT-GRADE HIGHWAY.
      IF(IPRSW.GE.2) WRITE(IWRI,550)REP1,SEP1,REP2,SEP2
550   FORMAT(' ENDPOINTS OF THE LINE SOURCE',/,
     *F9.3,',',F9.3,' AND',F9.3,',',F9.3)
      NL=XNL
      IF(IPRSW.GE.2) WRITE(IWRI,560)H
```

```
560    FORMAT (' EMISSION HEIGHT IS',F8.3,' METERS')
       IF(IPRSW.GE.2) WRITE(IWRI,570) NL
570    FORMAT(' EMISSION RATE (GRAMS/SECOND*METER) OF',I4,' LANE(S)')
C      READ(IRD,540)(QLS(I),I=1,NL)
C         QLS IS THE LINE SURCE STRENGTH (GRAMS/SECOND*METER)
       IF(IPRSW.GE.2) WRITE(IWRI,580)(QLS(I),I=1,NL)
580    FORMAT(8E12.3)
C      READ(IRD,540)CUT,WIDTC
C           CUT SECTION.
C           WIDTC IS THE WIDTH OF THE TOP OF THE CUT SECTION (M)
       IF(CUT.EQ.0.)GOTO40
C         DQLS IS THE CUT SECTION SOURCE STRENGTH
       DQLS=0.
       DO 20 I=1,NL
20     DQLS=DQLS+QLS(I)
       XNDL=10.
       NL=XNDL
       DQLS=DQLS/XNDL
       IF(IPRSW.GE.2) WRITE(IWRI,590)WIDTC
590    FORMAT(' WIDTH OF TOP OF CUT SECTION IS',F10.3,' M')
       DO30I=1,NL
30     QLS(I)=DQLS
       WIDTH=WIDTC
       XNL=XNDL
       CNTR=0.
       GOTO50
    40 IF(IPRSW.GE.2) WRITE(IWRI,600)WIDTH,CNTR
600    FORMAT(' WIDTH OF AT-GRADE HIGHWAY IS',F10.1,' M',/,
     *' WIDTH OF CENTER STRIP IS',F10.1,' M')
C   50 READ(IRD,540) THETA,U,HL,XKST
    50 CONTINUE
       KST=XKST
C         THETA IS THE WIND DIRECTION IN DEGREES.
C         U IS THE WIND SPEED IN METERS PER SECOND.
C         KST IS THE STABILITY CLASS
C         HL IS THE HEIGHT OF THE LIMITING LID
    60 IF(IPRSW.GE.2) WRITE (IWRI,610) THETA,U,KST,HL
610    FORMAT (' WIND DIRECTION IS',F7.0,'  DEGREES',/,' WIND SPEED IS',
     *F7.1,' METERS/SEC'/' STABILITY CLASS IS',I5,/,' HEIGHT OF LIMITING
     * LID IS',F8.1,' METERS')
```

```
C     READ(IRD,540)GS
C        GS IS THE MEASURE BETWEEN COORDINATES (KM).
      IF(IPRSW.GE.2) WRITE(IWRI,620)GS
620   FORMAT(' THE SCALE OF THE COORDINATE AXES IS ',F10.4,' KM/USER UNI
     *TS.'//)
      IF(IPRSW.GE.1) WRITE(IWRI,630)
630   FORMAT(1H0,'  RECEPTOR LOCATION       HEIGHT      CONCENTRATION',/,
     * '        X',10X,'Y             Z(M)    UGM/METER**3      PPM *')
      RA=REP1*GS
      RB=REP2*GS
      SA=SEP1*GS
      SB=SEP2*GS
      WL= (WIDTH-CNTR)/XNL
      IF(CUT.GT.0.) GO TO 80
70    SYON=3.
      SZON=1.5
      GO TO 100
80    IF(U.GT.3.)GO TO 70
      IF(U.LT.1.) GO TO 90
      DUM=(U-1.)/2.
      SYON=10.-7.*DUM
      SZON=5.-3.5*DUM
      GO TO 100
90    SYON=10.
      SZON=5.
100   CONTINUE
      IF(NL.EQ.1) WL=0.
      IF(NL.EQ.1) CNTR=0.
      DELR=RB-RA
      DELS=SB-SA
      DIST=SQRT(DELS*DELS+DELR*DELR)
      NLIM=NL/2
      ALIM=NLIM
      DO 110 ID=1,NLIM
      A=ID
      DL=(-0.5)*CNTR+((-1)*ALIM-0.5+A)*WL
      DUM=DL*0.001/DIST
      RAQ(ID)=RA+DELS*DUM
      RBQ(ID)=RB+DELS*DUM
      SAQ(ID)=SA-DELR*DUM
```

```
      SBQ(ID)=SB-DELR*DUM
      QLN(ID)=QLS(ID)
      HLN(ID)=H
 110  CONTINUE
      NS=NLIM+1
      AS=NS
      DO 120 ID=NS,NL
      A=ID
      DL=0.5*CNTR+(0.5+A-AS)*WL
      DUM=DL*0.001/DIST
      RAQ(ID)=RA+DELS*DUM
      RBQ(ID)=RB+DELS*DUM
      SAQ(ID)=SA-DELR*DUM
      SBQ(ID)=SB-DELR*DUM
      QLN(ID)=QLS(ID)
      HLN(ID)=H
 120  CONTINUE
      K=NL
      ICHK=1
C     N=1
C 130 READ(IRD,540,END=150)XXRR(N),XXSR(N),Z(N)
C     IF(XXRR(N).GE.9999.)GO TO 170
C150  ICHK=2
C     GO TO 170
C     N=N+1
C     GO TO 130
C 170 N=N-1
  160 CONTINUE
      DO 180 IDUM=1,N
      RR(IDUM)=XXRR(IDUM)*GS
      SR(IDUM)=XXSR(IDUM)*GS
      ZR(IDUM)=Z(IDUM)
 180  CON(IDUM)=0.
C    K IS NUMBER OF LINE SOURCES
C    N IS NUMBER OF RECEPTORS
      CALL DBTLNE(K,N,THETA,U,KST,HL,CON)
      IF(IPRSW.LT.1) GO TO 1000
      DO 211 NC=1,N
      CLSS=0.00087*CON(NC)
      WRITE(IWRI,300)XXRR(NC),XXSR(NC),ZR(NC),CON(NC),CLSS
```

```
  300 FORMAT(1H ,3(F10.4,2X),F10.0,F10.3)                               PTH02010
  211 CONTINUE                                                          PTH02020
      WRITE(IWRI,650)                                                   PTH02030
650   FORMAT(1H0,'*  PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLYPTH02040
     *.')                                                               PTH02050
C     GO TO (10,190),ICHK                                               PTH02060
C 190 CALL EXIT                                                         PTH02070
 1000 CONTINUE                                                          PTH02080
      RETURN                                                            PTH02090
      END                                                               PTH02100
```

```
      SUBROUTINE DBTLNE(NQ,NR,THETA,U,KST,HL,CON)
      COMMON /SOL/ QLN(25),HLN(25),RAQ(25),SAQ(25),RBQ(25),SBQ(25),
     *SYON,SZON
      COMMON /REC/ RR(51),SR(51),ZR(51)
      DIMENSION XST(11),YST(11),CON(1)
      X(R,S) = (R-RREC)*SINT + (S-SREC)*COST
C        X IS UPWIND DISTANCE OF R,S FROM RREC,SREC
      Y(R,S) = (S-SREC)*SINT - (R-RREC)*COST
C        Y IS CROSSWIND DISTANCE OF R,S FROM RREC,SREC
      IWRI=6
      TR = THETA/57.2958
      SINT = SIN(TR)
      COST = COS(TR)
      PIN=0.05
      UZ=U
      XVYL=XVY(SYON,KST)
      XVZL=XVZ(SZON,KST)
C---CALCULATE CONCENTRATIONS FOR EACH RECPTOR.
      DO 465 NC=1,NR
      RREC=RR(NC)
      SREC=SR(NC)
      Z=ZR(NC)
C---SUM CONCENTRATIONS OVER EACK LANE.
      DO 470 NS=1,NQ
      R1 = RAQ(NS)
      S1 = SAQ(NS)
      R2 = RBQ(NS)
      S2 = SBQ(NS)
      QL = QLN(NS)
      H = HLN(NS)
      X1 = X(R1,S1)
      X2 = X(R2,S2)
      IF(X1)35,45,45
35    IF(X2)40,45,45
40    RC = 0.
      GO TO 470
   45 IF(X1-100.)46,46,47
   46 IF(X2-100.)49,49,47
47    WRITE(IWRI,48)
   48 FORMAT(1H0,'RECEPTOR IS 100KM OR MORE FROM SOURCE')
```

```
      GO TO 465                                                         DBL00410
49    DELR = R2 - R1                                                    DBL00420
      DELS = S2 - S1                                                    DBL00430
      Y1 = Y(R1,S1)                                                     DBL00440
      Y2 = Y(R2,S2)                                                     DBL00450
      IF(Y1-Y2) 100,255,100                                             DBL00460
C        IF Y1 = Y2, LINE SOURCE IS PARALLEL TO UPWIND AZIMUTH FROM RECEDBL00470
100   IF(COST + 0.0001)135,105,105                                      DBL00480
105   IF(COST - 0.0001)110,110,135                                      DBL00490
110   IF(DELR + 0.0001)125,115,115                                      DBL00500
115   IF(DELR - 0.0001) 120,120,125                                     DBL00510
120   SLOC = SREC                                                       DBL00520
      RLOC = R1                                                         DBL00530
      GO TO 200                                                         DBL00540
125   SLP = DELS/DELR                                                   DBL00550
      IF(SLP)130,255,130                                                DBL00560
130   SLOC = SREC                                                       DBL00570
      RLOC = (SLOC - S1)/SLP + R1                                       DBL00580
      GO TO 200                                                         DBL00590
135   IF(SINT + 0.0001)160,140,140                                      DBL00600
140   IF(SINT - 0.0001)145,145,160                                      DBL00610
145   IF(DELR + 0.0001)155,150,150                                      DBL00620
150   IF(DELR - 0.0001)255,255,155                                      DBL00630
155   SLP = DELS/DELR                                                   DBL00640
      RLOC = RREC                                                       DBL00650
      SLOC = SLP * (RLOC - R1) + S1                                     DBL00660
      GO TO 200                                                         DBL00670
160   IF(DELR + 0.0001)175,165,165                                      DBL00680
165   IF(DELR - 0.0001)170,170,175                                      DBL00690
170   RLOC = R1                                                         DBL00700
      SLOC = (RLOC - RREC) * COST/SINT + SREC                           DBL00710
      GO TO 200                                                         DBL00720
175   IF(DELS + 0.0001)190,180,180                                      DBL00730
180   IF(DELS - 0.0001)185,190,190                                      DBL00740
185   SLOC = S1                                                         DBL00750
      RLOC = (SLOC - SREC) * SINT/COST + RREC                           DBL00760
      GO TO 200                                                         DBL00770
190   TATH = SINT/COST                                                  DBL00780
C        TATH IS TANGENT (THETA)                                        DBL00790
      SLP = DELS/DELR                                                   DBL00800
```

```
C          SLP IS SLOPE OF LINE SOURCE.
      RLOC = (RREC/TATH + S1 - SLP*R1 - SREC)/(1./TATH - SLP)
      SLOC = (RLOC - RREC)/TATH + SREC
C          RLOC, SLOC IS LOCUS OF UPWIND VECTOR FROM RECEPTOR AND LINEAR
C             EXTENSION OF LINE SOURCE.
  200 XLOC = X(RLOC,SLOC)
      IF (XLOC)255,255,205
C          XLOC IS POSITIVE IF LOCUS IS UPWIND.
  205 IF(S2-S1)210,210,215
  210 SMAX = S1
      SMIN = S2
      GO TO 220
  215 SMAX = S2
      SMIN = S1
  220 IF(R2-R1)225,225,230
  225 RMAX = R1
      RMIN = R2
      GO TO 235
  230 RMAX = R2
      RMIN = R1
C          SEE IF UPWIND LOCUS IS ON LINE SOURCE.
  235 IF(RLOC-RMIN)255,240,240
  240 IF(RMAX-RLOC)255,245,245
  245 IF(SLOC-SMIN)255,250,250
  250 IF(SMAX-SLOC)255,260,260
  255 INDIC = 1
C          INDIC =1 FOR NO LOCUS ON LINE SOURCE.
      XA = X1
      YA = Y1
      XB = X2
      YB = Y2
      GO TO 300
  260 INDIC = 2
C          INDIC =2 FOR LOCUS ON LINE SOURCE.
      XA = X1
      YA = Y1
      XB = XLOC
      YB = 0.
  300 DISX = XB - XA
      DISY = YB - YA
```

```
      DISI = SQRT (DISX*DISX + DISY*DISY)                               DBL01210
C        DISI IS LENGTH(KM) OF LINE CONSIDERED.                         DBL01220
      IF(DISI)310,305,310                                               DBL01230
305   CURR = 0.                                                         DBL01240
      GO TO 435                                                         DBL01250
310   DDI = DISI*1000./20.                                              DBL01260
C        ONE-HALF IS INCLUDED IN THE 20.                                DBL01270
C        DDI IS ONE-HALF TIMES 1/10 OF DISI (M).                        DBL01280
      DX = DISX/10.                                                     DBL01290
      DY = DISY/10.                                                     DBL01300
      PREV =0.                                                          DBL01310
      KNTRL = 1                                                         DBL01320
      XI = XA                                                           DBL01330
      YI = YA                                                           DBL01340
      KNT = 0                                                           DBL01350
      DO 355 I = 1,11                                                   DBL01360
C        STORE EACH XI,YI.                                              DBL01370
      XST(I) = XI                                                       DBL01380
      YST(I) = YI                                                       DBL01390
      IF(XST(I)) 311,311,312                                            DBL01400
311   RC=0.                                                             DBL01410
      GOTO313                                                           DBL01420
312   XZ = XI + XVZL                                                    DBL01430
      XY = XI + XVYL                                                    DBL01440
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YI,KST,AN,M,SY,SZ,RC)                 DBL01450
313   GO TO(315,335),KNTRL                                              DBL01460
C        IF RC IS ZERO, CONTINUE UNTIL RC IS POSITIVE.                  DBL01470
315   IF(RC)350,350,320                                                 DBL01480
320   IF(I-1)325,325,330                                                DBL01490
325   KNTRL = 2                                                         DBL01500
      GO TO 345                                                         DBL01510
C        RESET POINT A TO LAST ONE PREVIOUS.                            DBL01520
330   XA = XST(I-1)                                                     DBL01530
      YA = YST(I-1)                                                     DBL01540
      KNTRL = 2                                                         DBL01550
      GO TO 345                                                         DBL01560
335   IF(RC)340,340,345                                                 DBL01570
C        RESET POINT B IF REACH ZERO CONCENTRATION.                     DBL01580
340   XB = XI                                                           DBL01590
      YB = YI                                                           DBL01600
```

```
      GO TO 360
  345 KNT = KNT + 1
  350 XI = XI + DX
      YI = YI + DY
  355 CONTINUE
  360 IF(KNT)370,370,365
  365 IF(KNT-6)300,300,390
C        IF GET TO 370, CONC. FROM THIS SEGMENT IS 0.
  370 GO TO (375,380,385),INDIC
  375 RC = 0.
      GO TO 470
  380 FIRST = 0.
      GO TO 450
  385 RC = FIRST
      GO TO 460
  390 CONTINUE
C        DO  A TRAPEZOIDAL INTEGRATION FROM A TO B IN TEN STEPS.
C        IT IS LIKELY THAT A OR B HAVE BEEN REDEFINED.
  400 DISX = XB-XA
      DISY = YB-YA
      DISI = SQRT(DISX*DISX + DISY*DISY)
C        DISI IS DISTANCE(KM) FROM A TO B
      DELD = DISI*100.
C        DELD IS 1/10 DISI IN METERS.
      DX = DISX/10.
      DY = DISY/10.
      SUM = 0.
      XDUM = XA
      YDUM = YA
      IF(XDUM.LE.0.) GOTO404
      XZ = XDUM + XVZL
      XY = XDUM + XVYL
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)
      SUM = SUM + RC/2.
  404 DO 405 I = 1,9
      XDUM = XDUM + DX
      YDUM = YDUM + DY
      IF(XDUM.LE.0.) GOTO405
      XZ = XDUM + XVZL
      XY = XDUM + XVYL
```

```
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)               DBL02010
      SUM = SUM + RC                                                    DBL02020
  405 CONTINUE                                                          DBL02030
      XDUM = XDUM + DX                                                  DBL02040
      YDUM = YDUM + DY                                                  DBL02050
      IF(XDUM.LE.0.) GOTO411                                            DBL02060
      XZ = XDUM + XVZL                                                  DBL02070
      XY = XDUM + XVYL                                                  DBL02080
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)               DBL02090
      SUM = SUM + RC/2.                                                 DBL02100
C        INTEGRATED VALUE IS CURR.                                      DBL02110
  411 CURR = SUM * DELD                                                 DBL02120
      ILIM = 10                                                         DBL02130
C     FIRST ESTIMATE COMPLETED HERE.                                    DBL02140
  410 PREV = CURR                                                       DBL02150
C        EVALUATE FOR POINTS IN BETWEEN THOSE ALREADY EVALUATED.        DBL02160
      DELD = DELD/2.                                                    DBL02170
      XDUM = XA + DX/2.                                                 DBL02180
      YDUM = YA + DY/2.                                                 DBL02190
      DO 415 I = 1,ILIM                                                 DBL02200
      IF(XDUM.LE.0.) GOTO414                                            DBL02210
      XZ = XDUM + XVZL                                                  DBL02220
      XY = XDUM + XVYL                                                  DBL02230
      CALL DBTRCX(UZ,Z,H,HL,XZ,XY,YDUM,KST,AN,M,SY,SZ,RC)               DBL02240
C        NOTE ADD THESE TO RC'S FOUND ABOVE.                            DBL02250
      SUM = SUM + RC                                                    DBL02260
  414 XDUM = XDUM + DX                                                  DBL02270
  415 YDUM = YDUM + DY                                                  DBL02280
      CURR = SUM * DELD                                                 DBL02290
C    SECOND ESTIMATE COMPLETED HERE. ALSO FOURTH,SIXTH,ETC.             DBL02300
      TEST = ABS((CURR-PREV)/CURR)                                      DBL02310
C        IF WITHIN PIN OF LAST VALUE (PREV), CONSIDER THIS AS FINAL VALUDBL02320
      IF(TEST-PIN)435,420,420                                           DBL02330
  420 ILIM = ILIM * 2                                                   DBL02340
      PREV = CURR                                                       DBL02350
C        EVALUATE POINTS IN BETWEEN.                                    DBL02360
      DELD = DELD/2.                                                    DBL02370
      DX = DX/2.                                                        DBL02380
      DY = DY/2.                                                        DBL02390
      XDUM = XA + DX/2.                                                 DBL02400
```

```
      YDUM = YA + DY/2.
      DO 425 I = 1,ILIM
      IF(XDUM.LE.0.) GOTO424
      XZ = XDUM + XVZL
      XY = XDUM + XVYL
      CALL DBTRCX(UZ,Z,H,HL,XZ.XY,YDUM,KST,AN,M,SY,SZ,RC)
      SUM = SUM + RC
  424 XDUM = XDUM +DX
  425 YDUM = YDUM +DY
      CURR = SUM * DELD
C        THIRD ESTIMATE COMPLETED HERE. ALSO FIFTH,SEVENTH, ETC.
      TEST = ABS((CURR-PREV)/CURR)
      IF (TEST-PIN)435,430,430
  430 ILIM = ILIM * 2
      IF(ILIM.GT.2000) GO TO 435
      DX = DX/2.
      DY = DY/2.
      GO TO 410
C        AT 435 HAVE FINAL VALUE OF INTEGRATION IN CURR.
  435 GO TO (440,445,455),INDIC
  440 RC = CURR
      GO TO 460
  445 FIRST = CURR
  450 INDIC = 3
      XA = XLOC
      YA = 0.
      XB = X2
      YB = Y2
      GO TO 300
  455 RC = FIRST + CURR
  460 CON(NC)=CON(NC)+RC*QL
  470 CONTINUE
      CON(NC)=1.0E+6*CON(NC)
  465 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE DBTRCX (U,Z,H,HL,X,XY,Y,KST,AN,M,SY,SZ,RC)            DBX00010
C        THIS IS THE 1972 VERSION OF DBTRCX.                             DBX00020
C        D. B. TURNER, RESEARCH METEOROLOGIST* MODEL DEVELOPMENT BRANCH,DBX00030
C         DIVISION OF METEOROLOGY, ENVIRONMENTAL PROTECTION AGENCY.      DBX00040
C           ROOM 314B, NCHS BUILDING, RTP. PHONE (919) 549-8411 EXT 4564DBX00050
C          MAILING ADDRESS- DM. EPA. RESEARCH TRIANGLE PARK, NC 27711    DBX00060
C         * ON ASSIGNMENT FROM NATIONAL OCEANIC AND ATMOSPHERIC          DBX00070
C               ADMINISTRATION, DEPARTMENT OF COMMERCE.                  DBX00080
C        SUBROUTINE DBTRCX CALCULATES CHI/Q CONCENTRATION VALUES. DBTRCXDBX00090
C         CALLS UPON SUBROUTINE DBTSIG TO OBTAIN STANDARD DEVIATIONS.    DBX00100
C        THE INPUT VARIABLES ARE....                                     DBX00110
C         U    WIND SPEED (M/SEC)                                        DBX00120
C         Z    RECEPTOR HEIGHT (M)                                       DBX00130
C         H    EFFECTIVE STACK HEIGHT (M)                                DBX00140
C         HL=L HEIGHT OF LIMITING LID (M)                                DBX00150
C         X    DISTANCE RECEPTOR IS DOWNWIND OF SOURCE (KM)              DBX00160
C         XY   X+VIRTUAL DISTANCE USED FOR AREA SOURCE APPROX. (KM)      DBX00170
C         Y    DISTANCE RECEPTOR IS CROSSWIND FROM SOURCE (KM)           DBX00180
C         KST  STABILITY CLASS                                           DBX00190
C        THE OUTPUT VARIABLES ARE....                                    DBX00200
C         AN   THE NUMBER OF TIMES THE SUMMATION TERM IS EVALUATED       DBX00210
C               AND ADDED IN.                                            DBX00220
C         RC   RELATIVE CONCENTRATION (SEC/M**3)                         DBX00230
C        THE FOLLOWING EQUATION IS SOLVED --                             DBX00240
C          RC = (1/(2*PI*U*SIGMA Y*SIGMA Z))* (EXP(-0.5*(Y/SIGMA Y)**2))DBX00250
C           (EXP(-0.5*((Z-H)/SIGMA Z)**2) + EXP(-0.5*((Z+H)/SIGMA Z)**2)DBX00260
C              PLUS THE SUM OF THE FOLLOWING 4 TERMS K TIMES (N=1,K) --  DBX00270
C               TERM 1- EXP(-0.5*((Z-H-2NL)/SIGMA Z)**2)                 DBX00280
C               TERM 2- EXP(-0.5*((Z+H-2NL)/SIGMA Z)**2)                 DBX00290
C               TERM 3- EXP(-0.5*((Z-H+2NL)/SIGMA Z)**2)                 DBX00300
C               TERM 4- EXP(-0.5*((Z+H+2NL)/SIGMA Z)**2)                 DBX00310
C        THE ABOVE EQUATION IS SIMILAR TO EQUATION (5.8) P 36 IN         DBX00320
C         WORKBOOK OF ATMOSPHERIC DISPERSION ESTIMATES WITH THE ADDITIONDBX00330
C         OF THE EXPONENTIAL INVOLVING Y.                                DBX00340
C        IWRI IS CONTROL CODE FOR OUTPUT                                 DBX00350
      IWRI = 6                                                           DBX00360
C        IF THE SOURCE IS ABOVE THE LID, SET RC = 0.. A   RETURN.        DBX00370
      IF (H-HL)302,302,304                                               DBX00380
  302 IF (Z-HL)300,300,30                                                DBX00390
  304 IF (Z-HL)30,306,306                                                DBX00400
```

```
  306 WRITE(IWRI, 307)                                                  DBX00410
  307 FORMAT (1HO,'BOTH H AND Z ARE ABOVE THE MIXING HEIGHT SO A RELIABLDBX00420
     1E COMPUTATION CAN NOT BE MADE.')                                  DBX00430
   30 RC=0.                                                             DBX00440
      RETURN                                                            DBX00450
C        IF X IS LESS THAN 1 METER, SET RC=0. AND RETURN.  THIS AVOIDS  DBX00460
C          PROBLEMS OF INCORRECT VALUES NEAR THE SOURCE.                DBX00470
  300 IF(X-0.001)30,310,310                                             DBX00480
C        CALL DBTSIG TO OBTAIN VALUES FOR SY AND SZ                     DBX00490
  310 CALL DBTSIG (X,XY,KST,SY,SZ)                                      DBX00500
C          SY = SIGMA Y, THE STANDARD DEVIATION OF CONCENTRATION IN THE DBX00510
C          Y-DIRECTION (M)                                              DBX00520
C          SZ = SIGMA Z, THE STANDARD DEVIATION OF CONCENTRATION IN THE DBX00530
C          Z-DIRECTION (M)                                              DBX00540
      C1 = 1.                                                           DBX00550
      IF (Y)5,400,5                                                     DBX00560
    5 YD = 1000. * Y                                                    DBX00570
C        YD IS CROSSWIND DISTANCE IN METERS.                            DBX00580
      DUM = YD/SY                                                       DBX00590
      TEMP = 0.5*DUM*DUM                                                DBX00600
      IF (TEMP-50.)6,30,30                                              DBX00610
    6 C1 = EXP(TEMP)                                                    DBX00620
  400  IF(KST-4)401,401,403                                             DBX00630
  401 IF(HL-5000.)7,403,403                                             DBX00640
C        IF STABLE CONDITION OR UNLIMITED MIXING HEIGHT,                DBX00650
C          USE EQUATION 3.2 IF Z = 0, OR EQ 3.1 FOR NON-ZERO Z.         DBX00660
  403 C2 = 2.*SZ*SZ                                                     DBX00670
      IF(Z)30,404,406                                                   DBX00680
  404 C3 = H*H/C2                                                       DBX00690
      IF(C3-50.)405,30,30                                               DBX00700
  405 A2= 1./EXP(C3)                                                    DBX00710
C        WADE EQUATION 3.2.                                             DBX00720
      RC = A2/(3.14159*U*SY*SZ*C1)                                      DBX00730
      M = 1                                                             DBX00740
      RETURN                                                            DBX00750
  406 A2 = 0.                                                           DBX00760
      A3 = 0.                                                           DBX00770
      CA = Z-H                                                          DBX00780
      CB = Z+H                                                          DBX00790
      C3 = CA*CA/C2                                                     DBX00800
```

```
      C4 = CB*CB/C2
      IF(C3-50.)407,408,408
  407 A2 = 1./EXP(C3)
  408 IF(C4-50.)409,411,411
  409 A3 = 1./EXP(C4)
C        WADE EQUATION 3.1.
  411 RC = (A2 + A3)/(6.28318*U*SY*SZ*C1)
      M = 2
      RETURN
C        IF SIGMA-Z IS GREATER THAN 1.6 TIMES THE MIXING HEIGHT,
C         THE DISTRIBUTION BELOW THE MIXING HEIGHT IS UNIFORM WITH
C         HEIGHT REGARDLESS OF SOURCE HEIGHT.
    7 IF(SZ/HL - 1.6)9,9,8
C        WADE EQUATION 3.5.
    8 RC = 1./(2.5066*U*SY*HL*C1)
      M = 3
      RETURN
C        INITIAL VALUE OF AN SET = 0.
    9 AN = 0.
      IF (Z) 30,340,40
C        STATEMENTS 40 TO 250 CALCULATE RC, THE RELATIVE CONCENTRATION,
C         USING THE EQUATION DISCUSSED ABOVE.  SEVERAL INTERMEDIATE
C         VARIABLES ARE USED TO AVOID REPEATING CALCULATIONS.
C         CHECKS ARE MADE TO BE SURE THAT THE ARGUMENT OF THE
C         EXPONENTIAL FUNCTION IS NEVER GREATER THAN 50 (OR LESS THAN
C         -50).  IF 'AN' BECOMES GREATER THAN 45, A LINE OF OUTPUT IS
C         PRINTED INFORMING OF THIS.
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR RECEPTOR HEIGHT Z.
   40 A1 = 1./(6.28318*U*SY*SZ*C1)
      C2=2.*SZ*SZ
      A2 = 0.
      A3 = 0.
      CA = Z-H
      CB = Z+H
      C3 = CA*CA/C2
      C4 = CB*CB/C2
      IF (C3-50.)60,80,80
   60 A2=1./EXP(C3)
   80 IF(C4-50.)90,110,110
   90 A3=1./EXP(C4)
```

```
  110 SUM=0.
      THL = 2.* HL
  120 AN=AN+1.
      A4 = 0.
      A5 = 0.
      A6 = 0.
      A7 = 0.
      C5 = AN*THL
      CC = CA-C5
      CD = CB-C5
      CE = CA+C5
      CF = CB+C5
      C6 = CC*CC/C2
      C7 = CD*CD/C2
      C8 = CE*CE/C2
      C9 = CF*CF/C2
      IF(C6-50.)130,150,150
  130 A4=1./EXP(C6)
  150 IF(C7-50.)160,180,180
  160 A5=1./EXP(C7)
  180 IF(C8-50.)190,210,210
  190 A6=1./EXP(C8)
  210 IF(C9-50.)220,240,240
  220 A7=1./EXP(C9)
  240 T=A4+A5+A6+A7
      SUM=SUM+T
      IF (T-0.01)250,120,120
  250 RC=A1*(A2+A3+SUM)
      M = 5
      RETURN
C        CALCULATE MULTIPLE EDDY REFLECTIONS FOR GROUND LEVEL RECEPTOR H
  340 A1 = 1./(6.28318*U*SY*SZ*C1)
      A2 = 0.
      C2 = 2.*SZ*SZ
      C3 = H*H/C2
      IF(C3-50.)360,410,410
  360 A2 = 2./EXP(C3)
  410 SUM = 0.
      THL = 2. * HL
  420 AN = AN + 1.
```

```
      A4 = 0.                                                           DBX01610
      A6 = 0.                                                           DBX01620
      C5 = AN*THL                                                       DBX01630
      CC = H-C5                                                         DBX01640
      CE = H + C5                                                       DBX01650
      C6 = CC*CC/C2                                                     DBX01660
      C8 = CE*CE/C2                                                     DBX01670
      IF(C6-50.)430,480,480                                             DBX01680
  430 A4 = 2./EXP(C6)                                                   DBX01690
  480 IF(C8-50.)490,540,540                                             DBX01700
  490 A6 = 2./EXP(C8)                                                   DBX01710
  540 T = A4 + A6                                                       DBX01720
      SUM = SUM + T                                                     DBX01730
      IF(T-0.01)550,420,420                                             DBX01740
  550 RC = A1 * (A2 + SUM)                                              DBX01750
      M = 4                                                             DBX01760
      RETURN                                                            DBX01770
      END                                                               DBX01780
```

```
      SUBROUTINE DBTSIG (X,XY,KST,SY,SZ)
      DIMENSION XA(7),XB(2),XD(5),XE(8),XF(9),AA(8),BA(8),AB(3),BB(3),
     1 AD(6),BD(6),AE(9),BE(9),AF(10),BF(10)
      DATA XA/.5,.4,.3,.25,.2,.15,.1/
      DATA XB/.4,.2/
      DATA XD /30.,10.,3.,1.,.3/
      DATA XE /40.,20.,10.,4.,2.,1.,.3,.1/
      DATA XF /60.,30.,15.,7.,3.,2.,1.,.7,.2/
      DATA AA /453.85,346.75,258.89,217.41,179.52,170.22,158.08,122.8/
      DATA BA /2.1166,1.7283,1.4094,1.2644,1.1262,1.0932,1.0542,.9447/
      DATA AB /109.30,98.483,90.673/
      DATA BB /1.0971,0.98332,0.93198/
      DATA AD /44.053,36.650,33.504,32.093,32.093,34.459/
      DATA BD /0.51179,0.56589,0.60486,0.64403,0.81066,0.86974/
      DATA AE /47.618,35.420,26.970,24.703,22.534,21.628,21.628,23.331,
     1 24.26/
      DATA BE /0.29592,0.37615,0.46713,0.50527,0.57154,0.63077,0.75660,
     1 0.81956,0.8366/
      DATA AF /34.219,27.074,22.651,17.836,16.187,14.823,13.953,13.953,
     1 14.457,15.209/
      DATA BF /0.21716,0.27436,0.32681,0.41507,0.46490,0.54503,0.63227,
     1 0.68465,0.78407,0.81558/
      GO TO (10,20,30,40,50,60),KST
C         STABILITY A (10)
   10 TH = (24.167 - 2.5334*ALOG(XY))/57.2958
      IF (X.GT.3.11) GO TO 69
      DO 11 ID = 1,7
      IF(X.GE.XA(ID)) GO TO 12
   11 CONTINUE
      ID = 8
   12 SZ = AA(ID) * X ** BA(ID)
      GO TO 71
C         STABILITY B (20)
   20 TH = (18.333 - 1.8096*ALOG(XY))/57.2958
      IF(X.GT.35.) GO TO 69
      DO 21 ID = 1,2
      IF (X.GE.XB(ID)) GO TO 22
   21 CONTINUE
      ID = 3
   22 SZ = AB(ID) * X ** BB(ID)
```

```
      GO TO 70
C        STABILITY C (30)
   30 TH = (12.5 - 1.0857*ALOG(XY))/57.2958
      SZ = 61.141 *X ** 0.91465
      GO TO 70
C        STABILITY D (40)
   40 TH = (8.3333-0.72382*ALOG(XY))/57.2958
      DO 41 ID = 1,5
      IF (X.GE.XD(ID)) GO TO 42
   41 CONTINUE
      ID = 6
   42 SZ = AD(ID) * X ** BD(ID)
      GO TO 70
C        STABILITY E (50)
   50 TH = (6.25 - 0.54287*ALOG(XY))/57.2958
      DO 51 ID = 1,8
      IF (X.GE.XE(ID)) GO TO 52
   51 CONTINUE
      ID = 9
   52 SZ = AE(ID) * X ** BE(ID)
      GO TO 70
C        STABILITY F (60)
   60 TH = (4.1667 - 0.36191*ALOG(XY))/57.2958
      DO 61 ID = 1,9
      IF (X.GE.XF(ID)) GO TO 62
   61 CONTINUE
      ID = 10
   62 SZ = AF(ID) * X ** BF(ID)
      GO TO 70
   69 SZ = 5000.
      GO TO 71
   70 IF (SZ.GT.5000.) SZ = 5000.
   71 SY = 1000. * XY * SIN(TH)/(2.15 * COS(TH))
      RETURN
      END
```

```
      FUNCTION XVY(SYO,KST)
      GO TO (1,2,3,4,5,6),KST
    1 XVY=(SYO/213.0)**1.1143
      RETURN
    2 XVY=(SYO/155.0)**1.097
      RETURN
    3 XVY=(SYO/103.0)**1.092
      RETURN
    4 XVY=(SYO/68.0)**1.076
      RETURN
    5 XVY=(SYO/50.0)**1.086
      RETURN
    6 XVY=(SYO/33.5)**1.083
      RETURN
      END
```


FUNCTION XVY(SYO,KST)

```
      FUNCTION XVZ(SZO,KST)
      DIMENSION SA(7),SB(2),SD(5),SE(8),SF(9),AA(8),AB(3),AD(6),AE(9),
     1AF(10),CA(8),CB(3),CD(6),CE(9),CF(10)
      DATA SA/13.95,21.40,29.3,37.67,47.44,71.16,104.65/
      DATA SB/20.23,40.0/
      DATA SD/12.09,32.09,65.12,134.9,251.2/
      DATA SE/3.534,8.698,21.628,33.489,49.767,79.07,109.3,141.86/
      DATA SF/4.093,10.93,13.953,21.627,26.976,40.,54.89,68.84,83.25/
      DATA AA/122.8,158.08,170.22,179.52,217.41,258.89,346.75,453.85/
      DATA AB/90.673,98.483,109.3/
      DATA AD/34.459,32.093,32.093,33.504,36.650,44.053/
      DATA AE/24.26,23.331,21.628,21.628,22.534,24.703,26.97,35.42,
     *47.618/
      DATA AF/15.209,14.457,13.953,13.953,14.823,16.187,17.836,22.651,
     *27.074,34.219/
      DATA CA/1.0585,0.9486,0.9147,0.8879,0.7909,0.7095,0.5786,0.4725/
      DATA CB/1.073,1.017,0.9115/
      DATA CD/1.1498,1.2336,1.5527,1.6533,1.7671,1.9539/
      DATA CE/1.1953,1.2202,1.3217,1.5854,1.7497,1.9791,2.1407,2.6585,
     *3.3793/
      DATA CF/1.2261,1.2754,1.4606,1.5816,1.8348,2.151,2.4092,3.0599,
     *3.6448,4.6049/
      GO TO (10,20,30,40,50,60),KST
C         STABILITY A (10)
   10 DO 11 ID=1,7
      IF(SZO.LE.SA(ID)) GO TO 12
   11 CONTINUE
      ID=8
   12 XVZ=(SZO/AA(ID))**CA(ID)
      RETURN
C         STABILITY B (20)
   20 DO 21 ID=1,2
      IF(SZO.LE.SB(ID)) GO TO 22
   21 CONTINUE
      ID=3
   22 XVZ=(SZO/AB(ID))**CB(ID)
      RETURN
C         STABILITY C (30)
   30 XVZ=(SZO/61.141)**1.0933
      RETURN
```

```
C           STABILITY D (40)                                            XVZ00410
   40 DO 41 ID=1,5                                                      XVZ00420
      IF(SZO.LE.SD(ID)) GO TO 42                                        XVZ00430
   41 CONTINUE                                                          XVZ00440
      ID=6                                                              XVZ00450
   42 XVZ=(SZO/AD(ID))**CD(ID)                                          XVZ00460
      RETURN                                                            XVZ00470
C           STABILITY E (50)                                            XVZ00480
   50 DO 51 ID=1,8                                                      XVZ00490
      IF(SZO.LE.SE(ID)) GO TO 52                                        XVZ00500
   51 CONTINUE                                                          XVZ00510
      ID=9                                                              XVZ00520
   52 XVZ=(SZO/AE(ID))**CE(ID)                                          XVZ00530
      RETURN                                                            XVZ00540
C           STABILITY F (60)                                            XVZ00550
   60 DO 61 ID=1,9                                                      XVZ00560
      IF(SZO.LE.SF(ID)) GO TO 62                                        XVZ00570
   61 CONTINUE                                                          XVZ00580
      ID=10                                                             XVZ00590
   62 XVZ=(SZO/AF(ID))**CF(ID)                                          XVZ00600
      RETURN                                                            XVZ00610
      END                                                               XVZ00620
```

```
      BLOCK DATA                                                        BL100010
      COMMON/COEFMM/BAD1,BAD2,BAD3,BAD4                                 BL100020
      COMMON/DET/DETER                                                  BL100030
      REAL DETER(20),BAD1(12,5),BAD2(12,5),BAD3(12,5),BAD4(12,5)        BL100040
      DATA BAD1/                                                        BL100050
     &  0.10210419E+01,-0.46106476E-01, 0.12750413E-01, 0.19804664E-01, BL100060
     &  0.10487151E-02,-0.15174127E+00, 0.19398060E-01,-0.79918522E-04, BL100070
     & -0.27256622E-03, 0.33066291E+00,-0.24132896E-02, 0.32060244E-03, BL100080
     &  0.63576120E+00,-0.24510358E-01, 0.43812852E-01, 0.49628541E-02, BL100090
     &  0.44958130E-03,-0.47973134E-01, 0.61538182E-02, 0.10994070E-04, BL100100
     & -0.67511966E-04, 0.30338836E+00,-0.27355787E-02, 0.13473761E-03, BL100110
     &  0.28043038E+00,-0.47583590E-02, 0.43524541E-01, 0.13808063E-02, BL100120
     &  0.10754808E-03,-0.21531656E-02, 0.93090301E-03, 0.11250070E-04, BL100130
     & -0.19257031E-05, 0.22921783E+00,-0.40214434E-02, 0.12248126E-03, BL100140
     &  0.49613750E+00,-0.14627926E-01, 0.61504323E-01,-0.10729437E-02, BL100150
     &  0.21254545E-03,-0.68023652E-02, 0.97647379E-03, 0.10525828E-03, BL100160
     &  0.37405029E-04, 0.26291054E+00,-0.18189936E-02, 0.84008745E-04, BL100170
     &  0.50066710E+00,-0.17586585E-01, 0.59339337E-01,-0.18133272E-02, BL100180
     &  0.22920808E-03,-0.12368958E-01, 0.11492474E-02, 0.74215845E-04, BL100190
     &  0.14108437E-04, 0.30531263E+00,-0.70244968E-02, 0.10785337E-03/ BL100200
      DATA BAD2/                                                        BL100210
     &  0.39664203E+00,-0.13213880E-01, 0.58552373E-01,-0.19716325E-02, BL100220
     &  0.16135792E-03,-0.43251887E-02, 0.21358313E-03, 0.86380664E-04, BL100230
     &  0.40023762E-04, 0.24617422E+00,-0.68550445E-02, 0.10254829E-03, BL100240
     &  0.36676234E+00,-0.14121491E-01, 0.68226576E-01,-0.32857144E-02, BL100250
     &  0.18291990E-03, 0.22933292E-02, 0.19526284E-04, 0.13627447E-03, BL100260
     &  0.54617223E-04, 0.22517568E+00,-0.46133995E-02, 0.69841262E-04, BL100270
     &  0.10577946E+01,-0.67509690E-01, 0.62050894E-01, 0.11177700E-01, BL100280
     &  0.14054242E-02,-0.17354453E+00, 0.21822363E-01, 0.12219173E-03, BL100290
     & -0.29136962E-03, 0.30515999E+00,-0.65815225E-02, 0.36294828E-03, BL100300
     &  0.68093568E+00,-0.48967101E-01, 0.90703070E-01, 0.41544996E-02, BL100310
     &  0.97224675E-03,-0.92593908E-01, 0.13378501E-01, 0.19100340E-03, BL100320
     & -0.13010977E-03, 0.19975567E+00,-0.77630468E-02, 0.33748685E-03, BL100330
     &  0.10887880E+01,-0.71653783E-01, 0.56213565E-01, 0.12077432E-01, BL100340
     &  0.14173663E-02,-0.18283314E+00, 0.22780791E-01, 0.11450195E-03, BL100350
     & -0.30368124E-03, 0.31737489E+00,-0.97049810E-02, 0.31322357E-03/ BL100360
      DATA BAD3/                                                        BL100370
     &  0.12207556E+01,-0.89525878E-01, 0.95823228E-01, 0.61595142E-02, BL100380
     &  0.17752303E-02,-0.19405907E+00, 0.24501167E-01, 0.30660117E-03, BL100390
     & -0.31120144E-03, 0.30530828E+00,-0.67905560E-02, 0.22574072E-03, BL100400
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     & 0.14931040E+01,-0.10349673E+00, 0.72227307E-02, 0.59160888E-02, BL100410
     & 0.20053601E-02,-0.23721021E+00, 0.26225589E-01, 0.23920002E-04, BL100420
     & -0.39849989E-03, 0.32876998E+00,-0.91728717E-02, 0.29819994E-03, BL100430
     & 0.11040087E+01,-0.79453886E-01, 0.56303188E-01, 0.17077201E-02, BL100440
     & 0.16181599E-02,-0.17064410E+00, 0.19803409E-01, 0.20100000E-03, BL100450
     & -0.26381994E-03, 0.25955880E+00,-0.75969696E-02, 0.26727002E-03, BL100460
     & 0.28853571E+00,-0.12315691E-01, 0.92407882E-01,-0.31504999E-02, BL100470
     & 0.16614000E-03, 0.70702210E-02, 0.46436000E-03, 0.14813000E-03, BL100480
     & 0.56589997E-04, 0.15976292E+00,-0.65233000E-02, 0.10359001E-03, BL100490
     & 0.20974290E+00,-0.12848910E-01, 0.96859634E-01,-0.66359304E-02, BL100500
     & 0.18598999E-03, 0.21924630E-01,-0.15685901E-02, 0.27883006E-03, BL100510
     & 0.12293000E-03, 0.11387944E+00,-0.28685799E-02, 0.47189998E-04/ BL100520
      DATA BAD4/                                                        BL100530
     & 0.57665521E+00,-0.36277410E-01, 0.21571960E-01, 0.29442401E-02, BL100540
     & 0.63650007E-03,-0.52853432E-01, 0.69414489E-02,-0.17560000E-04, BL100550
     & -0.94470000E-04, 0.25530094E+00,-0.76948516E-02, 0.13530999E-03, BL100560
     & 0.54005557E+00,-0.39594091E-01, 0.28321180E-01, 0.14426301E-02, BL100570
     & 0.70013991E-03,-0.57096951E-01, 0.73297806E-02, 0.53550000E-04, BL100580
     & -0.85880005E-04, 0.20601881E+00,-0.58017895E-02, 0.85580003E-04, BL100590
     & 0.21578521E+00,-0.12577798E-01, 0.51477298E-01,-0.23425999E-02, BL100600
     & 0.16780000E-03,-0.15755999E-02, 0.28229994E-03, 0.12529999E-03, BL100610
     & 0.48500006E-04, 0.11655778E+00,-0.46298988E-02, 0.69899994E-04, BL100620
     & 0.21578521E+00,-0.12577798E-01, 0.51477298E-01,-0.23425999E-02, BL100630
     & 0.16780000E-03,-0.15755999E-02, 0.28229994E-03, 0.12529999E-03, BL100640
     & 0.48500006E-04, 0.11655778E+00,-0.46298988E-02, 0.69899994E-04, BL100650
     & 0.21578521E+00,-0.12577798E-01, 0.51477298E-01,-0.23425999E-02, BL100660
     & 0.16780000E-03,-0.15755999E-02, 0.28229994E-03, 0.12529999E-03, BL100670
     & 0.48500006E-04, 0.11655778E+00,-0.46298988E-02, 0.69899994E-04/ BL100680
      DATA DETER/.146,.214,.558,.671,.708,.824,1.033,.312,.290,.327,    BL100690
     & .351,.218,.217,.497,.524,.558,.584,.339,.144,-0.037/             BL100700
      END                                                               BL100710
```

```
      BLOCK DATA
C
      COMMON/ACOM/AIN1,AIN2,AIN3
C
      REAL AIN1(6,18),AIN2(6,18),AIN3(6,18)
C
C**HC SPEED CORRECTION FACTOR COEFFICIENTS
      DATA AIN1/
     *2.2461,-.29097,0.015889,-.47249E-03,0.69408E-05,-.39280E-07,
     *2.3103,-.28957,0.015299,-.44669E-03,0.64818E-05,-.36346E-07,
     *2.1656,-.26999,0.014420,-.43364E-03,0.65074E-05,-.37810E-07,
     *2.3973,-.29998,0.016135,-.48749E-03,0.72909E-05,-.41977E-07,
     *2.4087,-.30819,0.016817,-.50684E-03,0.75385E-05,-.43160E-07,
     *2.2322,-.28499,0.015383,-.45674E-03,0.67349E-05,-.38380E-07,
     *2.2522,-.28778,0.015682,-.47318E-03,0.70795E-05,-.40846E-07,
     *2.0278,-.27305,0.015360,-.46030E-03,0.67853E-05,-.38488E-07,
     *2.1506,-.28362,0.015380,-.44214E-03,0.62873E-05,-.34631E-07,
     *2.2302,-.29365,0.016240,-.48415E-03,0.71159E-05,-.40286E-07,
     *2.1223,-.29107,0.016910,-.52615E-03,0.80271E-05,-.47012E-07,
     *2.1536,-.28345,0.015700,-.46976E-03,0.69383E-05,-.39471E-07,
     *2.0735,-.28935,0.017300,-.55471E-03,0.86420E-05,-.51311E-07,
     *2.3495,-.30496,0.016842,-.50962E-03,0.75952E-05,-.43496E-07,
     *2.1134,-.28568,0.016320,-.50079E-03,0.75507E-05,-.43719E-07,
     *2.1194,-.29863,0.018450,-.61654E-03,0.99206E-05,-.60402E-07,
     *2.6838,-.34463,0.019542,-.62572E-03,0.97844E-05,-.58337E-07,
     *2.3954,-.33578,0.021161,-.73155E-03,0.12072E-04,-.74857E-07/
C
C**CO SPEED CORRECTION FACTOR COEFFICIENTS
      DATA AIN2/
     * 1.8198,-.25466,.015235,-.48740E-03,.75821E-05,-.44951E-07,
     * 2.3399,-.29698,.016007,-.47740E-03,.70675E-05,-.40398E-07,
     * 2.4415,-.29147,.014296,-.38785E-03,.52978E-05,-.28244E-07,
     * 2.4655,-.30502,.016050,-.47397E-03,.69908E-05,-.39976E-07,
     * 2.7780,-.31913,.015318,-.42233E-03,.58495E-05,-.31497E-07,
     * 2.7890,-.32711,.016294,-.46757E-03,.67191E-05,-.37440E-07,
     * 2.7074,-.33131,.017616,-.53858E-03,.81740E-05,-.47780E-07,
     * 1.8692,-.27668,.017233,-.55828E-03,.87168E-05,-.51698E-07,
     * 1.8213,-.27205,.017030,-.55202E-03,.86254E-05,-.51144E-07,
     * 2.0142,-.29519,.018635,-.62161E-03,.99366E-05,-.59978E-07,
     * 2.0453,-.31062,.020485,-.70853E-03,.11621E-04,-.71569E-07,
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     *  2.3187,-.34115,.020945,-.66589E-03,.10223E-04,-.59827E-07,
     *  2.5752,-.32889,.018975,-.62826E-03,.10092E-04,-.61273E-07,
     *  2.6845,-.33282,.017628,-.52412E-03,.77222E-05,-.43702E-07,
     *  2.1549,-.32912,.021011,-.68906E-03,.10839E-04,-.64712E-07,
     *  2.5456,-.36285,.023277,-.81504E-03,.13623E-04,-.85591E-07,
     *  2.8393,-.36876,.021078,-.67644E-03,.10627E-04,-.63641E-07,
     *  2.4875,-.39156,.027072,-.97618E-03,.16527E-04,-1.0432E-07/
C
C**NOX SPEED CORRECTION FACTOR COEFFICIENTS
      DATA AIN3/
     *  2.4442,-.250110,1.3829E-02,-.28703E-03,.20758E-05,0.0,
     *  1.6863,-.118300,.65497E-02,-.13714E-03,.10085E-05,0.0,
     *  1.1265,-.039340,.26864E-02,-.60802E-04,.47729E-06,0.0,
     *  1.2268,-.044498,.26248E-02,-.56715E-04,.43429E-06,0.0,
     *  1.0174,-.011896,.91437E-03,-.21574E-04,.18230E-06,0.0,
     *  .98760,-.019567,.16964E-02,-.40400E-04,.32800E-06,0.0,
     *  1.1592,-.044454,.29643E-02,-.66899E-04,.52236E-06,0.0,
     *  1.8866,-.161290,.90499E-02,-.18561E-03,.13256E-05,0.0,
     *  1.5578,-.113030,.67183E-02,-.14341E-03,.10608E-05,0.0,
     *  2.0452,-.194010,.11074E-01,-.23175E-03,.16837E-05,0.0,
     *  1.6326,-.121860,.70302E-02,-.14629E-03,.10614E-05,0.0,
     *  1.4482,-.122440,.79502E-02,-.17108E-03,.12578E-05,0.0,
     *  .24597,.084195,-.34084E-02,.62988E-04,-.41397E-06,0.0,
     *  1.2817,-.080487,.53574E-02,-.11889E-03,.90106E-06,0.0,
     *  1.5345,-.125670,.78592E-02,-.16943E-03,.12549E-05,0.0,
     *  .70481,.038153,-.17391E-02,.32614E-04,-.20385E-06,0.0,
     *  .78384,.32855E-03,.10603E-02,-.31935E-04,.29039E-06,0.0,
     *  .94213,-.042324,.38625E-02,-.93985E-04,.75388E-06,0.0   /
C
      END
```

```
      BLOCK DATA
C
      COMMON/MYMCOM/MYM,MYR,TF
      COMMON/LNKCOM/SPD,TEMP,PCCO,PCHS,PCCC,MS
C
      REAL SPD(3),MS(6),MYM(20,6),MYR(20,6),TF(20,6)
C
C**DEFAULT MODAL SPLIT
      DATA MS/.803,.058,.058,.045,.031,.005/
C
C**ANNUAL AVERAGE MILEAGE ACCUMULATION (DIVIDED BY 100000)
      DATA MYM/
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,
     *0.159,0.150,0.140,0.131,0.122,0.113,0.103,0.094,0.085,0.076,
     *0.067,0.066,0.062,0.059,0.055,0.051,0.050,0.047,0.044,0.044,
     *0.157,0.157,0.141,0.126,0.113,0.102,0.094,0.086,0.080,0.075,
     *0.071,0.066,0.063,0.060,0.055,0.052,0.050,0.047,0.044,0.041,
     *0.190,0.190,0.179,0.165,0.150,0.135,0.120,0.106,0.095,0.086,
     *0.078,0.070,0.063,0.059,0.053,0.049,0.047,0.046,0.044,0.042,
     *0.736,0.736,0.699,0.633,0.566,0.500,0.456,0.412,0.382,0.360,
     *0.346,0.338,0.331,0.324,0.309,0.287,0.257,0.213,0.184,0.154,
     *.0201,.0251,.0207,.0185,.0172,.0162,.0155,.0149,.0143,.0139,
     *.0135,.0132,.0129,.0127,.0125,.0123,.0122,.0121,.0120,.0119/
C
C**VEHICLE REGISTRATION DISTRIBUTIONS
      DATA MYR/
     *0.075,0.107,0.107,0.106,0.100,0.092,0.085,0.077,0.066,0.052,
     *0.039,0.027,0.018,0.014,0.009,0.006,0.005,0.005,0.005,0.004,
     *0.061,0.095,0.094,0.103,0.083,0.076,0.076,0.063,0.054,0.043,
     *0.036,0.024,0.030,0.028,0.026,0.024,0.022,0.020,0.018,0.016,
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,
     *0.037,0.070,0.078,0.086,0.075,0.075,0.075,0.068,0.059,0.053,
     *0.044,0.032,0.038,0.036,0.034,0.032,0.030,0.028,0.026,0.024,
     *0.077,0.135,0.134,0.131,0.099,0.090,0.082,0.062,0.045,0.033,
     *0.025,0.015,0.013,0.011,0.010,0.008,0.007,0.006,0.005,0.004,
     *0.105,0.225,0.206,0.149,0.097,0.062,0.046,0.033,0.029,0.023,
     *0.008,0.005,0.013,0.0  ,0.0  ,0.0  ,0.0  ,0.0  ,0.0  ,0.0  /
C
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      END                                                               BL300410
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      BLOCK DATA
C
      COMMON/INDXCM/INDX49,INDXCA,INDXHI
      COMMON/BASECM/BASE49,BASECA,BASEHI
      COMMON/DELCOM/ DEL49, DELCA, DELHI
C
      INTEGER INDX49(30,3,6),INDXCA(30,3,6),INDXHI(30,3,6)
      REAL BASE49(10,3,6),BASECA(10,3,6),BASEHI(10,3,6)
      REAL DEL49 (10,3,6),DELCA (10,3,6),DELHI (10,3,6)
C
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
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
      DATA INDX49/
     *1,1,2,2,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,2,2,2,2,2,2,2,3,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,3,3,4,4,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,
     *1,1,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,2,2,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,3,3,4,4,4,4,5,5,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,
     *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,
     *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,
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,
     *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,
     *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,
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4 /
C
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
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
      DATA INDXCA/
     *2,2,2,2,2,2,2,2,2,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,
     *2,2,2,2,2,2,2,2,2,3,3,4,4,4,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *2,2,2,2,2,2,2,3,3,4,4,5,5,5,6,7,7,7,7,7,7,7,7,7,7,7,7,7,7,7,
     *1,1,2,2,2,2,2,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,5,
     *1,1,2,2,2,2,2,2,2,3,3,3,4,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,
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     *1,1,2,2,2,2,2,3,3,4,4,4,4,5,5,6,6,7,7,7,7,7,7,7,7,7,7,7,7,7,        BL400410
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,        BL400420
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,        BL400430
     *1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,        BL400440
     *1,1,1,2,2,2,2,3,3,4,4,5,5,5,6,6,6,7,7,7,7,7,7,7,7,7,7,7,7,7,        BL400450
     *1,1,1,2,2,2,2,3,3,4,4,5,5,5,5,5,5,6,6,6,6,6,6,6,6,6,6,6,6,6,        BL400460
     *1,1,1,2,2,2,2,3,3,4,4,5,5,5,6,6,6,6,6,7,7,7,7,7,7,7,7,7,7,7,        BL400470
     *1,1,1,1,1,1,1,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,        BL400480
     *1,1,1,1,1,1,1,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,        BL400490
     *1,1,1,1,1,1,1,2,2,2,2,3,3,3,4,4,4,4,4,4,5,5,5,5,5,5,5,5,5,5,        BL400500
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,        BL400510
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,4,        BL400520
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4 /       BL400530
C                                                                         BL400540
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       BL400550
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       BL400560
      DATA INDXHI/                                                        BL400570
     *1,1,2,2,2,2,2,2,2,3,3,4,5,5,6,7,7,7,8,8,8,8,8,8,8,8,8,8,8,8,        BL400580
     *1,1,2,2,2,2,2,2,2,3,3,4,5,5,6,7,7,7,8,8,8,8,8,8,8,8,8,8,8,8,        BL400590
     *1,1,2,2,2,2,2,3,3,4,4,5,6,6,7,8,8,8,9,9,9,9,9,9,9,9,9,9,9,9,        BL400600
     *1,1,2,2,2,2,2,2,2,3,3,4,5,6,6,6,6,7,8,8,8,8,8,8,8,8,8,8,8,8,        BL400610
     *1,1,2,2,2,2,2,2,2,3,3,4,5,6,6,6,6,7,8,8,8,8,8,8,8,8,8,8,8,8,        BL400620
     *1,1,2,2,2,2,2,3,3,4,4,5,6,7,7,7,7,7,8,9,9,9,9,9,9,9,9,9,9,9,        BL400630
     *1,1,1,1,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,        BL400640
     *1,1,1,1,2,2,2,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,5,        BL400650
     *1,1,1,1,2,2,2,2,2,2,2,2,2,3,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,        BL400660
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,6,6,        BL400670
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,6,6,        BL400680
     *1,1,1,1,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,5,6,6,6,6,6,6,6,6,6,6,        BL400690
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,        BL400700
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,        BL400710
     *1,1,1,1,1,1,1,1,2,2,2,2,2,3,3,3,3,3,4,4,4,4,4,4,4,4,4,4,4,4,        BL400720
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,        BL400730
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5,        BL400740
     *1,1,1,1,1,1,1,1,1,1,1,1,2,2,3,3,3,4,5,5,5,5,5,5,5,5,5,5,5,5 /       BL400750
C                                                                         BL400760
C***EXHAUST EMISSION FACTOR INTERCEPT: 49 STATE                           BL400770
      DATA BASE49/                                                        BL400780
     *  4.45,  2.43,  1.13,  0.13,  0.13,  0.13, 0.0 , 0.0 , 0.0 , 0.0 ,BL400790
     * 68.30, 31.14, 18.60,  3.00,  1.40,  1.40, 0.0 , 0.0 , 0.0 , 0.0 ,BL400800
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     *  3.58,  4.43,  2.98,  2.42,  1.50,  0.29, 0.0 , 0.0 , 0.0 , 0.0 ,BL400810
     *  4.45,  2.43,  1.11,  0.94,  0.31,  0.31, 0.0 , 0.0 , 0.0 , 0.0 ,BL400820
     * 68.30, 31.14, 16.10, 14.50,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,BL400830
     *  3.58,  4.43,  2.98,  2.45,  1.73,  0.41, 0.0 , 0.0 , 0.0 , 0.0 ,BL400840
     *  5.99,  2.90,  0.94,  0.31,  0.31,  0.31, 0.0 , 0.0 , 0.0 , 0.0 ,BL400850
     * 78.70, 32.40, 14.50,  3.87,  3.87,  3.87, 0.0 , 0.0 , 0.0 , 0.0 ,BL400860
     *  6.49,  5.04,  1.73,  0.41,  0.41,  0.41, 0.0 , 0.0 , 0.0 , 0.0 ,BL400870
     * 23.90, 18.54, 22.02,  5.22,  1.46,  1.46, 0.0 , 0.0 , 0.0 , 0.0 ,BL400880
     *272.90,212.70,218.80,191.90, 15.38, 15.38, 0.0 , 0.0 , 0.0 , 0.0 ,BL400890
     *  8.80, 12.80, 10.50,  9.10,  3.99,  3.99, 0.0 , 0.0 , 0.0 , 0.0 ,BL400900
     *  4.30,  4.50,  4.50,  2.85,  2.85,  2.85, 0.0 , 0.0 , 0.0 , 0.0 ,BL400910
     * 35.10, 27.00, 27.00, 27.00, 27.00, 27.00, 0.0 , 0.0 , 0.0 , 0.0 ,BL400920
     * 21.40, 20.10, 19.90,  5.35,  5.35,  5.35, 0.0 , 0.0 , 0.0 , 0.0 ,BL400930
     *  8.96,  4.70,  3.82,  0.29,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL400940
     * 34.40, 20.27, 14.86,  2.71,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL400950
     *  0.14,  0.28,  0.56,  0.04,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /BL400960
C                                                                       BL400970
C***EXHAUST EMISSION FACTOR INTERCEPT: CALIFORNIA                        BL400980
      DATA BASECA/                                                      BL400990
     *  4.45,  2.00,  0.29,  0.15,  0.15,  0.15, 0.0 , 0.0 , 0.0 , 0.0 ,BL401000
     * 68.30, 30.42,  3.80,  3.80,  3.00,  3.00, 0.0 , 0.0 , 0.0 , 0.0 ,BL401010
     *  3.58,  3.92,  3.12,  1.50,  1.10,  0.29, 0.21, 0.0 , 0.0 , 0.0 ,BL401020
     *  4.45,  2.43,  1.11,  0.29,  0.15,  0.15, 0.15, 0.0 , 0.0 , 0.0 ,BL401030
     * 68.30, 31.14, 16.10, 13.70,  3.80,  3.80, 3.80, 0.0 , 0.0 , 0.0 ,BL401040
     *  3.58,  4.43,  2.98,  1.50,  1.28,  0.54, 0.21, 0.0 , 0.0 , 0.0 ,BL401050
     *  5.99,  2.90,  0.29,  0.16,  0.16,  0.16, 0.16, 0.0 , 0.0 , 0.0 ,BL401060
     * 78.70, 32.40, 13.70,  3.80,  3.80,  3.80, 3.80, 0.0 , 0.0 , 0.0 ,BL401070
     *  6.49,  5.04,  1.73,  0.44,  0.44,  0.44, 0.44, 0.0 , 0.0 , 0.0 ,BL401080
     * 23.90, 18.54, 22.02, 18.16,  5.22,  3.50, 1.46, 0.0 , 0.0 , 0.0 ,BL401090
     *272.90,212.70,218.80,209.00,191.90, 15.38,15.38, 0.0 , 0.0 , 0.0 ,BL401100
     *  8.80, 12.80, 10.50,  7.50,  8.04,  6.20, 3.99, 0.0 , 0.0 , 0.0 ,BL401110
     *  4.30,  4.50,  4.50,  2.85,  2.85,  2.85, 2.85, 0.0 , 0.0 , 0.0 ,BL401120
     * 35.10, 27.00, 27.00, 27.00, 27.00, 27.00,27.00, 0.0 , 0.0 , 0.0 ,BL401130
     * 21.40, 20.10, 18.61, 16.30,  5.35,  5.35, 5.35, 0.0 , 0.0 , 0.0 ,BL401140
     *  8.96,  4.70,  3.82,  0.82,  0.29,  0.29, 0.29, 0.29, 0.29, 0.29,BL401150
     * 34.40, 20.27, 14.86,  2.71,  2.71,  2.71, 2.71, 2.71, 2.71, 2.71,BL401160
     *  0.14,  0.28,  0.56,  0.04,  0.04,  0.04, 0.04, 0.04, 0.04, 0.04/BL401170
C                                                                       BL401180
C***EXHAUST EMISSION FACTOR INTERCEPT: HIGH ALTITUDE                     BL401190
      DATA BASEHI/                                                      BL401200
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     *  6.03,  4.07,  1.83,  0.70,  1.83,  0.21, 0.21, 0.13, 0.13, 0.13,
     *110.04, 76.73, 38.31, 10.30, 38.31,  6.18, 2.88, 1.40, 1.40, 1.40,
     *  1.96,  3.00,  1.94,  1.50,  1.90,  1.50, 0.93, 0.18, 0.29, 0.29,
     *  6.03,  4.07,  1.79,  1.11,  1.79,  1.52, 0.47, 0.31, 0.0 , 0.0 ,
     *110.04, 76.73, 33.15, 16.10, 33.15, 29.90, 8.00, 3.87, 0.0 , 0.0 ,
     *  1.96,  3.00,  1.94,  1.52,  2.45,  1.52, 1.07, 1.73, 0.41, 0.0 ,
     *  8.12,  4.86,  1.52,  0.47,  0.31,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *127.30, 79.90, 29.90,  8.00,  3.87,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.55,  3.41,  1.07,  1.73,  0.41,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 32.40, 31.05, 36.77,  8.74,  2.35,  1.46, 0.0 , 0.0 , 0.0 , 0.0 ,
     *441.50,344.20,353.20,310.90, 31.70, 15.38, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  4.82,  8.67,  6.84,  5.92,  5.64,  3.99, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  5.80,  6.10,  6.10,  3.85,  2.85,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 56.80, 43.70, 43.70, 43.70, 27.00,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 11.80, 13.10, 12.90,  5.35,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 12.10,  7.97,  6.38,  0.45,  0.29,  0.29, 0.29, 0.29, 0.29, 0.29,
     * 47.10, 27.80, 20.40,  5.58,  2.71,  2.71, 2.71, 2.71, 2.71, 2.71,
     *  0.08,  0.18,  0.36,  0.03,  0.04,  0.04, 0.04, 0.04, 0.04,  0.0/
C
C***EXHAUST EMISSION FACTOR SLOPE: 49 STATE
      DATA DEL49/
     * 0.58, 0.53, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.15, 2.80, 2.30, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.08, 0.16, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.58, 0.53, 0.41, 0.41, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.15, 5.34, 5.34, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.11, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.58, 0.53, 0.41, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.15, 5.34, 2.00, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.58, 0.53, 0.53, 0.53, 1.06, 1.06, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 3.06, 6.15, 6.15, 6.15,10.54,10.54, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.34, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 1.17, 1.03, 1.03, 0.23, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 1.54, 4.00, 4.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 0.0 , 0.0 , 0.0 , 0.22, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0    /
C
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C***EXHAUST EMISSION FACTOR SLOPE: CALIFORNIA                            BL401610
      DATA DELCA/                                                        BL401620
     * 0.58, 0.70, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 ,       BL401630
     * 3.06, 6.40, 2.33, 2.33, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 ,       BL401640
     * 0.0 , 0.0 , 0.0 , 0.16, 0.16, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,       BL401650
     * 0.58, 0.53, 0.41, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 ,       BL401660
     * 3.06, 6.15, 5.34, 5.34, 2.33, 2.00, 2.00, 0.0 , 0.0 , 0.0 ,       BL401670
     * 0.0 , 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,       BL401680
     * 0.58, 0.53, 0.23, 0.23, 0.23, 0.23, 0.23, 0.0 , 0.0 , 0.0 ,       BL401690
     * 3.06, 6.15, 5.34, 2.00, 2.00, 2.00, 2.00, 0.0 , 0.0 , 0.0 ,       BL401700
     * 0.0 , 0.0 , 0.11, 0.22, 0.22, 0.22, 0.22, 0.0 , 0.0 , 0.0 ,       BL401710
     * 0.58, 0.53, 0.53, 0.53, 0.53, 0.53, 1.06, 0.0 , 0.0 , 0.0 ,       BL401720
     * 3.06, 6.15, 6.15, 6.15, 6.15,10.54,10.54, 0.0 , 0.0 , 0.0 ,       BL401730
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.0 , 0.0 , 0.0 ,       BL401740
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401750
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401760
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401770
     * 0.58, 0.53, 0.53, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,       BL401780
     * 3.06, 6.15, 6.15, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00,       BL401790
     * 0.0 , 0.0 , 0.0 , 0.22, 0.22, 0.22, 0.22, 0.22, 0.22, 0.22 /      BL401800
C                                                                        BL401810
C***EXHAUST EMISSION FACTOR SLOPE: HIGH ALTITUDE                          BL401820
      DATA DELHI/                                                        BL401830
     * 0.55, 0.55, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,       BL401840
     * 2.81, 4.24, 2.80, 2.80, 2.80, 2.30, 2.00, 2.00, 2.00, 2.00,       BL401850
     * 0.0 , 0.0 , 0.0 , 0.08, 0.16, 0.16, 0.16, 0.22, 0.22, 0.22,       BL401860
     * 0.55, 0.55, 0.41, 0.41, 0.41, 0.41, 0.23, 0.23, 0.0 , 0.0 ,       BL401870
     * 2.81, 4.24, 5.34, 5.34, 5.34, 5.34, 2.00, 2.00, 0.0 , 0.0 ,       BL401880
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.11, 0.11, 0.22, 0.0 ,       BL401890
     * 0.55, 0.55, 0.41, 0.23, 0.23, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401900
     * 2.81, 4.24, 5.34, 2.00, 2.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401910
     * 0.0 , 0.0 , 0.11, 0.11, 0.22, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401920
     * 0.55, 0.55, 0.55, 0.55, 1.06, 1.06, 0.0 , 0.0 , 0.0 , 0.0 ,       BL401930
     * 2.81, 4.24, 4.24, 4.24,10.54,10.54, 0.0 , 0.0 , 0.0 , 0.0 ,       BL401940
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.34, 0.0 , 0.0 , 0.0 , 0.0 ,       BL401950
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401960
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401970
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,       BL401980
     * 0.55, 0.55, 0.55, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23, 0.23,       BL401990
     * 2.81, 4.24, 4.24, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00,       BL402000
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     * 0.0 , 0.0 , 0.0 , 0.22, 0.22, 0.22, 0.22, 0.22, 0.22, 0.22 /      BL402010
C                                                                       BL402020
      END                                                               BL402030
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      BLOCK DATA
C
      COMMON/IDLBCM/IDLB49,IDLBCA,IDLBHI
      COMMON/IDLDCM/IDEL49,IDELCA,IDELHI
C
      REAL IDLB49(10,3,6),IDLBCA(10,3,6),IDLBHI(10,3,6)
      REAL IDEL49(10,3,6),IDELCA(10,3,6),IDELHI(10,3,6)
C
C***IDLE EMISSION FACTOR INTERCEPT: 49 STATE
      DATA IDLB49/
     *  2.01,  0.68,  0.27,  0.03,  0.07,  0.07, 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 12.73,  5.43,  0.88,  0.41,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.26,  0.16,  0.36,  0.22,  0.04, 0.2 , 0.0 , 0.0 , 0.0 ,
     *  2.01,  0.68,  0.28,  0.24,  0.08,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 12.73,  2.02,  1.82,  0.49,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.26,  0.16,  0.25,  0.18,  0.04, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  2.93,  1.86,  0.24,  0.08,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 17.24, 18.62,  1.82,  0.49,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.18,  0.27,  0.18,  0.04,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  3.85,  0.71,  3.09,  0.73,  0.20,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 24.63, 15.70, 21.92, 19.23,  1.54,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.02,  0.04,  0.02,  0.02,  0.01,  0.01, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.50,  0.40,  0.40,  0.25,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  1.32,  0.66,  0.66,  0.66,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  1.11,  1.00,  0.99,  0.27,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  4.05,  2.12,  1.72,  0.13,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  8.27,  4.87,  3.57,  0.65,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.01,  0.02,  0.04,  0.01,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /
C
C***IDLE EMISSION FACTOR INTERCEPT: CALIFORNIA
      DATA IDLBCA/
     *  2.01,  0.93,  0.04,  0.02,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 15.02,  0.18,  0.18,  0.14,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.24,  0.07,  0.11,  0.08,  0.02, 0.02, 0.0 , 0.0 , 0.0 ,
     *  2.01,  0.68,  0.23,  0.07,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 16.42, 12.73,  2.02,  1.72,  0.48,  0.48, 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.16,  0.26,  0.16,  0.25,  0.21,  0.09, 0.04, 0.0 , 0.0 , 0.0 ,
     *  2.93,  1.86,  0.07,  0.04,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     * 17.24, 18.62,  1.72,  0.48,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
     *  0.18,  0.27,  0.25,  0.09,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,
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     *  3.85,  0.71,  3.09,  0.18,  0.05,  0.03, 0.01, 0.0 , 0.0 , 0.0 ,BL500410
     * 24.63, 15.70, 21.92,  4.40,  4.04,  0.32, 0.0 , 0.0 , 0.0 , 0.0 ,BL500420
     *  0.02,  0.04,  0.02,  0.05,  0.05,  0.04, 0.03, 0.0 , 0.0 , 0.0 ,BL500430
     *  0.50,  0.40,  0.40,  0.25,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500440
     *  1.32,  0.66,  0.66,  0.66,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500450
     *  1.11,  1.00,  0.93,  0.61,  0.27,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500460
     *  3.46,  1.81,  1.48,  0.32,  0.11,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500470
     * 11.57,  6.82,  5.00,  0.91,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500480
     *  0.01,  0.02,  0.04,  0.01,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /BL500490
C                                                                       BL500500
C***IDLE EMISSION FACTOR INTERCEPT: HIGH ALTITUDE                       BL500510
      DATA IDLEHI/                                                      BL500520
     *  2.29,  1.04,  0.24,  0.17,  0.24,  0.05, 0.05, 0.03, 0.0 , 0.0 ,BL500530
     * 20.70, 20.71,  4.48,  3.01,  4.48,  1.81, 0.84, 0.41, 0.0 , 0.0 ,BL500540
     *  0.26,  0.19,  0.08,  0.06,  0.28,  0.06, 0.14, 0.02, 0.04, 0.0 ,BL500550
     *  2.29,  1.04,  0.22,  0.28,  0.22,  0.39, 0.12, 0.08, 0.0 , 0.0 ,BL500560
     * 20.70, 20.71,  5.60,  2.02,  5.60,  3.75, 1.01, 0.49, 0.0,  0.0, BL500570
     *  0.26,  0.19,  0.08,  0.04,  0.25,  0.04, 0.11, 0.18, 0.04, 0.0 ,BL500580
     *  3.40,  3.50,  0.39,  0.12,  0.08,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500590
     * 38.84, 48.25,  3.75,  1.01,  0.49,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500600
     *  0.10,  0.17,  0.11,  0.18,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500610
     *  4.46,  1.34,  5.82,  1.22,  0.32,  0.20, 0.0 , 0.0 , 0.0 , 0.0 ,BL500620
     * 55.59, 40.68, 56.80, 31.15,  3.17,  1.54, 0.0 , 0.0 , 0.0 , 0.0 ,BL500630
     *  0.01,  0.03,  0.02,  0.01,  0.01,  0.01, 0.0 , 0.0 , 0.0 , 0.0 ,BL500640
     *  0.58,  0.75,  0.75,  0.34,  0.25,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500650
     *  2.97,  1.71,  1.71,  1.71,  0.66,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500660
     *  0.64,  0.64,  0.64,  0.27,  0.0 ,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500670
     *  4.01,  3.59,  2.87,  0.20,  0.13,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500680
     * 26.07,  6.68,  4.90,  1.34,  0.65,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,BL500690
     *  0.01,  0.01,  0.03,  0.01,  0.04,  0.0 , 0.0 , 0.0 , 0.0 , 0.0 /BL500700
C                                                                       BL500710
C***IDLE EMISSION FACTOR SLOPE: 49 STATE                                BL500720
      DATA IDEL49/                                                      BL500730
     * 0.18, 0.20, 0.07, 0.07, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500740
     * 2.55, 2.92, 0.83, 0.67, 0.59, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500750
     * 0.0 , 0.0 , 0.0 , 0.03, 0.06, 0.08, 0.0 , 0.0 , 0.0 , 0.0 ,      BL500760
     * 0.18, 0.20, 0.19, 0.19, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500770
     * 2.55, 2.92, 1.56, 1.56, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500780
     * 0.0 , 0.0 , 0.0 , 0.02, 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 ,      BL500790
     * 0.18, 0.20, 0.19, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,      BL500800
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     * 2.55, 2.92, 1.56, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500810
     * 0.0 , 0.0 , 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500820
     * 0.18, 0.20, 0.20, 0.20, 0.40, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500830
     * 2.55, 2.92, 2.92, 2.92, 5.00, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500840
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500850
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500860
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500870
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500880
     * 0.36, 0.62, 0.62, 0.10, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500890
     * 1.28, 1.12, 1.12, 0.48, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500900
     * 0.0 , 0.0 , 0.0 , 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0     /    BL500910
C                                                                         BL500920
C***IDLE EMISSION FACTOR SLOPE: CALIFORNIA                                 BL500930
      DATA IDELCA/                                                        BL500940
     * 0.18, 0.31, 0.01, 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500950
     * 2.55, 3.15, 0.08, 0.08, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500960
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500970
     * 0.18, 0.20, 0.19, 0.05, 0.05, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL500980
     * 2.55, 2.92, 1.56, 1.56, 0.29, 0.29, 0.0 , 0.0 , 0.0 , 0.0 ,        BL500990
     * 0.0 , 0.0 , 0.0 , 0.02, 0.04, 0.04, 0.04, 0.0 , 0.0 , 0.0 ,        BL501000
     * 0.18, 0.20, 0.05, 0.05, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501010
     * 2.55, 2.92, 1.56, 0.29, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501020
     * 0.0 , 0.0 , 0.02, 0.04, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501030
     * 0.18, 0.20, 0.20, 0.20, 0.20, 0.20, 0.40, 0.0 , 0.0 , 0.0 ,        BL501040
     * 2.55, 2.92, 2.92, 2.92, 2.92, 5.00, 0.0 , 0.0 , 0.0 , 0.0 ,        BL501050
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501060
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501070
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501080
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501090
     * 0.31, 0.28, 0.28, 0.12, 0.12, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501100
     * 1.80, 3.61, 3.61, 1.18, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,        BL501110
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0     /    BL501120
C                                                                         BL501130
C***IDLE EMISSION FACTOR SLOPE: HIGH ALTITUDE                              BL501140
      DATA IDELHI/                                                        BL501150
     * 0.21, 0.14, 0.02, 0.07, 0.07, 0.07, 0.07, 0.07, 0.0 , 0.0 ,        BL501160
     * 0.53, 1.15, 0.98, 0.83, 0.83, 0.67, 0.59, 0.59, 0.0 , 0.0 ,        BL501170
     * 0.0 , 0.0 , 0.0 , 0.04, 0.06, 0.06, 0.06, 0.08, 0.08, 0.0 ,        BL501180
     * 0.21, 0.14, 0.08, 0.19, 0.19, 0.19, 0.06, 0.06, 0.0 , 0.0 ,        BL501190
     * 0.53, 1.15, 1.24, 1.56, 1.56, 1.56, 0.25, 0.25, 0.0 , 0.0 ,        BL501200
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     * 0.0 , 0.0 , 0.0 , 0.03, 0.02, 0.02, 0.01, 0.01, 0.02, 0.0 ,         BL501210
     * 0.21, 0.14, 0.19, 0.06, 0.06, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501220
     * 0.53, 1.15, 1.56, 0.25, 0.25, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501230
     * 0.0 , 0.0 , 0.01, 0.01, 0.02, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501240
     * 0.21, 0.14, 0.14, 0.20, 0.40, 0.40, 0.0 , 0.0 , 0.0 , 0.0 ,         BL501250
     * 0.53, 1.15, 1.15, 2.92, 5.00, 5.00, 0.0 , 0.0 , 0.0 , 0.0 ,         BL501260
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501270
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501280
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501290
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501300
     * 0.36, 0.62, 0.62, 0.10, 0.10, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501310
     * 0.66, 1.12, 1.12, 0.48, 0.48, 0.0 , 0.0 , 0.0 , 0.0 , 0.0 ,         BL501320
     * 0.0 , 0.0 , 0.0 , 0.0 , 0.01, 0.0 , 0.0 , 0.0 , 0.0 , 0.0  /        BL501330
C                                                                         BL501340
      END                                                                 BL501350
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      BLOCK DATA                                                        BL600010
C                                                                       BL600020
      COMMON/IMCRED/PCIMHN,PCIMHY,PCIMCN,PCIMCY                         BL600030
C                                                                       BL600040
      INTEGER PCIMHN(19,5,4),PCIMHY(19,5,4),PCIMCN(19,5,4),             BL600050
     *  PCIMCY(19,5,4)                                                  BL600060
C                                                                       BL600070
C                                                                       BL600080
      DATA PCIMHN/ 3, 6,11,15,19,24,27,31,35,39,41,42,44,46,47,48,49,51,BL600090
     * 52,    4, 8,13,18,22,28,34,36,40,42,45,46,49,50,51,52,54,56,57,  BL600100
     *        7,14,20,28,34,39,43,46,49,52,54,55,57,58,59,60,61,62,63,  BL600110
     *        8,15,22,30,36,41,46,49,52,54,56,58,59,61,62,63,64,65,65,  BL600120
     *        8,16,23,31,37,42,46,50,53,55,57,59,60,61,62,63,64,65,66,  BL600130
     *        4, 6, 9,11,16,19,20,23,25,28,29,30,32,33,35,36,36,37,38,  BL600140
     *        6,11,16,20,23,27,31,33,36,38,40,41,43,44,45,46,47,48,49,  BL600150
     *       10,18,24,28,33,36,40,42,45,47,48,50,51,53,55,55,55,57,58,  BL600160
     *       12,20,26,32,37,40,43,46,49,51,52,54,55,56,57,59,59,60,61,  BL600170
     *       13,22,28,34,39,43,46,49,51,54,55,57,58,59,61,61,62,63,64,  BL600180
     *        4,11,22,32,42,49,54,58,62,64,66,68,69,71,72,73,74,74,75,  BL600190
     *        4,13,25,37,46,53,58,62,65,67,69,71,72,73,74,75,76,77,77,  BL600200
     *        4,15,28,40,49,55,60,64,67,69,71,72,74,75,76,77,77,78,79,  BL600210
     *        5,17,31,43,51,59,63,66,69,71,73,74,75,76,77,78,79,79,80,  BL600220
     *        5,18,32,44,53,59,63,67,70,72,73,75,76,77,78,79,79,80,81,  BL600230
     *        3, 7,14,23,31,38,44,49,53,56,58,60,62,63,65,66,67,68,69,  BL600240
     *        3, 7,15,24,33,40,46,51,54,57,60,62,63,65,66,67,68,69,70,  BL600250
     *        3, 7,16,25,34,41,47,51,55,58,60,62,64,65,67,68,69,70,71,  BL600260
     *        3, 8,17,26,35,42,48,52,56,59,61,63,65,66,68,69,70,71,71,  BL600270
     *        3, 8,17,27,36,43,49,54,57,60,62,64,66,67,68,69,70,71,72/  BL600280
C                                                                       BL600290
      DATA PCIMHY/ 6,13,17,20,25,32,35,40,45,47,49,50,53,53,54,56,57,57,BL600300
     * 58,    9,14,19,25,31,36,43,45,50,51,53,54,55,56,58,58,61,63,63,  BL600310
     *       12,19,27,35,41,44,51,53,55,57,59,61,61,63,65,65,66,66,67,  BL600320
     *       13,24,33,40,46,50,54,57,59,61,63,65,65,66,68,68,69,70,71,  BL600330
     *       14,25,35,42,48,53,56,59,62,64,65,66,68,69,70,70,71,72,72,  BL600340
     *        9,13,15,18,22,26,28,31,33,35,37,39,40,42,44,44,44,46,48,  BL600350
     *       13,16,20,26,31,34,38,41,43,44,45,47,48,50,52,52,53,54,55,  BL600360
     *       14,21,28,33,38,41,45,47,50,52,53,54,56,57,59,60,61,61,62,  BL600370
     *       15,24,31,36,41,44,48,50,52,54,56,58,58,60,61,62,63,63,65,  BL600380
     *       16,26,33,39,43,47,50,53,55,57,59,60,61,63,64,65,65,66,67,  BL600390
     *       10,33,51,59,67,70,74,76,78,80,80,81,82,83,84,84,85,85,86,  BL600400
```

```
     *        13,36,53,62,69,73,76,78,80,81,82,83,83,84,85,85,86,86,87,   BL600410
     *        15,38,54,64,70,74,77,79,81,82,83,84,85,85,86,86,87,87,87,   BL600420
     *        16,39,54,64,70,74,77,80,81,83,84,85,85,86,87,87,87,88,88,   BL600430
     *        16,39,54,64,70,74,77,80,81,83,84,85,86,86,87,87,88,88,88,   BL600440
     *         7,24,36,52,54,65,66,69,72,75,75,75,77,79,79,80,80,81,81,   BL600450
     *        11,29,45,56,63,68,70,74,76,76,78,80,80,81,82,82,83,84,84,   BL600460
     *        12,32,46,58,65,69,72,75,76,77,80,81,81,82,83,83,84,85,85,   BL600470
     *        14,36,52,62,68,73,76,78,80,81,82,83,84,85,85,86,86,87,87,   BL600480
     *        15,38,54,64,70,74,77,79,81,83,84,85,85,86,87,87,88,88,88/   BL600490
C                                                                          BL600500
C                                                                          BL600510
      DATA  PCIMCN/ 7,13,17,22,26,30,32,35,37,40,41,42,44,45,46,47,48,50,BL600520
     * 50,     9,17,22,27,31,35,37,40,42,44,46,48,49,51,52,53,54,55,56,   BL600530
     *        12,21,27,32,36,40,44,47,49,52,53,55,56,58,59,60,61,62,62,   BL600540
     *        14,23,29,35,39,43,47,50,52,55,56,58,59,60,61,62,63,64,65,   BL600550
     *        15,25,31,36,41,45,49,52,54,56,58,59,61,62,63,64,65,65,66,   BL600560
     *        10,15,20,23,26,28,31,32,34,35,37,37,38,40,41,41,42,43,44,   BL600570
     *        17,25,29,32,36,38,41,42,44,46,47,48,49,50,51,52,52,53,54,   BL600580
     *        21,31,36,40,44,47,49,51,53,55,56,57,58,59,60,61,62,62,63,   BL600590
     *        23,34,39,43,46,49,52,54,56,57,59,60,61,62,63,63,64,65,65,   BL600600
     *        25,36,41,45,49,52,54,56,58,60,61,62,63,64,65,66,67,67,68,   BL600610
     *         0, 4, 8,14,20,26,30,33,35,39,42,44,45,48,49,50,50,53,55,   BL600620
     *         0, 5,10,18,23,28,32,37,40,43,45,47,49,51,52,53,54,56,57,   BL600630
     *         1, 6,13,21,27,33,38,42,45,48,50,52,54,56,57,59,60,61,62,   BL600640
     *         1, 6,14,22,28,34,39,43,47,49,52,54,55,57,58,60,61,62,63,   BL600650
     *         2, 7,14,22,29,35,40,44,47,50,52,54,56,58,59,60,61,62,63,   BL600660
     *         0, 2, 7,13,19,24,29,33,37,40,43,45,47,49,50,52,53,54,55,   BL600670
     *         0, 4,11,19,26,32,37,42,45,48,51,53,55,56,58,59,60,62,62,   BL600680
     *         1, 5,13,21,26,34,40,44,48,51,53,55,57,58,60,61,62,63,64,   BL600690
     *         2, 8,18,28,36,42,47,52,55,58,60,62,63,65,66,67,68,69,70,   BL600700
     *         3,12,23,33,42,48,53,57,60,63,65,66,68,69,70,71,72,73,74/   BL600710
C                                                                          BL600720
      DATA  PCIMCY/11,20,26,30,34,40,43,47,50,52,53,55,58,57,58,59,61,60,BL600730
     * 62,    16,23,29,35,40,43,49,51,54,55,57,58,59,60,62,62,64,66,66,   BL600740
     *        20,29,37,42,47,49,55,57,59,61,62,64,64,66,67,68,68,68,70,   BL600750
     *        22,34,41,46,51,55,58,61,63,64,65,67,68,69,70,70,71,72,73,   BL600760
     *        23,35,42,48,53,57,60,62,65,66,68,69,70,71,72,72,73,74,74,   BL600770
     *        17,25,27,31,35,38,40,43,44,45,49,50,50,53,54,54,55,56,58,   BL600780
     *        26,33,36,41,46,48,51,54,56,57,58,59,60,61,63,63,64,65,66,   BL600790
     *        30,41,47,50,54,57,59,61,63,65,65,66,67,68,69,70,71,71,71,   BL600800
```

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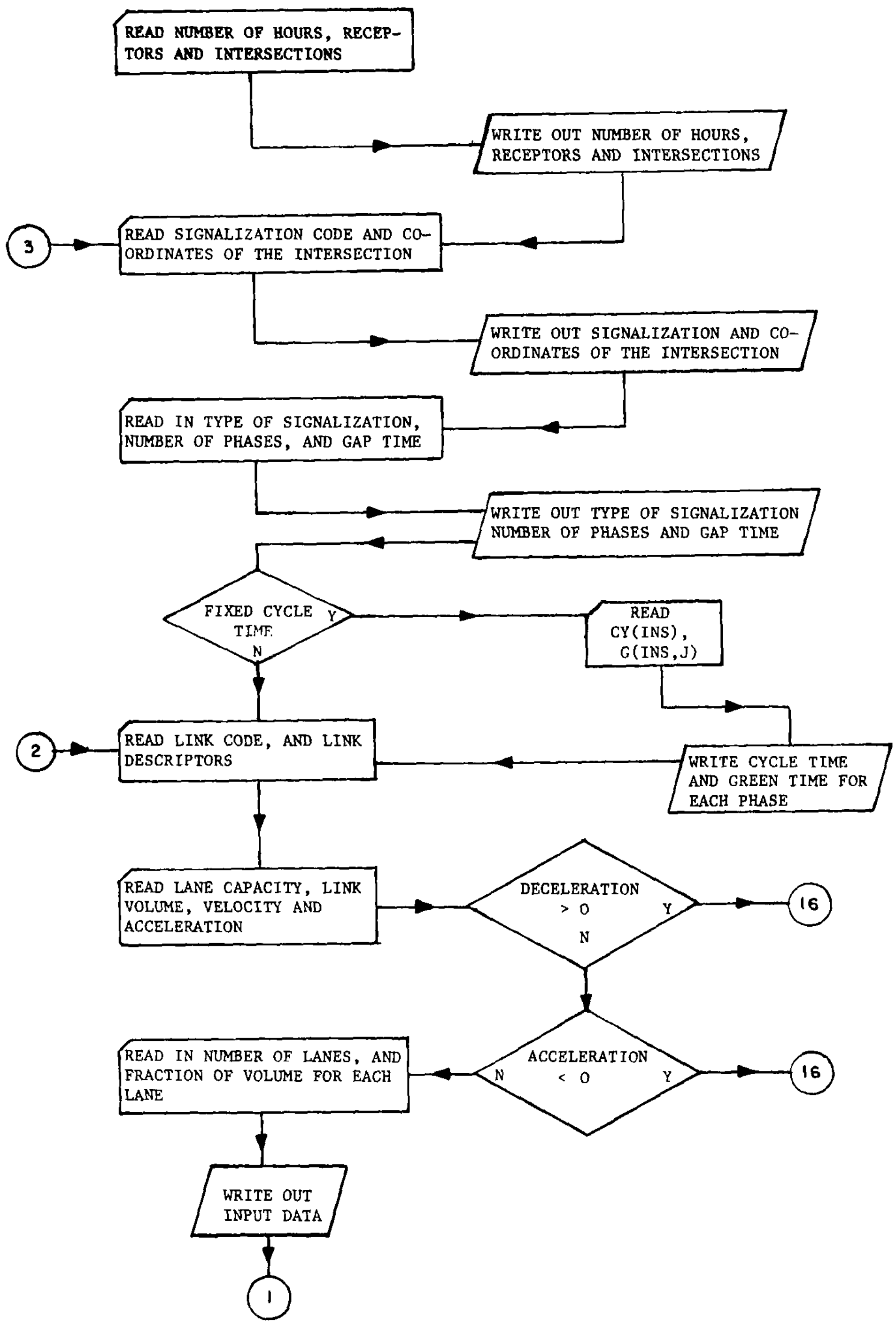
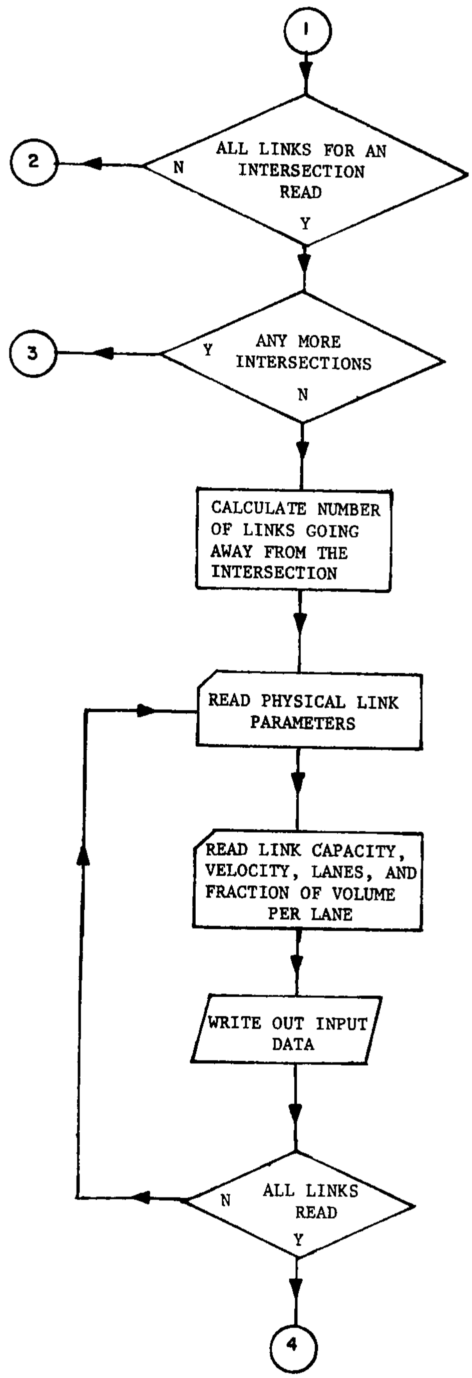
     *     32,45,50,54,57,60,63,64,65,67,68,69,70,71,72,72,73,73,74,     BL600810
     *     33,47,52,56,60,62,65,67,68,69,70,71,72,73,74,74,75,75,76,     BL600820
     *      5,24,40,48,56,60,65,67,69,72,72,74,75,76,77,78,78,79,79,     BL600830
     *      8,27,42,51,58,63,66,69,71,73,74,76,76,77,78,79,79,80,80,     BL600840
     *     11,29,43,52,59,64,67,70,72,74,75,76,77,78,79,80,80,81,81,     BL600850
     *     13,30,43,52,59,64,68,71,73,75,76,77,78,79,80,80,81,82,82,     BL600860
     *     14,30,43,52,59,64,68,71,73,75,76,77,78,79,80,81,81,82,82,     BL600870
     *      9,30,41,56,58,68,68,71,74,77,77,78,79,81,81,81,81,82,83,     BL600880
     *     15,37,51,60,66,70,72,76,77,78,80,82,82,82,83,84,84,85,85,     BL600890
     *     18,39,52,62,68,71,74,77,78,79,82,82,82,84,84,84,85,86,86,     BL600900
     *     21,43,57,66,71,75,78,80,81,83,84,85,85,86,86,87,87,88,88,     BL600910
     *     23,44,58,66,72,76,79,81,83,84,85,86,86,87,88,88,88,89,89/     BL600920
C                                                                        BL600930
      END                                                                BL600940
C          DATA SET PTHWY       AT LEVEL 019 AS OF 08/24/77              BL600950
```

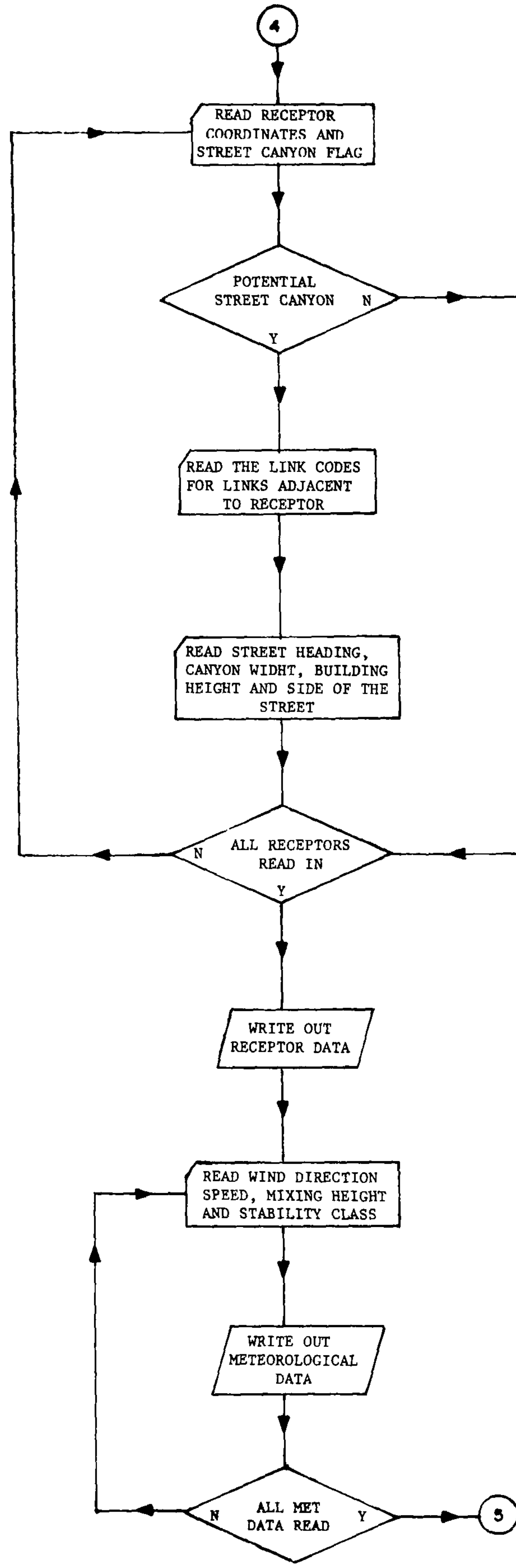
APPENDIX B

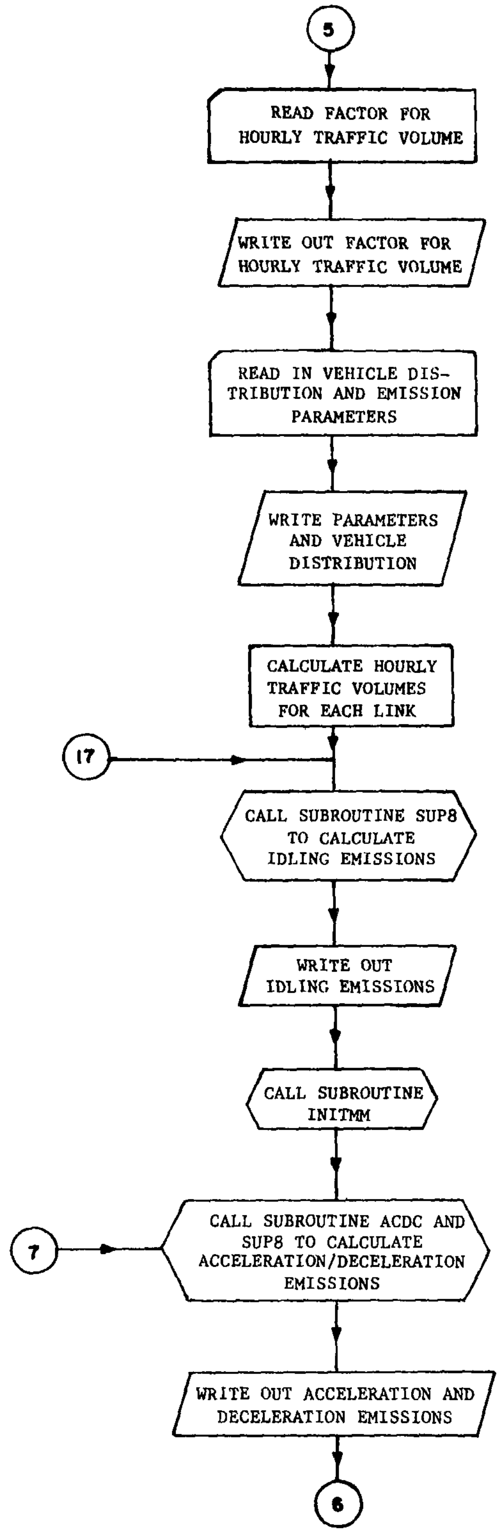
FLOW CHARTS FOR IMM, AND ASSOCIATED SUBROUTINES

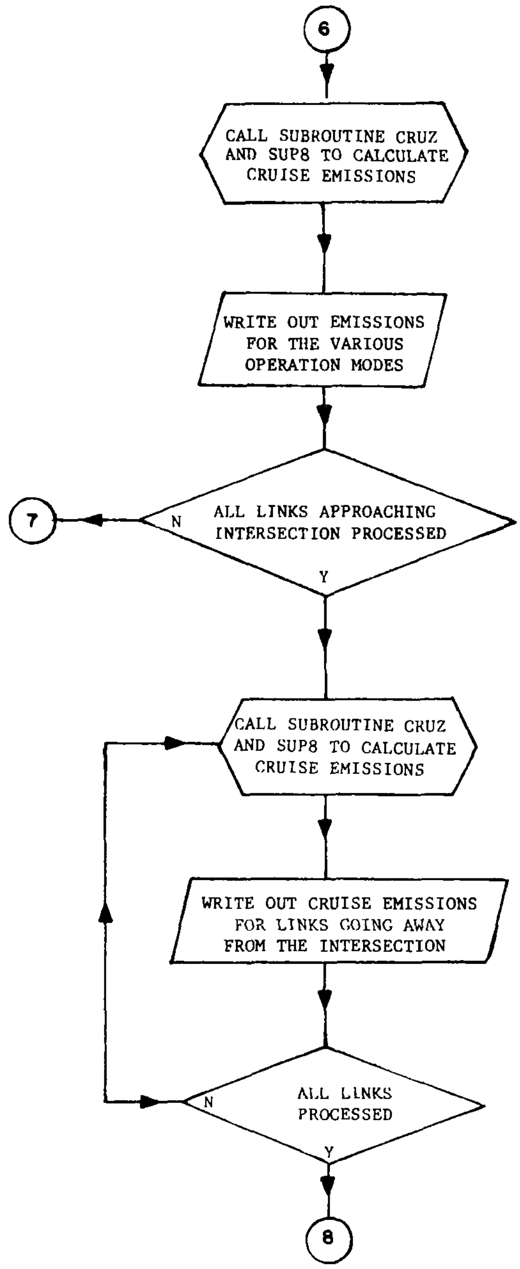

READ NUMBER OF HOURS, RECEPTORS AND INTERSECTIONS
WRITE OUT NUMBER OF HOURS, RECEPTORS AND INTERSECTIONS
3
READ SIGNALIZATION CODE AND CO-ORDINATES OF THE INTERSECTION
WRITE OUT SIGNALIZATION AND CO-ORDINATES OF THE INTERSECTION
READ IN TYPE OF SIGNALIZATION, NUMBER OF PHASES, AND GAP TIME
WRITE OUT TYPE OF SIGNALIZATION NUMBER OF PHASES AND GAP TIME
FIXED CYCLE TIME
Y
N
READ CY(INS), G(INS,J)
2
READ LINK CODE, AND LINK DESCRIPTORS
WRITE CYCLE TIME AND GREEN TIME FOR EACH PHASE
READ LANE CAPACITY, LINK VOLUME, VELOCITY AND ACCELERATION
DECELERATION > 0
Y
N
16
ACCELERATION < 0
N
Y
16
READ IN NUMBER OF LANES, AND FRACTION OF VOLUME FOR EACH LANE
WRITE OUT INPUT DATA
1

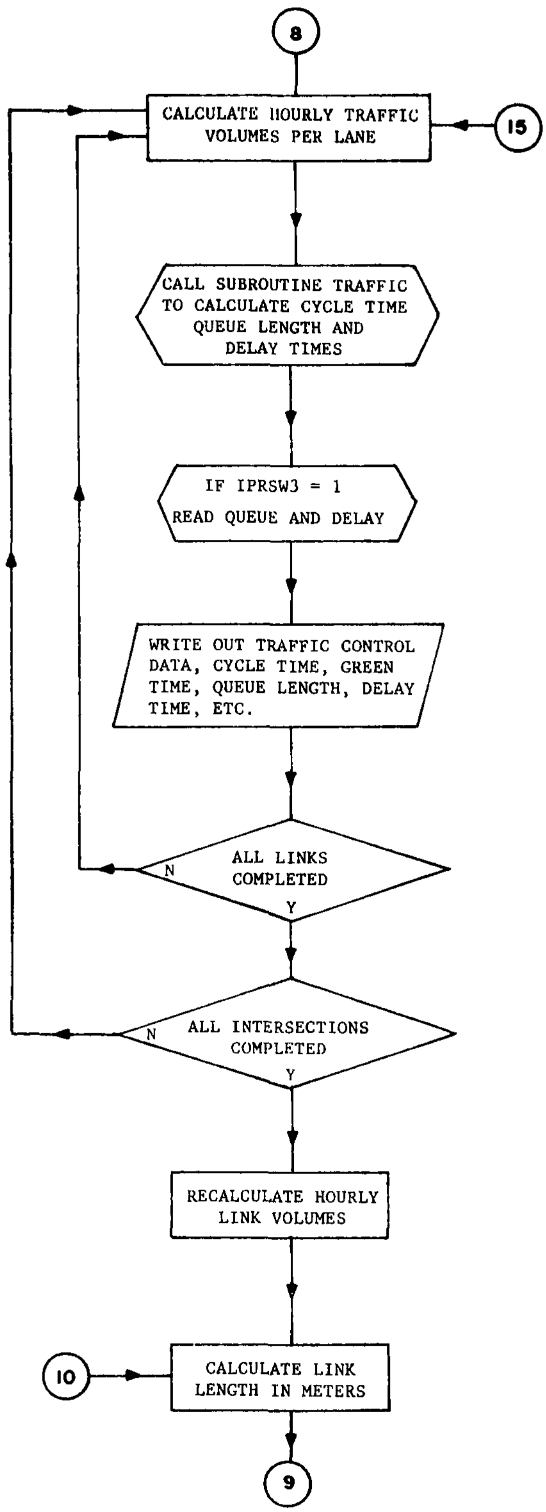


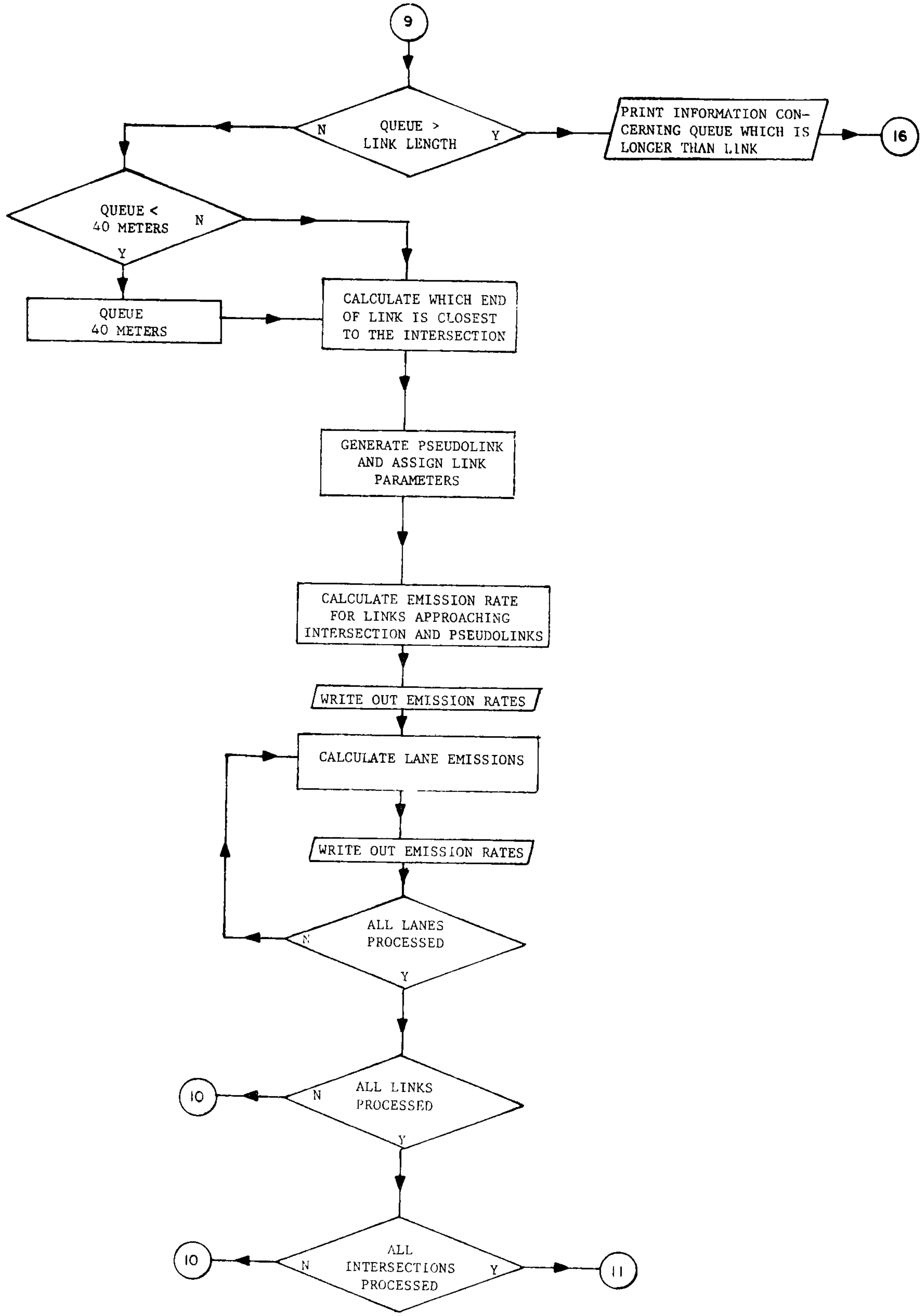
1
ALL LINKS FOR AN INTERSECTION READ
N
2
Y
ANY MORE INTERSECTIONS
Y
3
N
CALCULATE NUMBER OF LINKS GOING AWAY FROM THE INTERSECTION
READ PHYSICAL LINK PARAMETERS
READ LINK CAPACITY, VELOCITY, LANES, AND FRACTION OF VOLUME PER LANE
WRITE OUT INPUT DATA
ALL LINKS READ
N
Y
4

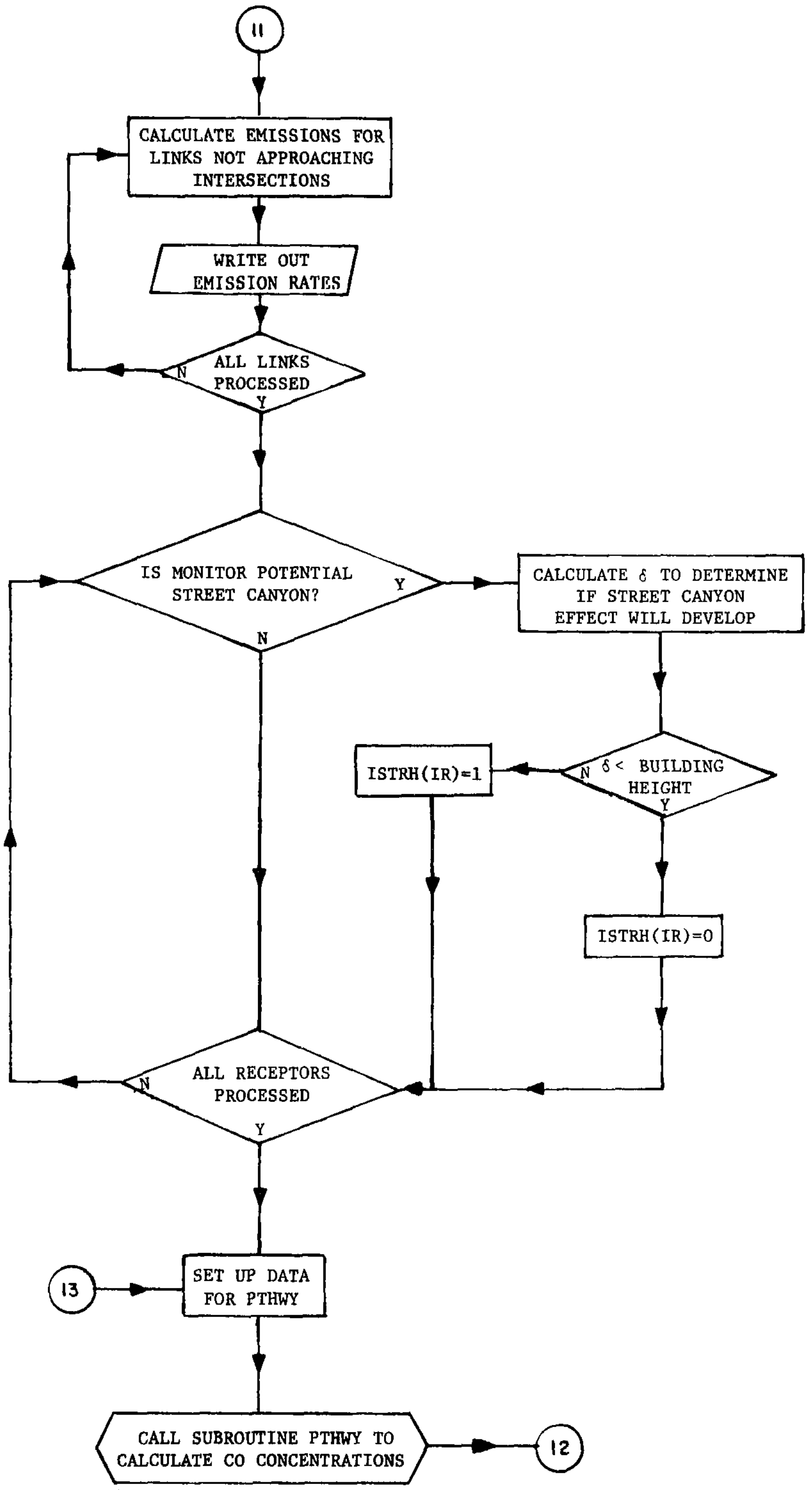

4
READ RECEPTOR COORDINATES AND STREET CANYON FLAG
POTENTIAL STREET CANYON
N
Y
READ THE LINK CODES FOR LINKS ADJACENT TO RECEPTOR
READ STREET HEADING, CANYON WIDHT, BUILDING HEIGHT AND SIDE OF THE STREET
ALL RECEPTORS READ IN
N
Y
WRITE OUT RECEPTOR DATA
READ WIND DIRECTION SPEED, MIXING HEIGHT AND STABILITY CLASS
WRITE OUT METEOROLOGICAL DATA
ALL MET DATA READ
N
Y
5

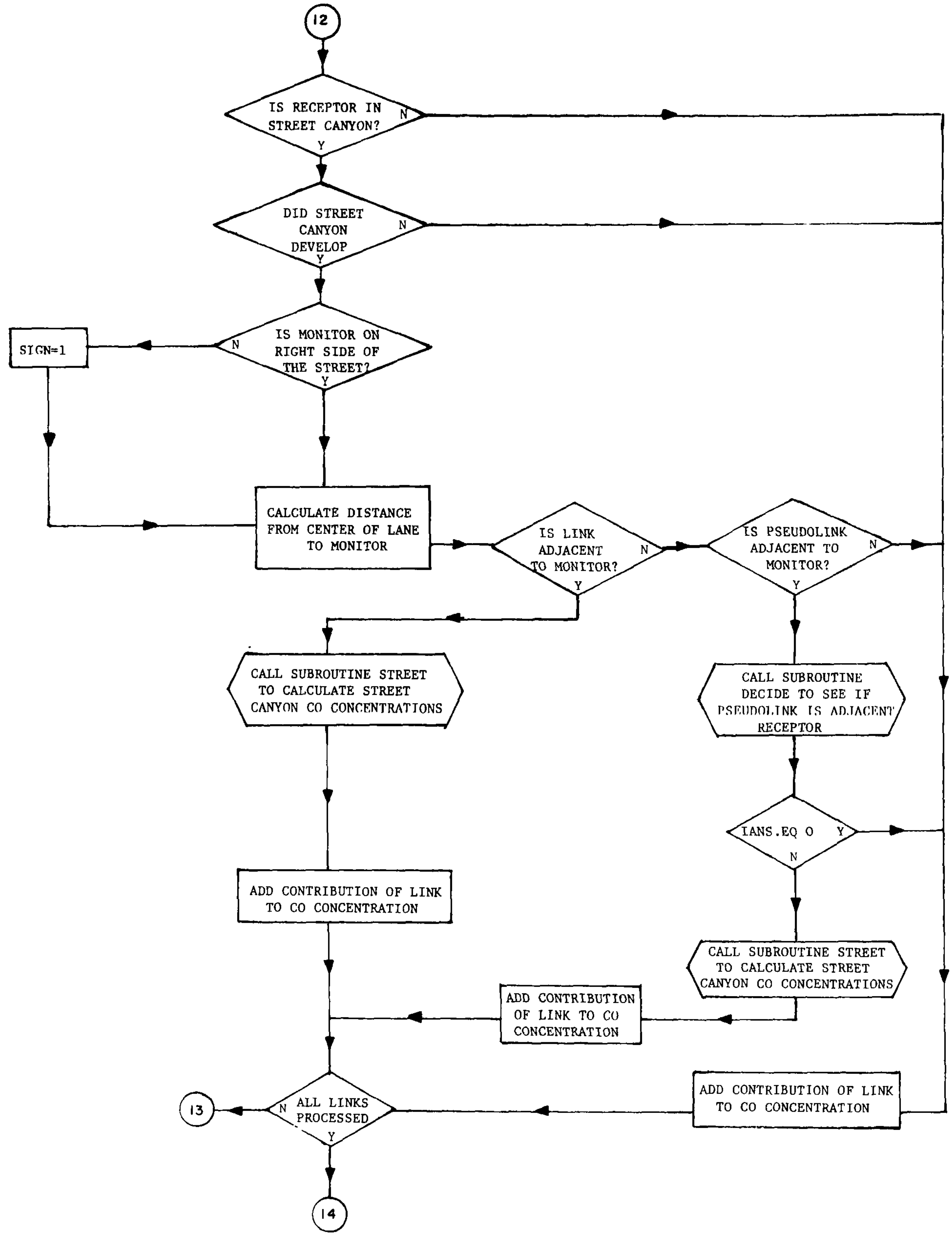

5
READ FACTOR FOR HOURLY TRAFFIC VOLUME
WRITE OUT FACTOR FOR HOURLY TRAFFIC VOLUME
READ IN VEHICLE DIS-TRIBUTION AND EMISSION PARAMETERS
WRITE PARAMETERS AND VEHICLE DISTRIBUTION
CALCULATE HOURLY TRAFFIC VOLUMES FOR EACH LINK
17
CALL SUBROUTINE SUP8 TO CALCULATE IDLING EMISSIONS
WRITE OUT IDLING EMISSIONS
CALL SUBROUTINE INITMM
7
CALL SUBROUTINE ACDC AND SUP8 TO CALCULATE ACCELERATION/DECELERATION EMISSIONS
WRITE OUT ACCELERATION AND DECELERATION EMISSIONS
6

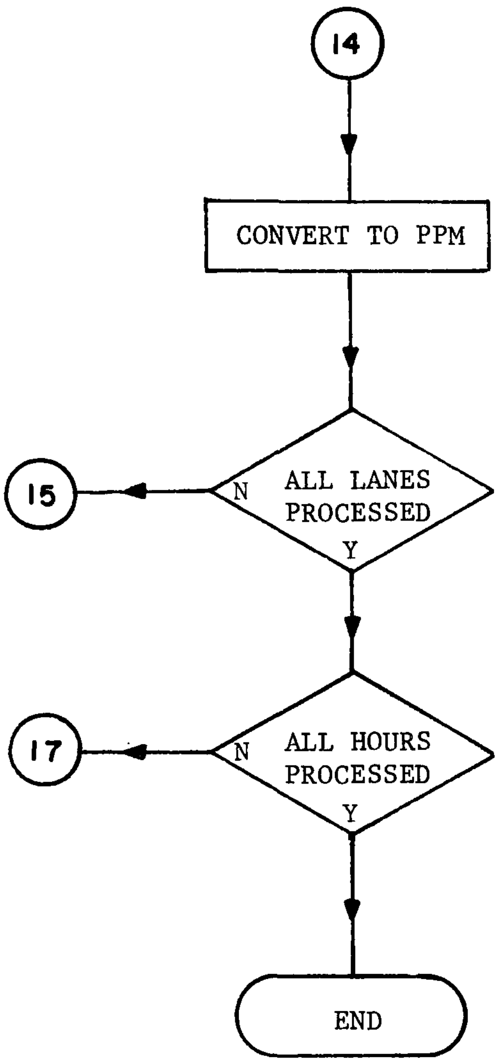

6
CALL SUBROUTINE CRUZ AND SUP8 TO CALCULATE CRUISE EMISSIONS
WRITE OUT EMISSIONS FOR THE VARIOUS OPERATION MODES
ALL LINKS APPROACHING INTERSECTION PROCESSED
N
7
Y
CALL SUBROUTINE CRUZ AND SUP8 TO CALCULATE CRUISE EMISSIONS
WRITE OUT CRUISE EMISSIONS FOR LINKS GOING AWAY FROM THE INTERSECTION
ALL LINKS PROCESSED
N
Y
8

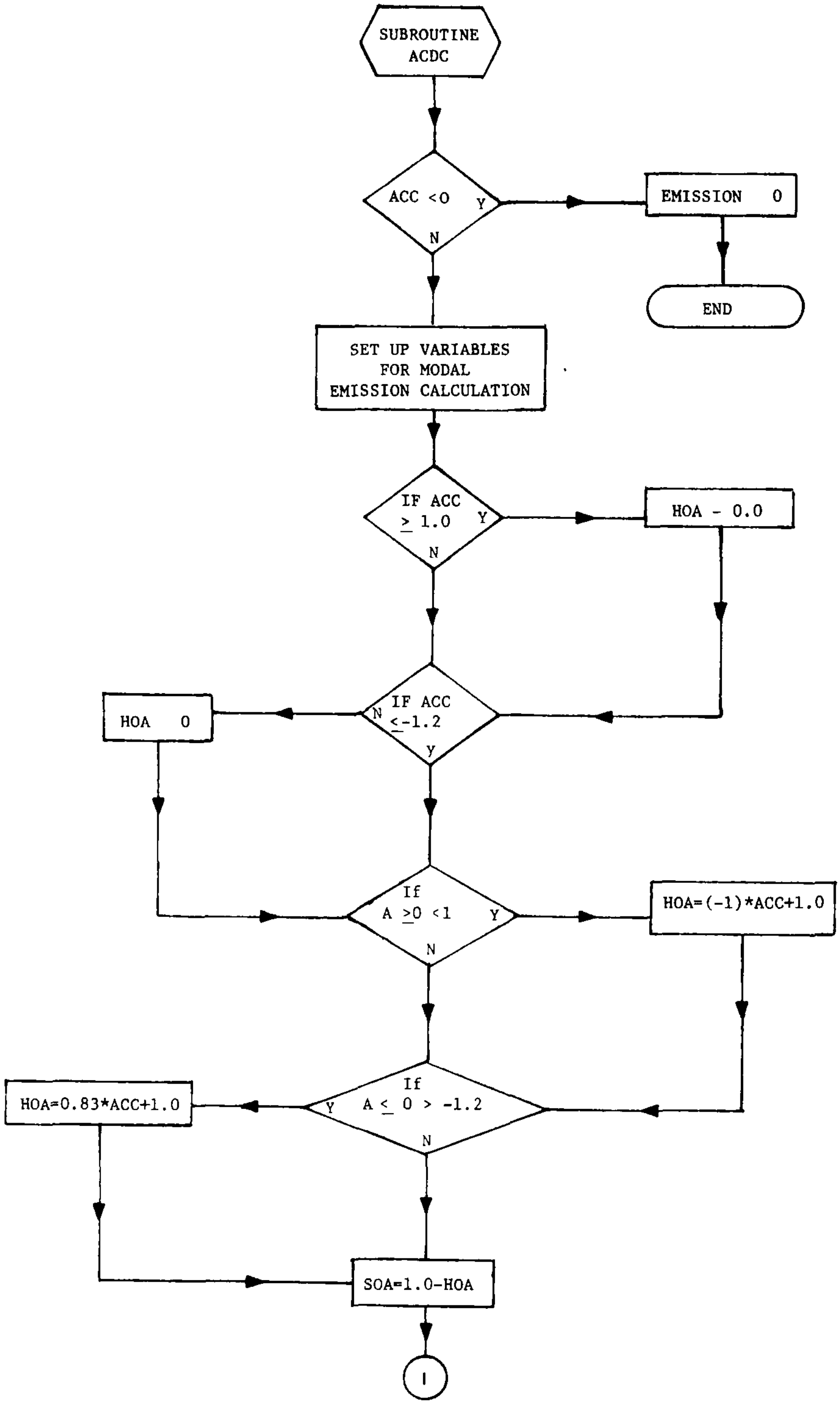

8
CALCULATE HOURLY TRAFFIC VOLUMES PER LANE
15
CALL SUBROUTINE TRAFFIC TO CALCULATE CYCLE TIME QUEUE LENGTH AND DELAY TIMES
IF IPRSW3 = 1
READ QUEUE AND DELAY
WRITE OUT TRAFFIC CONTROL DATA, CYCLE TIME, GREEN TIME, QUEUE LENGTH, DELAY TIME, ETC.
ALL LINKS COMPLETED
N
Y
ALL INTERSECTIONS COMPLETED
N
Y
RECALCULATE HOURLY LINK VOLUMES
10
CALCULATE LINK LENGTH IN METERS
9

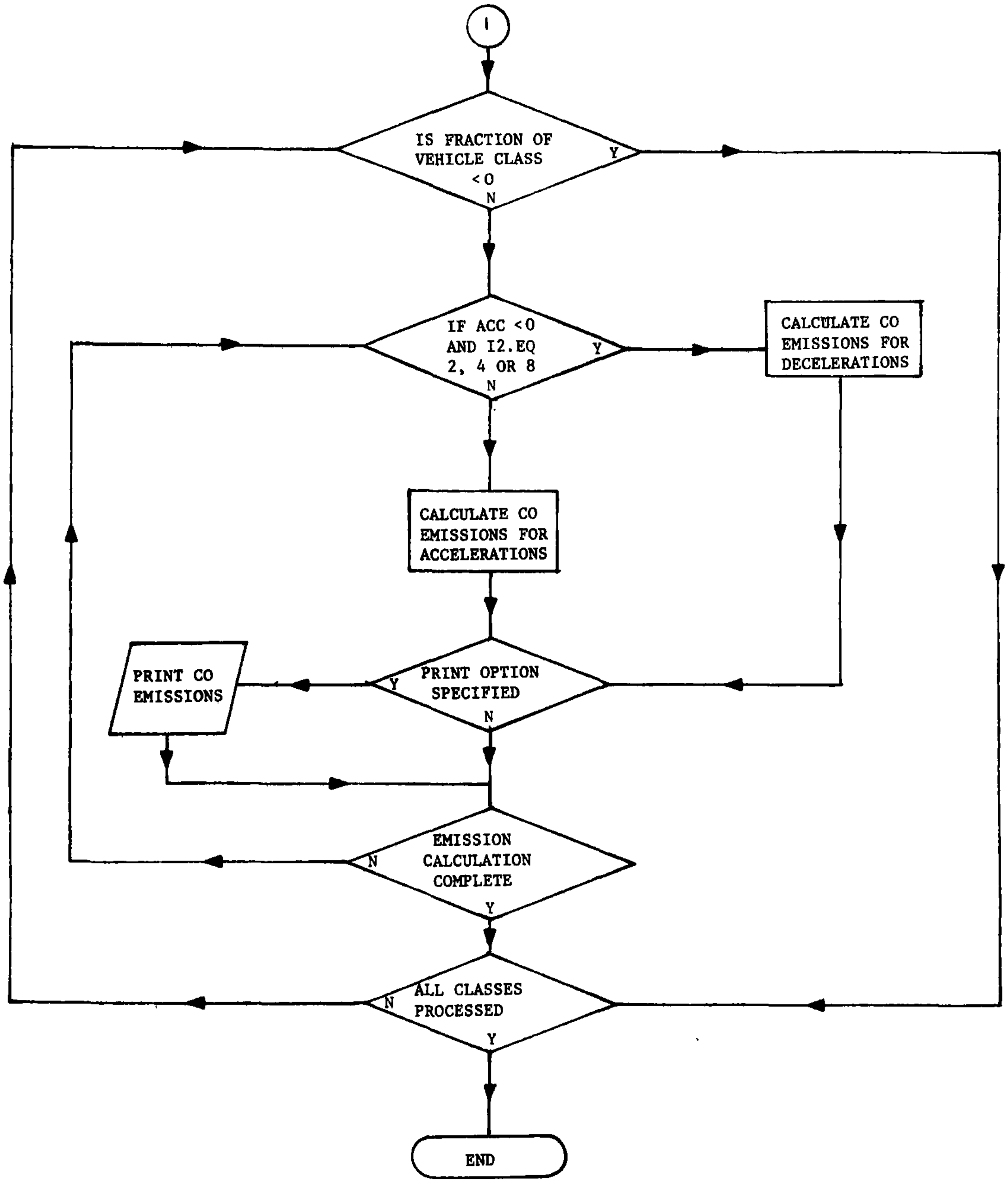

9
QUEUE > LINK LENGTH
N
Y
PRINT INFORMATION CONCERNING QUEUE WHICH IS LONGER THAN LINK
16
QUEUE < 40 METERS
N
Y
QUEUE 40 METERS
CALCULATE WHICH END OF LINK IS CLOSEST TO THE INTERSECTION
GENERATE PSEUDOLINK AND ASSIGN LINK PARAMETERS
CALCULATE EMISSION RATE FOR LINKS APPROACHING INTERSECTION AND PSEUDOLINKS
WRITE OUT EMISSION RATES
CALCULATE LANE EMISSIONS
WRITE OUT EMISSION RATES
ALL LANES PROCESSED
N
Y
ALL LINKS PROCESSED
N
Y
10
ALL INTERSECTIONS PROCESSED
N
Y
10
11

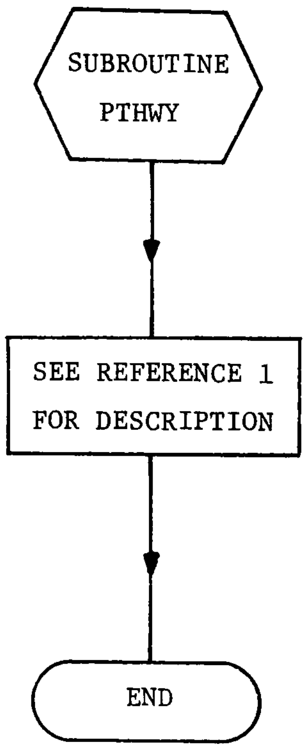

11
CALCULATE EMISSIONS FOR LINKS NOT APPROACHING INTERSECTIONS
WRITE OUT EMISSION RATES
ALL LINKS PROCESSED
N
Y
IS MONITOR POTENTIAL STREET CANYON?
Y
N
CALCULATE δ TO DETERMINE IF STREET CANYON EFFECT WILL DEVELOP
δ < BUILDING HEIGHT
N
Y
ISTRH(IR)=1
ISTRH(IR)=0
ALL RECEPTORS PROCESSED
N
Y
13
SET UP DATA FOR PTHWY
CALL SUBROUTINE PTHWY TO CALCULATE CO CONCENTRATIONS
12

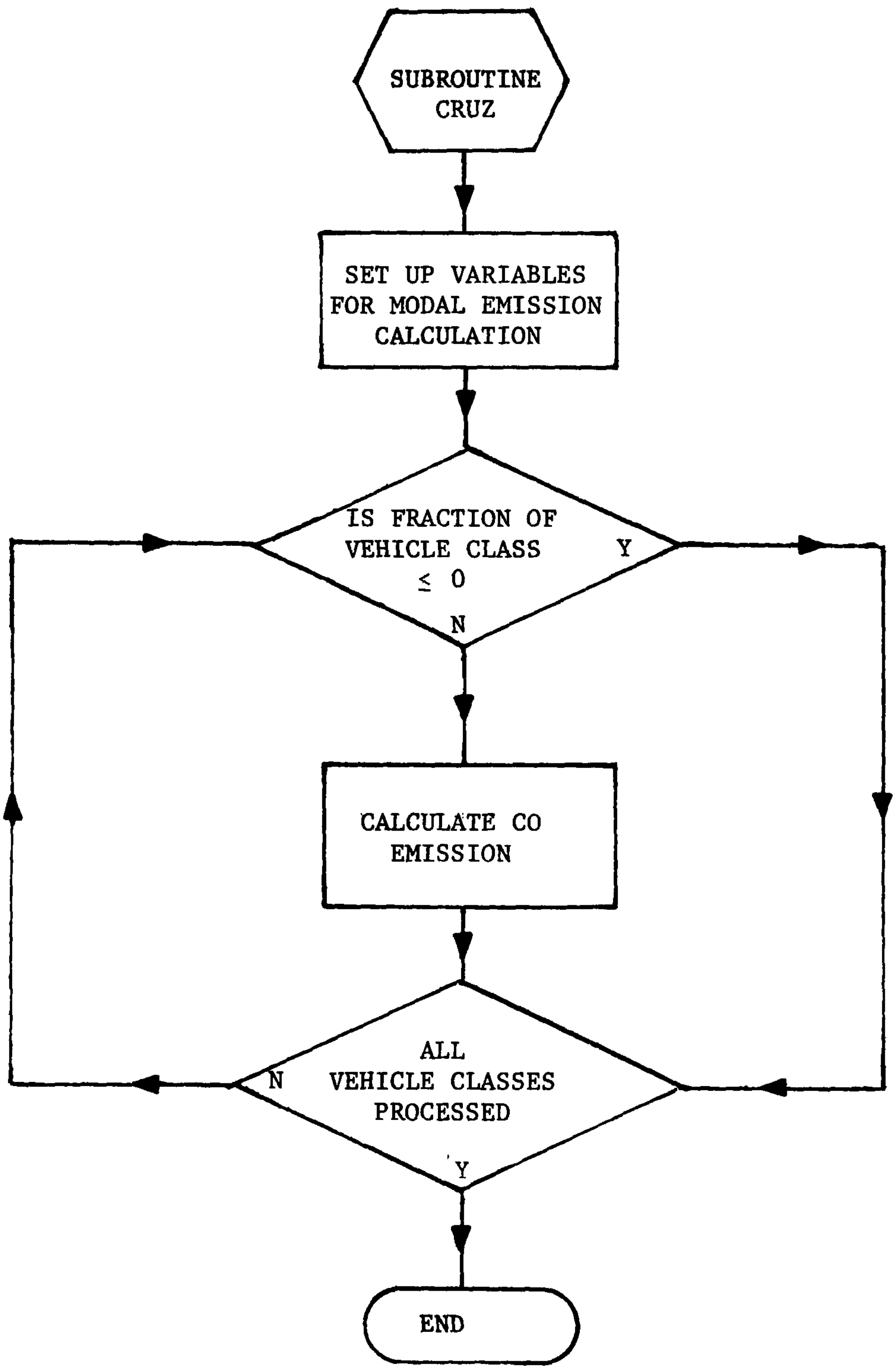

12
IS RECEPTOR IN STREET CANYON?
N
Y
DID STREET CANYON DEVELOP
N
Y
IS MONITOR ON RIGHT SIDE OF THE STREET?
N
Y
SIGN=1
CALCULATE DISTANCE FROM CENTER OF LANE TO MONITOR
IS LINK ADJACENT TO MONITOR?
N
Y
IS PSEUDOLINK ADJACENT TO MONITOR?
N
Y
CALL SUBROUTINE STREET TO CALCULATE STREET CANYON CO CONCENTRATIONS
CALL SUBROUTINE DECIDE TO SEE IF PSEUDOLINK IS ADJACENT RECEPTOR
IANS.EQ 0
Y
N
ADD CONTRIBUTION OF LINK TO CO CONCENTRATION
CALL SUBROUTINE STREET TO CALCULATE STREET CANYON CO CONCENTRATIONS
ADD CONTRIBUTION OF LINK TO CO CONCENTRATION
ALL LINKS PROCESSED
N
Y
13
ADD CONTRIBUTION OF LINK TO CO CONCENTRATION
14

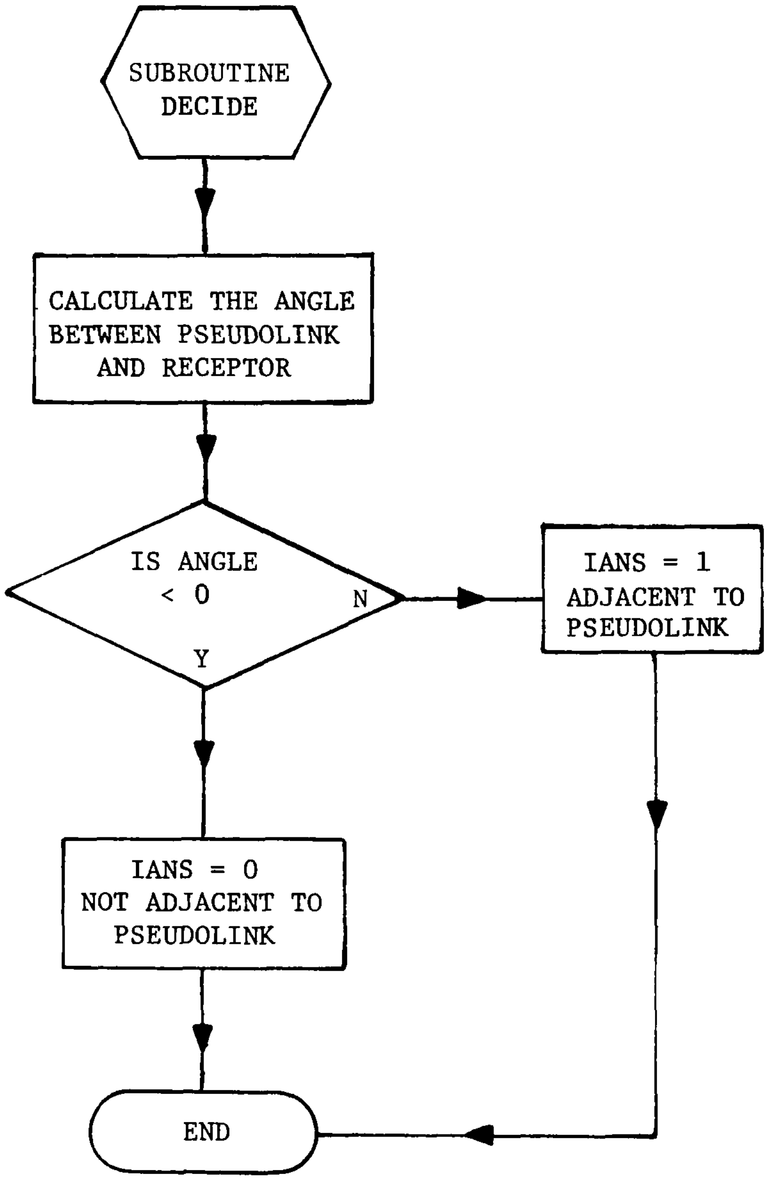

14
CONVERT TO PPM
15
N
ALL LANES PROCESSED
Y
17
N
ALL HOURS PROCESSED
Y
END

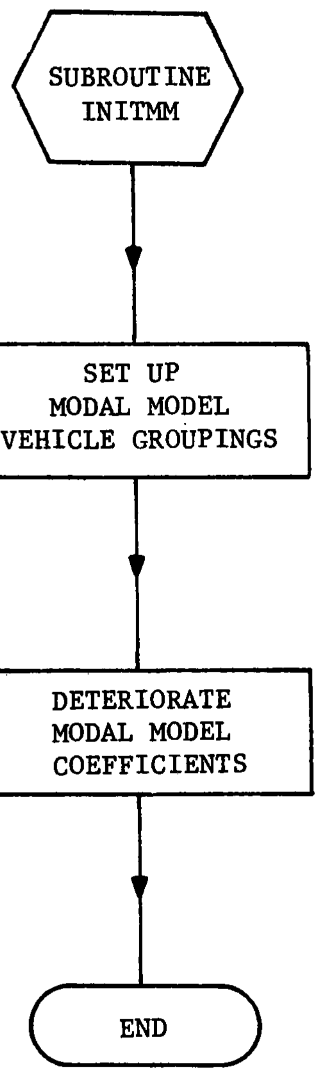

SUBROUTINE ACDC
ACC <0
Y
N
EMISSION 0
END
SET UP VARIABLES FOR MODAL EMISSION CALCULATION
IF ACC ≥ 1.0
Y
N
HOA - 0.0
IF ACC ≤-1.2
N
Y
HOA 0
If A ≥0 <1
Y
N
HOA=(-1)*ACC+1.0
If A ≤ 0 > -1.2
Y
N
HOA=0.83*ACC+1.0
SOA=1.0-HOA
1

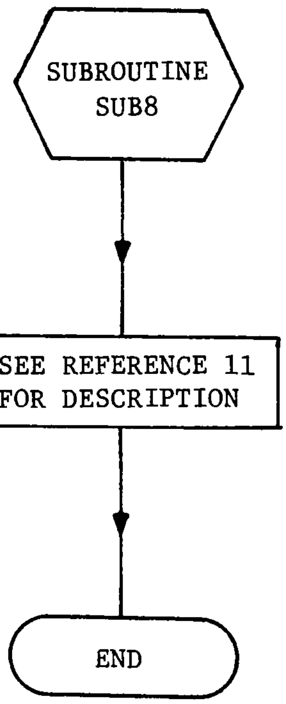

1
IS FRACTION OF VEHICLE CLASS < 0
Y
N
IF ACC < 0 AND I2.EQ 2, 4 OR 8
Y
N
CALCULATE CO EMISSIONS FOR DECELERATIONS
CALCULATE CO EMISSIONS FOR ACCELERATIONS
PRINT CO EMISSIONS
PRINT OPTION SPECIFIED
Y
N
EMISSION CALCULATION COMPLETE
N
Y
ALL CLASSES PROCESSED
N
Y
END

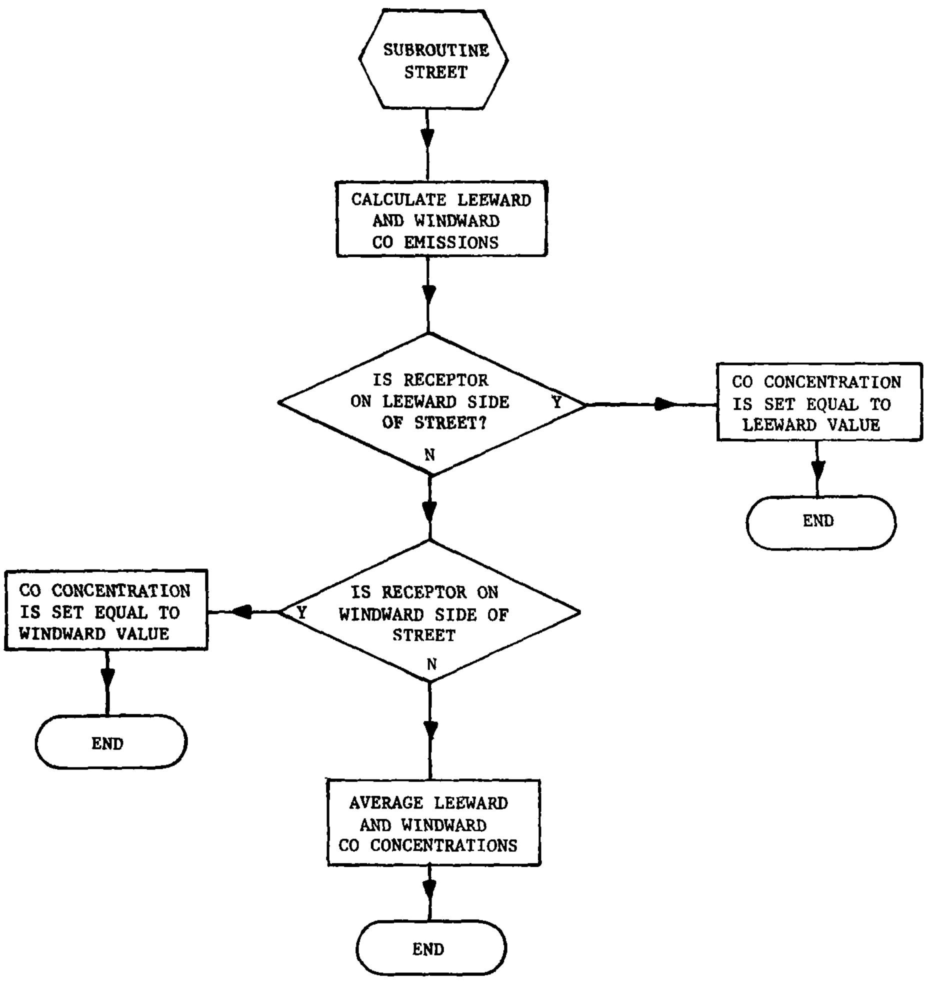

SUBROUTINE
PTHWY
SEE REFERENCE 1
FOR DESCRIPTION
END

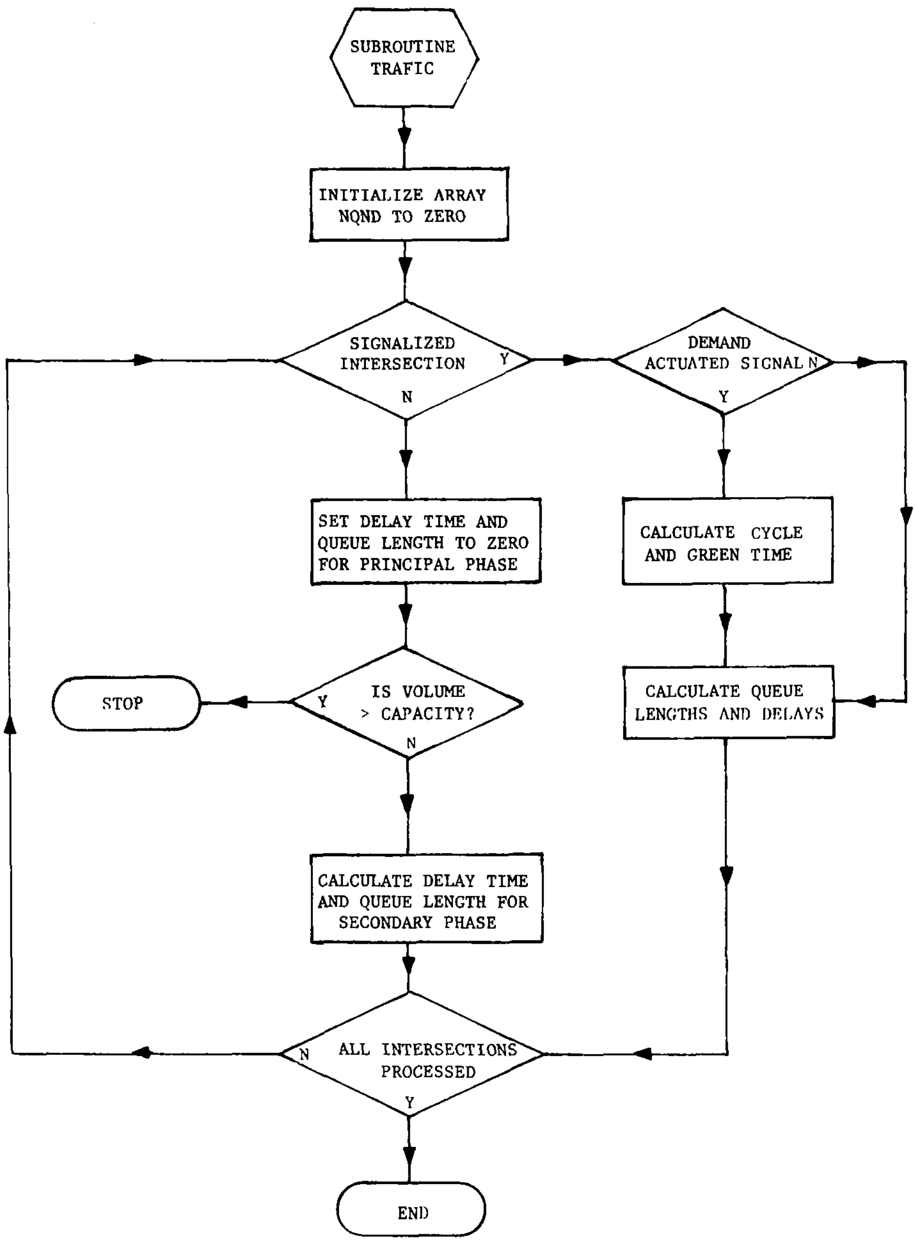

SUBROUTINE CRUZ
SET UP VARIABLES FOR MODAL EMISSION CALCULATION
IS FRACTION OF VEHICLE CLASS ≤ 0
Y
N
CALCULATE CO EMISSION
ALL VEHICLE CLASSES PROCESSED
N
Y
END


SUBROUTINE
DECIDE
CALCULATE THE ANGLE
BETWEEN PSEUDOLINK
AND RECEPTOR
IS ANGLE
< 0
N
Y
IANS = 1
ADJACENT TO
PSEUDOLINK
IANS = 0
NOT ADJACENT TO
PSEUDOLINK
END


SUBROUTINE
INITMM
SET UP
MODAL MODEL
VEHICLE GROUPINGS
DETERIORATE
MODAL MODEL
COEFFICIENTS
END


SUBROUTINE
SUB8
SEE REFERENCE 11
FOR DESCRIPTION
END


SUBROUTINE STREET
CALCULATE LEEWARD AND WINDWARD CO EMISSIONS
IS RECEPTOR ON LEEWARD SIDE OF STREET?
Y
N
CO CONCENTRATION IS SET EQUAL TO LEEWARD VALUE
END
IS RECEPTOR ON WINDWARD SIDE OF STREET
Y
N
CO CONCENTRATION IS SET EQUAL TO WINDWARD VALUE
END
AVERAGE LEEWARD AND WINDWARD CO CONCENTRATIONS
END


SUBROUTINE TRAFIC
INITIALIZE ARRAY NQND TO ZERO
SIGNALIZED INTERSECTION
Y
N
DEMAND ACTUATED SIGNAL
N
Y
SET DELAY TIME AND QUEUE LENGTH TO ZERO FOR PRINCIPAL PHASE
CALCULATE CYCLE AND GREEN TIME
STOP
IS VOLUME > CAPACITY?
Y
N
CALCULATE QUEUE LENGTHS AND DELAYS
CALCULATE DELAY TIME AND QUEUE LENGTH FOR SECONDARY PHASE
ALL INTERSECTIONS PROCESSED
N
Y
END

APPENDIX C

SAMPLE PROBLEM

This appendix contains the sample data input, and the output generated by IMM. The job control statements have not been included since the procedures required to run programs varies from one installation to another. Figure C-1 displays the general layout of the intersection which has been modeled, and the location of the receptors. Figure C-2 contains the input data cards for the sample problem, and Figure C-3 contains the output generated by the program.

The preliminary step in modeling the CO air quality in the vicinity of an intersection is to lay out the intersection on graph paper with the x-axis aligned along the west-east direction, and the y-axis along the south-north direction. Once the intersection is drawn to scale, the necessary coordinates and dimensions can be easily extracted from the graph.

The input formats for all the data cards is specified in Table 1. However, to help keep track of the sequence of input cards, the card numbers which appear in Table 1 have been inserted into the last columns of the data cards listed in Figure C-2. The example intersection will be analyzed for 2 hours with five receptors distributed about the intersection. Additionally, this is considered to be an isolated intersection which is not connected to any adjacent intersection. On the second card, it is specified that the intersection is signalized, and the approximate coordinates of the center of the intersection are coded on the card. The third data card requires additional information about the intersection, that is, the type of signalization, number of phases, and the gap acceptance time if it is an unsignalized intersection. Since this example is for a vehicle actuated signal, card 3a, on which the cycle and green times would have been noted, is not required. The next group of cards (4 through 7) are required to define the physical characteristics of each link approaching the intersection, and the volume and travel characteristics of the link. Since only one intersection is being modeled, only four links are read, however, if additional intersections were being modeled, all links approaching the intersections would be read at this time.

When all links approaching an intersection have been defined, the cards (8 through 10) which define the links leaving the intersection are read. The required data defines the physical link characteristics, and the travel characteristics of the link.

Once all the links have been read into the computer, the receptor sites are defined. If the receptor is in a street canyon, two additional cards are required. Card 11a requires the link number for those links adjacent to the

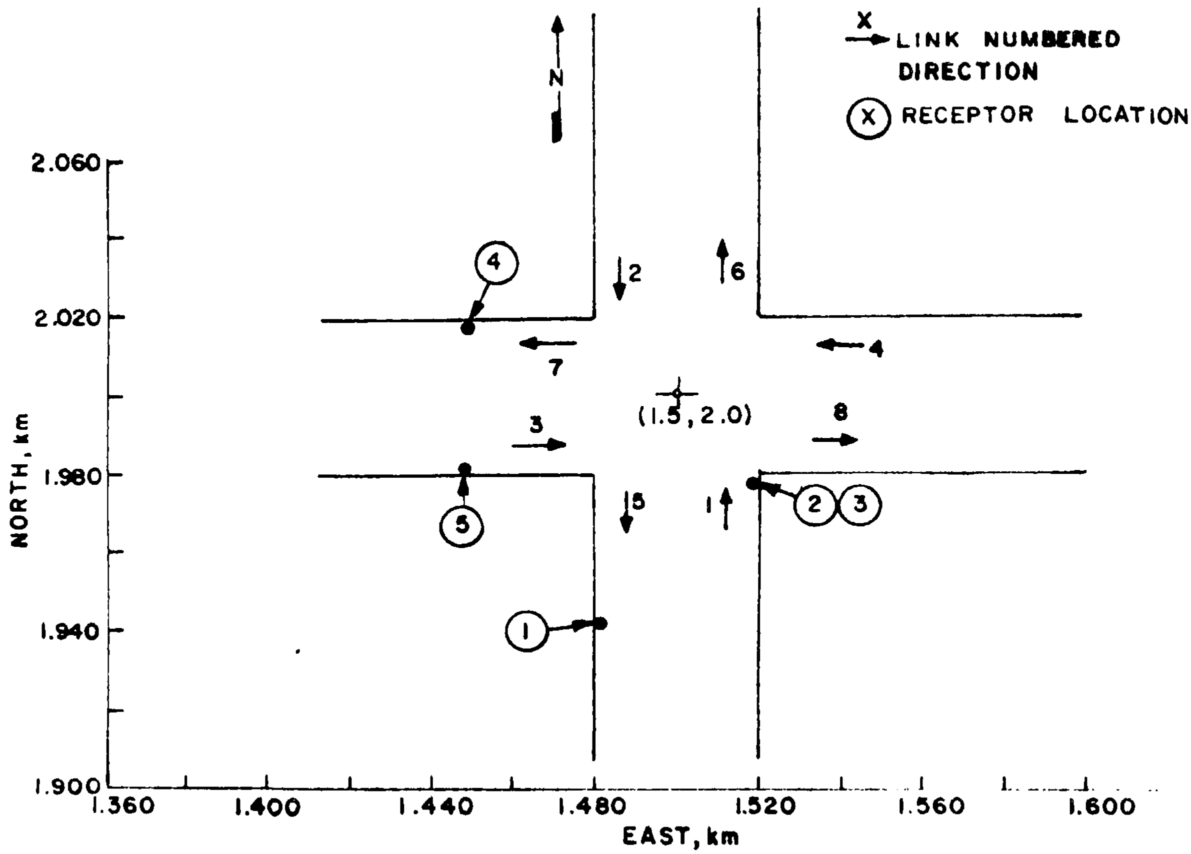


Figure C-1. Sample intersection.

```
@ELT,L  IMDATA
ELT007 SL73R1 07/12/79 08:36:46 (7,)
000001    003        1     1     0     1
000002    003        2     0     1                                                                             1
000003    003              1  1.500     2.000                                                                  2
000004    003        1     2     0                                                                             3
000005    003        1                                                                                         4
000006    003   1.510     1.520     1.510     1.990     10.0      0.5       0.0       0.0                      5
000007    003   2100.     500.      25.0      25.0      -2.5      2.0                                          6
000008    003   2.0       0.5       0.5                                                                        7
000009    003        2                                                                                         4
000010    003   1.490     2.020     1.490     2.520     15.0      0.5       0.0       0.0                      5
000011    003   1800.     400.      25.0      10.0      -2.0      2.5                                          6
000012    003   2.0       0.5       0.5                                                                        7
000013    003        3                                                                                         4
000014    003   0.480     1.990     1.480     1.990     5.0       0.5       0.0       0.0                      5
000015    003   1200.     250.      20.0      10.0      -2.0      2.0                                          6
000016    003   1.0       1.0                                                                                  7
000017    003        4                                                                                         4
000018    003   1.520     2.010     2.020     2.010     5.0       0.5       0.0       0 0                      5
000019    003   1200.     250.      20.0      10.0      -2.0      2.0                                          6
000020    003   1.0       1.0                                                                                  7
000021    003   1.490     1.520     1.490     1.980     7.5       0.5       0.0       0.0                      8
000022    003   400.      20.0                                                                                 9
000023    003   2.0       0.5       0.5                                                                        10
000024    003   1.510     2.020     1.510     2.520     7.50      0.5       0.0       0.0                      8
000025    003   400.      25.0                                                                                 9
000026    003   2.0       0.6       0.4                                                                        10
000027    003   0.480     2.010     1.480     2.010     5.0       0.5       0.0       0.0                      8
000028    003   300.      20.0                                                                                 9
000029    003   1.0       1.0                                                                                  10
000030    003   1.520     1.990     2.020     1.990     5.0       0.5       0.0       0.0                      8
000031    003   300.      20.0                                                                                 9
000032    003   1.0       1.0                                                                                  10
000033    003   1.430     1.970     1.0                 0                                                    11
000034    003   1.520     1.980     1.0                 0                                                    11
000035    003   1.520     1.980     4.0                 0                                                    11
000036    003   1.470     2.020     1.0                 1                                                    11
000037    003        2     3     7                                                                           11A
000038    003   90.0      50.0      50.0                2                                                    11B
000039    003   1.470     1.970     1.0                 1                                                    11
000040    003        2     3     7                                                                           11A
000041    003   90.0      50.0      50.0                1                                                    11B
000042    003   5.0       1.5       500.0               3  72.0      5.0       20.0                          12
000043    003   40.0      2.0       500.0               4                                                    12
000044    003   1.0       0.4                                                                                13
000045    003       77     1     0.88      0.05      0.03      0.02      0.02      0.0                         14
000046    003        0                                                                                         15
000047    003        0                                                                                         16
000048    003        0                                                                                         17

END ELT.

@PRKPT PRINTS
```

receptor, and card 11b requires the dimensions and orientation of the street canyon. After all site data has been input, the meteorological data and the fraction hot/cold start data for each hour is read. Card 13 contains the fraction of the traffic volume which was read on cards 6 and 9 which will be used for each hour of simulation. Alternatively, the volumes on cards 6 and 9 can be the average daily traffic (ADT), and card 13, would contain the fraction of ADT for each hour of the day. Each card 13 will have up to eight hourly ratios, and if more than 8 hours are modeled, additional card 13 will be required. Card 14 contains information required to correct the CO emissions for hot/cold starts and correct the emissions to correspond to the vehicle distribution at the intersection being modeled.

The next input, card 15, specifies the fraction of vehicles in each of the 11 categories utilized in the Modal Emission Model. The following cards (16 through 18) contain 4 coefficients per card, and represent the 12 modal coefficients, which are required for each of the 11 categories in the Modal Emission Model.

As a result of the input data in Figure C-2, the IMM model generates the data in Figure C-3. The initial data in Figure C-3 repeats the input data, and this section should be reviewed carefully to ascertain that the links have been properly defined, and utilize the correct travel data. Similarly, the receptor data, meteorological data, hourly volume ratios, and vehicle distributions should be checked to insure that the appropriate values were input to the model. The Modal Emission Factors should be reviewed the first time this data is utilized, to check that no transcription or key punching errors were made.

After all the input has been printed, the model prints the contribution from each link to each receptor. For each link approaching a signalized intersection, there is a queue. The queues are assigned link numbers by the program beginning one higher than the total number of links input to the model. In this sample case, the queue emissions are assigned link numbers 9 through 12. After all link contributions to the receptors has been determined for 1 hour, the CO concentrations are adjusted to account for the distribution of light and heavy-duty vehicles, and the fraction of hot/cold starts. The corrected concentration for each receptor are then printed.

```
NUMBER OF HOURS FOR THE SIMULATION=     2
NUMBER OF RECEPTORS=     [illegible]
NUMBER OF INTERSECTIONS     1

        FOR INTERSECTION  1  NO FREE FLOW CONDITIONS ASSUMED.


INTERSECTION     1 IS CONTROLLED BY A DEMAND ACTUATED SIGNAL

        CENTER OF INTERSECTION IS  1.500 KM EAST AND  2.000 KM NORTH


                 INPUT DATA FOR LINK     1

        X1 =    1.510     Y1 =    1.520      X2 =    1.510     Y2 =    1.980 KM

        NUMBER OF LANES =  2

        FRACTION OF LINK  1 VOLUME ON LANE  1 =  .50

        FRACTION OF LINK  1 VOLUME ON LANE  2 =  .50

        LINK WIDTH =  10.00 METERS          EMISSION HEIGHT =  .50 METERS

        LINK IS AT GRADE

        CAPACITY = 2100.0 VECHICLES/HOUR     VOLUME =  500.0 VECHICLES/HOUR
        SPEED INTO INTERSECTION = 25.0 MI/HR     SPEED OUT OF INTERSECTION = 25.0 MI/HR
        ACCELERATION INTO INTERSECTION = -2.50 MI/HR/SEC     ACCELERATION OUT OF INTERSECTION =  2.00 MI/HR/SEC


                 INPUT DATA FOR LINK     2

        X1 =    1.490     Y1 =    2.020      X2 =    1.490     Y2 =    2.520 KM

        NUMBER OF LANES =  2

        FRACTION OF LINK  2 VOLUME ON LANE  1 =  .50

        FRACTION OF LINK  2 VOLUME ON LANE  2 =  .50

        LINK WIDTH =  15.00 METERS          EMISSION HEIGHT =  .50 METERS

        LINK IS AT GRADE

        CAPACITY = 1800.0 VECHICLES/HOUR     VOLUME =  400.0 VECHICLES/HOUR
        SPEED INTO INTERSECTION = 25.0 MI/HR     SPEED OUT OF INTERSECTION = 10.0 MI/HR
        ACCELERATION INTO INTERSECTION = -2.00 MI/HR/SEC     ACCELERATION OUT OF INTERSECTION =  2.50 MI/HR/SEC
```

INPUT DATA FOR LINK 3

X1 = .480   Y1 = 1.990   X2 = 1.480   Y2 = 1.990 KM

NUMBER OF LANES = 1

FRACTION OF LINK 3 VOLUME ON LANE 1 = 1.00

LINK WIDTH = 5.00 METERS   EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

CAPACITY = 1200.0 VECHICLES/HOUR   VOLUME = 250.0 VECHICLES/HOUR
SPEED INTO INTERSECTION = 20.0 MI/HR   SPEED OUT OF INTERSECTION = 10.0 MI/HR
ACCELERATION INTO INTERSECTION = -2.00 MI/HR/SEC   ACCELERATION OUT OF INTERSECTION = 2.00 MI/HR/SEC

INPUT DATA FOR LINK 4

X1 = 1.520   Y1 = 2.010   X2 = 2.020   Y2 = 2.010 KM

NUMBER OF LANES = 1

FRACTION OF LINK 4 VOLUME ON LANE 1 = 1.00

LINK WIDTH = 5.00 METERS   EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

CAPACITY = 1200.0 VECHICLES/HOUR   VOLUME = 250.0 VECHICLES/HOUR
SPEED INTO INTERSECTION = 20.0 MI/HR   SPEED OUT OF INTERSECTION = 10.0 MI/HR
ACCELERATION INTO INTERSECTION = -2.00 MI/HR/SEC   ACCELERATION OUT OF INTERSECTION = 2.00 MI/HR/SEC

THE FOLLOWING DATA APPLIES TO THOSE LINKS WHICH DO NOT APPROACH ANY INTERSECTION

INPUT DATA FOR LINK 5

X1 = 1.490   Y1 = 1.520   X2 = 1.490   Y2 = 1.980 KM

LINK WIDTH = 7.50 METERS   EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 2

FRACTION OF LINK 5 VOLUME ON LANE 1 = .50

FRACTION OF LINK 5 VOLUME ON LANE 2 = .50

VOLUME= 400.00 VEHICLES/HOUR SPEED= 20.00 MI/HR

INPUT DATA FOR LINK 6

X1 = 1.510   Y1 = 2.020   X2 = 1.510   Y2 = 2.520 KM

LINK WIDTH = 7.50 METERS   EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 2

FRACTION OF LINK 6 VOLUME ON LANE 1 = .60

FRACTION OF LINK 6 VOLUME ON LANE 2 = .40

VOLUME= 400.00 VEHICLES/HOUR SPEED= 25.00 MI/HR

INPUT DATA FOR LINK 7

X1 = .480   Y1 = 2.010   X2 = 1.480   Y2 = 2.010 KM

LINK WIDTH = 5.00 METERS   EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 1

FRACTION OF LINK 7 VOLUME ON LANE 1 = 1.00

VOLUME= 300.00 VEHICLES/HOUR SPEED= 20.00 MI/HR

INPUT DATA FOR LINK 9

X1 = 1.520 Y1 = 1.990 X2 = 2.020 Y2 = 1.990 KM

LINK WIDTH = 5.00 METERS EMISSION HEIGHT = .50 METERS

LINK IS AT GRADE

NUMBER OF LANES = 1

FRACTION OF LINK VOLUME ON LANE 1 = 1.00

VOLUME= 300.00 VEHICLES/HOUR SPEED= 20.00 MI/HR

TOTAL NUMBER OF LINKS IS 9
OF WHICH 4 ARE LINKS WHICH DO NOT APPROACH ANY INTERSECTION

```
DATA FOR RECEPTOR     1

XX=      1.430 YY=      1.970 Z=       1.00

DATA FOR RECEPTOR     2

XX=      1.520 YY=      1.980 Z=       1.00

DATA FOR RECEPTOR     3

XX=      1.520 YY=      1.980 Z=       4.00

DATA FOR RECEPTOR     4

XX=      1.470 YY=      2.020 Z=       1.00
LINKS ADJACENT TO THE STREET CANYON RECEPTOR=     3     7
STREET HEADING FROM NORTH=      90.00 DEGREES
STREET WIDTH=      50.00 METERS
BUILDING HEIGHT=      50.00 METERS
IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADING
THE RECEPTOR IS ON THE LEFT SIDE OF THE STREET

DATA FOR RECEPTOR     5

XX=      1.470 YY=      1.980 Z=       1.00
LINKS ADJACENT TO THE STREET CANYON RECEPTOR=     3     7
STREET HEADING FROM NORTH=      90.00 DEGREES
STREET WIDTH=      50.00 METERS
BUILDING HEIGHT=      50.00 METERS
IF ONE FACES TOWARD THE DIRECTION OF THE STREET HEADING
THE RECEPTOR IS ON THE RIGHT SIDE OF THE STREET
```

```
METEOROLOGICAL INPUTS FOR HOUR     1
WIND DIRECTION       5.00 DEGREES
WIND SPEED=       1.50 METERS/SEC
MIXING HEIGHT=     500.00 METERS
STABILITY CLASS=  3
TEMPERATURE = 72.0
HOT STARTS = 5.00      COLD STARTS =20.00


METEOROLOGICAL INPUTS FOR HOUR     2
WIND DIRECTION      40.00 DEGREES
WIND SPEED=       2.00 METERS/SEC
MIXING HEIGHT=     500.00 METERS
STABILITY CLASS=  4
TEMPERATURE =    .0
HOT STARTS =  .00      COLD STARTS =  .00


     HOURLY RATIOS OF VOLUME TO AVERAGE VOLUME

  1.00       .40

   77     REGION= 1 MODAL SPLIT= .88,  .05,  .03,  .02,  .02,  .00,
```

EMISSION FACTOR CALCULATION SUBROUTINE SUF8 (MODILE1 PROGRAM MODIFIED)

* TOTAL HC EMISSION FACTORS INCLUDE EVAP. HC EMISSION FACTORS

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 72.0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				20.0/	5.0/	20.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	18.70	20.97	28.37	94.99	8.19	33.72	20.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	224.81	237.75	304.29	762.76	76.55	120.68	235.63
EXHAUST NOX:	2.94	3.02	5.23	9.37	32.37	.15	3.73

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	2.05	2.46	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.22	.28	.03	1.04	.01	.34

.10210419+01	-.46106476-01	.12750413-01	.19804664-01
.10487151-02	-.15174127+00	.19398060-01	-.79918522-04
-.27256622-03	.33066291+00	-.24132896-02	.32060244-03
.63576120+00	-.24510358-01	.43812852-01	.49628541-02
.44959130-03	-.47973134-01	.61538182-02	.10994070-04
-.67511966-04	.30338836+00	-.27355787-02	.13473761-03
.38047038+00	-.47583580-02	.43524541-01	.13808063-02
.10754802-03	-.21531656-02	.92090301-03	.11250070-04
-.19257031-05	.22921783+00	-.40214434-02	.12248126-03
.49613750+00	-.14627926-01	.61504323-01	-.10729437-02
.21254545-03	-.68023652-02	.97647379-03	.10525828-03
.37405029-04	.26291054+00	-.18169936-02	.84008745-04
.50065710+00	-.17586585-01	.59339337-01	-.18133272-02
.22920808-03	-.12368988-01	.11492474-02	.74215845-04
.14109437-04	.30531263+00	-.70244968-02	.10785337-03
.39664203+00	-.13213880-01	.58552373-01	-.19716325-02
.16135792-03	-.43251987-02	.21358313-03	.86380664-04
.40023762-04	.24617422+00	-.68550445-02	.10254829-03
.36676234+00	-.14121491-01	.68226576-01	-.32857144-02
.18291990-03	.22933292-02	.19526284-04	.13627447-03
.54617223-04	.22517568+00	-.46133995-02	.69841262-04
.10577946+01	-.67509890-01	.62050894-01	.11177700-01
.14054242-02	-.17354453+00	.21822363-01	.12219173-03
-.29136962-03	.30515999+00	-.65815225-02	.36294828-03
.68093568+00	-.48967101-01	.90703070-01	.41544996-02
.97224675-03	-.92593908-01	.13378501-01	.19100340-03
-.13010977-03	.19975567+00	-.77630468-02	.33743685-03
.10887880+01	-.71653783-01	.56213565-01	.12077432-01
.14173663-02	-.15283314+00	.22780791-01	.11450195-03
-.30369124-03	.31737489+00	-.97049810-02	.31322357-03
.12207556+01	-.89525478-01	.95823228-01	.61595142-02
.17752303-02	-.19405907+00	.24501167-01	.30660117-03
-.31120144-03	.30530128+00	-.67905560-02	.22574072-03
.14931040+01	-.19349673+00	.72227307-02	.59160885-02
.20053601-02	-.23721021+00	.26225589-01	.23920002-04
-.39842929-03	.32876990+00	-.91728717-02	.29819994-03

.11049997+01	-.79453986-01	.56703198-01	.17077201-02
.16181599-02	-.17064410+00	.19803409-01	.20100000-03
-.76381994-03	.25955580+00	-.75969496-02	.26727002-03
.28857571+00	-.12315691-01	.92407882-01	-.31504999-02
.16614000-03	.77702210-02	.46436000-03	.14813000-03
.56563997-04	.15976292+00	-.65223000-02	.10359001-03
.20974290+00	-.12246910-01	.96859634-01	-.66359304-02
.10599999-03	.21924630-01	-.15659901-02	.27883006-03
.12293000-03	.11387944+00	-.22655799-02	.47189998-04
.77665521+00	-.36277410-01	.21571960-01	.29442401-02
.53650007-03	-.52853432-01	.69414489-02	-.17560000-04
-.94475000-04	.25530094+00	-.76948516-02	.13530999-03
.54003557+00	-.39594091-01	.28321190-01	.14426301-02
.70017991-03	-.57096951-01	.73297806-02	.53550000-04
-.35883005-04	.20601381+00	-.58017895-02	.85580003-04
.21578521+00	-.12577798-01	.51477298-01	-.23425999-02
.16780000-03	-.15755999-02	.28229994-03	.12529999-03
.48500006-04	.11655778+00	-.46298988-02	.69899994-04
.21578521+00	-.12577798-01	.51477298-01	-.23425999-02
.16780000-03	-.15755999-02	.28229994-03	.12529999-03
.48500006-04	.11655778+00	-.46298988-02	.69899994-04
.21578521+00	-.12577798-01	.51477298-01	-.23425999-02
.16780000-03	-.15755999-02	.28229994-03	.12529999-03
.48500006-04	.11655778+00	-.46298988-02	.69899994-04

.14400
.21400
.55[illegible]00
.67100
.70900
.82400
1.03300
.71200
.29000
.32700
.35100
.21700
.21700
.49700
.52400
.55400
.58400
.33700
.14400
-.03700

.11701140+01	-.52038021-01	.14611973-01	.22696145-01
.12019275-02	-.17389350+00	.22230176-01	-.91596626-04
-.71234086-03	.37293969+00	-.27756298-02	.36741039-03
.77181409+00	-.29755574-01	.53188801-01	.60249043-02
.34579169-03	-.57239364-01	.74797352-02	.13346801-04
-.11955526-04	.36531347+00	-.73209925-02	.16357145-03
.43691053+00	-.74135213-02	.67811274-01	.21512962-02
.16755991-03	-.37546320-02	.14503469-02	.17527609-04
-.30002454-05	.35712137+00	-.62654098-02	.19082580-03
.92904575+00	-.24443264-01	.10277372+00	-.17928889-02
.35516344-03	-.11366752-01	.16316877-02	.17598658-03
.12503803-04	.43932351+00	-.30395382-02	.14037861-03
.95517940+00	-.30037387-01	.10135159+00	-.30971628-02
.79149740-03	-.21126231-01	.19629145-02	.12676066-03
.24097210-04	.52147397+00	-.11997840-01	.13421355-03
.72347506+00	-.24102117-01	.10679953+00	-.35962577-02
.29431685-03	-.77891441-02	.38957563-03	.15755833-03
.73003341-04	.44902178+00	-.12503601-01	.18704808-03
.74562793+00	-.25708991-01	.13570463+00	-.66798573-02
.77187615-03	.46623382-02	.39696935-04	.27704599-03
.11103681-03	.45776216+00	-.93790411-02	.14198728-03
.13579265+01	-.68572974-01	.81410772-01	.14665142-01
.16439165-02	-.22769042+00	.26630940-01	.16031555-03
-.78227694-03	.40036590+00	-.86349575-02	.47618814-03
.57840702+00	-.63167560-01	.11700696+00	.53593044-02
.12541993-02	-.11944614+00	.17258266-01	.24639439-03
-.16764160-03	.25768481+00	-.16014330-01	.43535803-03
.14448217+01	-.95084569-01	.74555400-01	.16026752-01
.16805451-02	-.24261958+00	.36230109-01	.15194408-03
-.40299500-03	.42115647+00	-.12578510-01	.41564767-03
.16492408+01	-.12094946+00	.12945718+00	.83215036-02
.23983361-02	-.26217380+00	.33101076-01	.41421918-03
-.42043314-03	.41247148+00	-.91740411-02	.30497571-03
.18186007+01	-.12605902+00	.87972860-02	.72057961-02
.24425286-02	-.23892203+00	.31942767-01	.29134562-04
-.48537286-03	.40044183+00	-.11172558-01	.36320752-03
.13435756+01	-.96695377-01	.68520979-01	.20782953-02
.19693006-02	-.20767387+00	.24100749-01	.24461700-03
-.32106556-03	.31588306+00	-.92455118-02	.32526761-03
.43193796+00	-.11436589-01	.13833460+00	-.47162983-02
.24871158-03	.10584121-01	.69514691-03	.22175061-03
.54715224-04	.23916509+00	-.97653801-02	.15507424-03
.31964818+00	-.19581738-01	.14761408+00	-.10113159-01
.28344874-03	.33413136-01	-.23905313-02	.42493701-03
.18734532-03	.17355227+00	-.43717157-02	.71917556-04
.99842881+00	-.56520205-01	.33609114-01	.45871261-02
.39166711-03	-.82345647-01	.10814777-01	-.27358480-04
-.14718426-03	.39775386+00	-.11968579-01	.21081296-03
.55544802+00	-.62717039-01	.44860749-01	.22851261-02
.11090216-02	-.99441570-01	.11610372-01	.84823199-04
-.13603393-03	.32633379+00	-.91900345-02	.13555872-03
.23897640+00	-.16841671-01	.68928102-01	-.31367413-02
.22469420-03	-.21097283-02	.37759962-03	.16777669-03
.64941508-04	.15607087+00	-.61954345-02	.93596092-04
.24685828+00	-.14389001-01	.58890028-01	-.26799343-02
.19196320-03	-.11024863-02	.32295113-03	.14334319-03

.55484006-04	.13334210+00	-.52966042-02	.79965592-04
.20780116+00	-.12112420-01	.49572639-01	-.22559237-02
.16159140-03	-.15173027-02	.27155455-03	.12066389-03
.46705506-04	.11224514+00	-.44555926-02	.67313695-04

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.14262
.10552

IDLING EMISSIONS= .5014+00 GM/VEHICLE/SEC

X(I) = 10.00 -125.00 -25.00 312.50 2083.33 62.50 -781.25-5208.3313020.83 10.00 -125.00 2083.33
SOA = 1.0 HOA = .0

EMAD =	.549	2	1
EMAD =	.284	2	2
EMAD =	.189	2	3
EMAD =	.056	2	4
EMAD =	.130	2	5
EMAD =	-.122	2	6
EMAD =	.292	2	7
EMAD =	.287	2	8
EMAD =	.212	2	9
EMAD =	.502	4	1

EMAD	=	.395	4	2
EMAD	=	.705	4	3
EMAD	=	.324	4	4
EMAD	=	.350	4	5
EMAD	=	.326	4	6
EMAD	=	.370	4	7
EMAD	=	.338	4	8
EMAD	=	.367	4	9
EMAD	=	.791	5	1
EMAD	=	.605	5	2
EMAD	=	.479	5	3
EMAD	=	.527	5	4
EMAD	=	.567	5	5
EMAD	=	.502	5	6
EMAD	=	.575	5	7
EMAD	=	.545	5	8
EMAD	=	.561	5	9
EMAD	=	1.024	6	1
EMAD	=	.831	6	2
EMAD	=	.660	6	3
EMAD	=	.732	6	4
EMAD	=	.771	6	5
EMAD	=	.740	6	6
EMAD	=	.759	6	7
EMAD	=	.707	6	8
EMAD	=	.768	6	9
EMAD	=	1.345	7	1
EMAD	=	1.067	7	2
EMAD	=	.799	7	3
EMAD	=	.960	7	4
EMAD	=	1.020	7	5
EMAD	=	1.043	7	6
EMAD	=	1.045	7	7
EMAD	=	.934	7	8
EMAD	=	1.046	7	9
EMAD	=	1.872	16	1
EMAD	=	1.222	16	2
EMAD	=	1.145	16	3
EMAD	=	1.013	16	4
EMAD	=	1.203	16	5
EMAD	=	.730	16	6
EMAD	=	1.507	16	7
EMAD	=	1.520	16	8
EMAD	=	1.344	16	9
EMAD	=	3.318	17	1
EMAD	=	1.509	17	2
EMAD	=	1.250	17	3
EMAD	=	1.085	17	4
EMAD	=	1.618	17	5
EMAD	=	.313	17	6
EMAD	=	2.407	17	7
EMAD	=	2.305	17	8
EMAD	=	1.896	17	9
EMAD	=	2.279	18	1
EMAD	=	2.000	18	2
EMAD	=	1.772	18	3
EMAD	=	1.702	18	4

EMAD =	1.964	18	5
EMAD =	1.940	18	6
EMAD =	1.986	18	7
EMAD =	1.970	18	8
EMAD =	1.982	18	9
EMAD =	2.232	19	1
EMAD =	2.077	19	2
EMAD =	1.968	19	3
EMAD =	1.987	19	4
EMAD =	2.044	19	5
EMAD =	2.028	19	6
EMAD =	2.063	19	7
EMAD =	1.957	19	8
EMAD =	2.060	19	9
EMAD =	2.279	20	1
EMAD =	2.120	20	2
EMAD =	1.989	20	3
EMAD =	2.063	20	4
EMAD =	2.099	20	5
EMAD =	2.089	20	6
EMAD =	2.111	20	7
EMAD =	2.045	20	8
EMAD =	2.109	20	9

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 12.5/12.5/12.5 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.12	10.22	14.01	48.17	5.86	15.70	10.04
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	90.19	96.23	120.21	424.90	46.00	51.93	97.19
EXHAUST NOX:	2.77	2.77	4.57	10.06	24.73	.12	3.37

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.68	11.90	48.17	5.86	13.76	7.70
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	73.13
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	2.46

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

DECELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 1 = .2803+01 GM/VEHICLE
X(I) = 12.50 156.25 25.00 312.50 2604.17 50.00 625.00 5208.3310416.67 12.50 156.25 2604.17

SOA = 1.0 HOA = .0

EMAD =	.665	2	1
EMAD =	.355	2	2
EMAD =	.449	2	3
EMAD =	.583	2	4
EMAD =	.683	2	5
EMAD =	.477	2	6
EMAD =	.508	2	7
EMAD =	.813	2	8
EMAD =	.753	2	9
EMAD =	1.115	4	1
EMAD =	.981	4	2
EMAD =	1.071	4	3
EMAD =	1.052	4	4
EMAD =	1.084	4	5
EMAD =	1.064	4	6
EMAD =	1.100	4	7
EMAD =	1.132	4	8
EMAD =	1.155	4	9
EMAD =	1.685	5	1
EMAD =	1.452	5	2
EMAD =	1.578	5	3
EMAD =	1.530	5	4
EMAD =	1.581	5	5
EMAD =	1.528	5	6
EMAD =	1.589	5	7
EMAD =	1.622	5	8
EMAD =	1.634	5	9
EMAD =	2.213	6	1
EMAD =	1.972	6	2
EMAD =	2.143	6	3
EMAD =	2.071	6	4
EMAD =	2.120	6	5
EMAD =	2.095	6	6
EMAD =	2.111	6	7
EMAD =	2.163	6	8
EMAD =	2.212	6	9
EMAD =	2.934	7	1
EMAD =	2.556	7	2
EMAD =	2.955	7	3
EMAD =	2.693	7	4
EMAD =	2.768	7	5
EMAD =	2.786	7	6
EMAD =	2.788	7	7
EMAD =	2.900	7	8
EMAD =	2.990	7	9
EMAD =	4.023	16	1
EMAD =	3.210	16	2
EMAD =	3.288	16	3
EMAD =	3.420	16	4
EMAD =	3.657	16	5
EMAD =	3.278	16	6
EMAD =	3.900	16	7
EMAD =	3.687	16	8
EMAD =	3.746	16	9
EMAD =	6.214	17	1
EMAD =	3.952	17	2

EMAD =	4.211	17	3
EMAD =	4.776	17	4
EMAD =	5.043	17	5
EMAD =	3.990	17	6
EMAD =	5.674	17	7
EMAD =	5.776	17	8
EMAD =	5.449	17	9
EMAD =	5.325	18	1
EMAD =	5.579	18	2
EMAD =	5.307	18	3
EMAD =	5.677	18	4
EMAD =	5.755	18	5
EMAD =	5.741	18	6
EMAD =	5.772	18	7
EMAD =	5.[illegible]83	18	8
EMAD =	5.[illegible]79	18	9
EMAD =	6.416	19	1
EMAD =	6.297	19	2
EMAD =	6.306	19	3
EMAD =	6.187	19	4
EMAD =	6.258	19	5
EMAD =	6.245	19	6
EMAD =	6.274	19	7
EMAD =	6.380	19	8
EMAD =	6.462	19	9
EMAD =	6.736	20	1
EMAD =	6.536	20	2
EMAD =	6.667	20	3
EMAD =	6.592	20	4
EMAD =	6.637	20	5
EMAD =	6.629	20	6
EMAD =	6.647	20	7
EMAD =	6.713	20	8
EMAD =	6.764	20	9

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 72.0(F) .850/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 12.5/12.5/12.5 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.12	10.22	14.01	48.17	5.86	15.70	10.04
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	90.18	96.23	120.21	424.90	46.00	51.93	97.19
EXHAUST NOX:	2.73	2.77	4.57	10.06	24.73	.12	3.37

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	7.68	11.90	48.17	5.86	13.76	7.70

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   *EVAP HC:   2.02      2.22      3.10      2.92       .00      1.94       ----
EXHAUST  CO:  73.13     75.42     98.59    424.90     46.00     44.13      73.13
EXHAUST NOX:   2.46      2.50      4.40     10.06     24.73       .11       2.46

                     CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66      1.94      3.52      4.05       .44      4.25       1.66
   IDLE  CO:  25.17     26.29     37.67     42.93       .93      8.96      25.17
   IDLE NOX:    .28       .24       .24       .03      1.04       .01        .28
---------------------------------------------------------------------------------
ACCELERATION EMISSIONS FOR INTERSECTION     1 PHASE    1 APPROACH    1 =        .8991+01 GM/VEHICLE
                                   VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977       TEMP: 72.0(F)          .880/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE      25.0/25.0/25.0 MPH ( 5.0)          20.0/  5.0/ 20.0

                     COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV       LDT1      LDT2       HDG       HDD        MC      ALL MODES
   TOTAL HC:   6.11      6.55      9.60     22.01      3.77     10.07       6.53
   *EVAP HC:   2.02      2.22      3.10      2.92       .00      1.94       ----
EXHAUST  CO:  49.58     53.42     65.55    211.97     24.05     30.57      52.99
EXHAUST NOX:   3.17      3.21      5.47     11.21     19.18       .13       3.72

                     CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   2.05      2.40      4.36      4.05       .44      4.94       2.15
   IDLE  CO:  29.93     31.02     44.09     42.93       .93     10.55      30.09
   IDLE NOX:    .34       .28       .28       .03      1.04       .01        .34
---------------------------------------------------------------------------------
                                   VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977       TEMP: 75.0(F)         1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE      25.0/25.0/25.0 MPH ( 5.0)             .0/   .0/   .0

                     COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV       LDT1      LDT2       HDG       HDD        MC      ALL MODES
   TOTAL HC:   5.26      5.91      8.36     22.01      3.77      8.93       5.26
   *EVAP HC:   2.02      2.22      3.10      2.92       .00      1.94       ----
EXHAUST  CO:  38.71     42.16     51.56    211.97     24.05     25.98      38.71
EXHAUST NOX:   2.93      2.96      5.18     11.21     19.18       .12       2.93

                     CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66      1.94      3.52      4.05       .44      4.25       1.66
   IDLE  CO:  25.17     26.29     37.67     42.93       .93      8.96      25.17
   IDLE NOX:    .28       .24       .24       .03      1.04       .01        .28
---------------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION     1 PHASE    1 APPROACH    1 =        .2506+00 GM/VEHICLE/SEC
    X(I) =    12.50 -156.25  -25.00  312.50 2604.17   50.00 -625.00-5208.3310416.67   12.50 -156.25 2604.17
    DOA =  1.0           HOA =   .0
         EMAD =          .685     2    1
         EMAD =          .355     2    2
         EMAD =          .260     2    3
         EMAD =          .127     2    4
         EMAD =          .229     2    5
         EMAD =          .521     2    6
         EMAD =          .352     2    7
         EMAD =          .347     2    8
         EMAD =          .287     2    9
         EMAD =          .649     4    1
         EMAD =          .516     4    2
         EMAD =          .426     4    3
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EMAD =	.445	4	4
EMAD =	.47[illegible]	4	5
EMAD =	.45[illegible]	4	6
EMAD =	.493	4	7
EMAD =	.461	4	8
EMAD =	.484	4	9
EMAD =	1.015	5	1
EMAD =	.782	5	2
EMAD =	.656	5	3
EMAD =	.704	5	4
EMAD =	.755	5	5
EMAD =	.702	5	6
EMAD =	.763	5	7
EMAD =	.730	5	8
EMAD =	.743	5	9
EMAD =	1.322	6	1
EMAD =	1.081	6	2
EMAD =	.910	6	3
EMAD =	.982	6	4
EMAD =	1.031	6	5
EMAD =	1.006	6	6
EMAD =	1.021	6	7
EMAD =	.969	6	8
EMAD =	1.017	6	9
EMAD =	1.739	7	1
EMAD =	1.392	7	2
EMAD =	1.123	7	3
EMAD =	1.285	7	4
EMAD =	1.360	7	5
EMAD =	1.379	7	6
EMAD =	1.380	7	7
EMAD =	1.268	7	8
EMAD =	1.356	7	9
EMAD =	2.391	16	1
EMAD =	1.579	16	2
EMAD =	1.901	16	3
EMAD =	1.369	16	4
EMAD =	1.407	16	5
EMAD =	1.228	16	6
EMAD =	1.950	16	7
EMAD =	1.363	16	8
EMAD =	1.722	16	9
EMAD =	4.190	17	1
EMAD =	1.928	17	2
EMAD =	1.669	17	3
EMAD =	1.505	17	4
EMAD =	2.171	17	5
EMAD =	1.127	17	6
EMAD =	2.802	17	7
EMAD =	2.700	17	8
EMAD =	2.373	17	9
EMAD =	2.652	18	1
EMAD =	2.503	18	2
EMAD =	2.275	18	3
EMAD =	2.405	18	4
EMAD =	2.482	18	5
EMAD =	2.468	18	6

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        EMAD =        2.500   18    7
        EMAD =        2.384   18    8
        EMAD =        2.474   18    9
        EMAD =        2.412   19    1
        EMAD =        2.392   19    2
        EMAD =        2.383   19    3
        EMAD =        2.502   19    4
        EMAD =        2.573   19    5
        EMAD =        2.561   19    6
        EMAD =        2.589   19    7
        EMAD =        2.483   19    8
        EMAD =        2.565   19    9
        EMAD =        2.339   20    1
        EMAD =        2.640   20    2
        EMAD =        2.309   20    3
        EMAD =        2.583   20    4
        EMAD =        2.625   20    5
        EMAD =        2.620   20    6
        EMAD =        2.638   20    7
        EMAD =        2.571   20    8
        EMAD =        2.623   20    9
                                 VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977     TEMP: 72.0(F)          .880/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE    12.5/12.5/12.5 MPH ( 5.0)             20.0/  5.0/ 20.0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2      HDG       HDD        MC      ALL MODES
    TOTAL HC:    9.12    10.22    14.01     48.17      5.86     15.70      10.04
    *EVAP HC:    2.02     2.22     3.10      2.92       .00      1.94       ----
 EXHAUST  CO:   90.18    96.23   120.21    424.90     46.00     51.93      97.19
 EXHAUST NOX:    2.73     2.77     4.57     10.06     24.73       .12       3.37

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
    IDLE  HC:    2.05     2.46     4.36      4.05       .44      4.94       2.15
    IDLE  CO:   29.93    31.02    44.09     42.93       .93     10.55      30.09
    IDLE NOX:     .34      .28      .28       .03      1.04       .01        .34
-----------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977     TEMP: 75.0(F)         1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE    12.5/12.5/12.5 MPH ( 5.0)                .0/    .0/   .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2      HDG       HDD        MC      ALL MODES
    TOTAL HC:    7.70     8.68    11.90     48.17      5.86     13.76       7.70
    *EVAP HC:    2.02     2.22     3.10      2.92       .00      1.94       ----
 EXHAUST  CO:   73.13    79.42    98.59    424.90     46.00     44.13      73.13
 EXHAUST NOX:    2.46     2.50     4.20     10.06     24.73       .11       2.46

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
    IDLE  HC:    1.66     1.94     3.52      4.05       .44      4.25       1.66
    IDLE  CO:   25.17    26.29    37.67     42.93       .93      8.96      25.17
    IDLE NOX:     .29      .24      .24       .03      1.04       .01        .28
-----------------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION    1 PHASE    1 APPROACH   2 =        .3486+01 GM/VEHICLE
    X(I) =    4.00    20.00   10.00    50.00  133.33   25.00  125.00  333.33  833.33    4.00    20.00  133.33
    SOA =   1.0           HOA =    .0
        EMAD =         .219    2     1
```

EMAD	=	.177	2	2
EMAD	=	.215	2	3
EMAD	=	.236	2	4
EMAD	=	.241	2	5
EMAD	=	.136	2	6
EMAD	=	.204	2	7
EMAD	=	.204	2	8
EMAD	=	.200	2	9
EMAD	=	.316	4	1
EMAD	=	.298	4	2
EMAD	=	.334	4	3
EMAD	=	.331	4	4
EMAD	=	.333	4	5
EMAD	=	.323	4	6
EMAD	=	.330	4	7
EMAD	=	.332	4	8
EMAD	=	.334	4	9
EMAD	=	.504	5	1
EMAD	=	.474	5	2
EMAD	=	.524	5	3
EMAD	=	.517	5	4
EMAD	=	.519	5	5
EMAD	=	.493	5	6
EMAD	=	.505	5	7
EMAD	=	.507	5	8
EMAD	=	.508	5	9
EMAD	=	.694	6	1
EMAD	=	.663	6	2
EMAD	=	.731	6	3
EMAD	=	.720	6	4
EMAD	=	.722	6	5
EMAD	=	.709	6	6
EMAD	=	.713	6	7
EMAD	=	.716	6	8
EMAD	=	.720	6	9
EMAD	=	.951	7	1
EMAD	=	.906	7	2
EMAD	=	1.014	7	3
EMAD	=	.988	7	4
EMAD	=	.992	7	5
EMAD	=	1.001	7	6
EMAD	=	1.001	7	7
EMAD	=	1.009	7	8
EMAD	=	1.016	7	9
EMAD	=	1.346	16	1
EMAD	=	1.242	16	2
EMAD	=	1.273	16	3
EMAD	=	1.294	16	4
EMAD	=	1.306	16	5
EMAD	=	1.117	16	6
EMAD	=	1.241	16	7
EMAD	=	1.240	16	8
EMAD	=	1.229	16	9
EMAD	=	2.019	17	1
EMAD	=	1.729	17	2
EMAD	=	1.[illegible]33	17	3
EMAD	=	1.[illegible]59	17	4

EMAD =	1.894	17	5
EMAD =	1.772	17	6
EMAD =	1.707	17	7
EMAD =	1.713	17	8
EMAD =	1.687	17	9
EMAD =	1.940	18	1
EMAD =	1.796	18	2
EMAD =	1.887	18	3
EMAD =	1.966	18	4
EMAD =	1.870	18	5
EMAD =	1.863	18	6
EMAD =	1.869	18	7
EMAD =	1.877	18	8
EMAD =	1.884	18	9
EMAD =	2.024	19	1
EMAD =	1.983	19	2
EMAD =	2.067	19	3
EMAD =	2.048	19	4
EMAD =	2.052	19	5
EMAD =	2.045	19	6
EMAD =	2.051	19	7
EMAD =	2.058	19	8
EMAD =	2.064	19	9
EMAD =	2.152	20	1
EMAD =	2.126	20	2
EMAD =	2.179	20	3
EMAD =	2.167	20	4
EMAD =	2.169	20	5
EMAD =	2.165	20	6
EMAD =	2.169	20	7
EMAD =	2.173	20	8
EMAD =	2.177	20	9

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 72.0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				20.0/	5.0/	20.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	18.70	20.97	28.37	94.99	8.19	33.72	20.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	224.81	237.75	304.29	762.76	76.55	120.68	235.63
EXHAUST NOX:	2.94	3.02	5.23	9.37	32.37	.15	3.73

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.26	.28	.03	1.04	.01	.34

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 75.0(F)		1.000/	.000/	.000/	.000/	.000/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	188.82

```
 XHAUST NOX:    2.50      2.50      4.65      9.37     32.37       .14       2.50

                       CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:    1.66      1.94      3.52      4.05       .44      4.25       1.66
   IDLE  CO:   25.17     26.29     37.67     42.93       .93      8.96      25.17
   IDLE NOX:     .28       .24       .24       .03      1.04       .01        .28
---------------------------------------------------------------------------------
ACCELERATION EMISSIONS FOR INTERSECTION    1 PHASE    1 APPROACH    2 =      .2717+01 GM/VEHICLE
                              VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977      TEMP: 72.0(F)      .880/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE     25.0/25.0/25.0 MPH ( 5.0)          20.0/  5.0/ 20.0

                       COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1      LDT2       HDG       HDD        MC    ALL MODES
   TOTAL HC:    6.11      6.55      9.60     22.01      3.77     10.07       6.53
   *EVAP HC:    2.02      2.22      3.10      2.92       .00      1.94       ----
EXHAUST  CO:   49.58     53.42     65.55    211.97     24.05     30.57      52.99
EXHAUST NOX:    3.17      3.21      5.47     11.21     19.18       .13       3.72

                       CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:    2.05      2.40      4.36      4.05       .44      4.94       2.15
   IDLE  CO:   29.93     31.02     44.09     42.93       .93     10.55      30.09
   IDLE NOX:     .34       .28       .28       .03      1.04       .01        .34
---------------------------------------------------------------------------------
                              VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977      TEMP: 75.0(F)     1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE     25.0/25.0/25.0 MPH ( 5.0)             .0/   .0/   .0

                       COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1      LDT2       HDG       HDD        MC    ALL MODES
   TOTAL HC:    5.26      5.91      8.36     22.01      3.77      8.93       5.26
   *EVAP HC:    2.02      2.22      3.10      2.92       .00      1.94       ----
EXHAUST  CO:   38.71     42.16     51.56    211.97     24.05     25.98      38.71
EXHAUST NOX:    2.93      2.96      5.18     11.21     19.18       .12       2.93

                       CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:    1.64      1.94      3.52      4.05       .44      4.25       1.66
   IDLE  CO:   25.17     26.29     37.67     42.93       .93      8.96      25.17
   IDLE NOX:     .28       .24       .24       .03      1.04       .01        .28
---------------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION    1 PHASE    1 APPROACH    2 =      .2506+00 GM/VEHICLE/SEC
    X(I) =   10.00 -100.00  -20.00  200.00 1333.33   40.00 -400.00-2666.67 5333.33   10.00 -100.00 1333.33
    SOA =  1.0           HOA =    .0
          EMAD =          .548    2    1
          EMAD =          .337    2    2
          EMAD =          .261    2    3
          EMAD =          .176    2    4
          EMAD =          .227    2    5
          EMAD =          .062    2    6
          EMAD =          .274    2    7
          EMAD =          .271    2    8
          EMAD =          .240    2    9
          EMAD =          .530    4    1
          EMAD =          .445    4    2
          EMAD =          .373    4    3
          EMAD =          .385    4    4
          EMAD =          .402    4    5
```

EMAD	=	.386	4	6
EMAD	=	.409	4	7
EMAD	=	.793	4	8
EMAD	=	.404	4	9
EMAD	=	.329	5	1
EMAD	=	.680	5	2
EMAD	=	.579	5	3
EMAD	=	.610	5	4
EMAD	=	.636	5	5
EMAD	=	.594	5	6
EMAD	=	.633	5	7
EMAD	=	.616	5	8
EMAD	=	.622	5	9
EMAD	=	1.086	6	1
EMAD	=	.931	6	2
EMAD	=	.794	6	3
EMAD	=	.841	6	4
EMAD	=	.866	6	5
EMAD	=	.945	6	6
EMAD	=	.855	6	7
EMAD	=	.829	6	8
EMAD	=	.553	6	9
EMAD	=	1.431	7	1
EMAD	=	1.209	7	2
EMAD	=	.994	7	3
EMAD	=	1.097	7	4
EMAD	=	1.136	7	5
EMAD	=	1.150	7	6
EMAD	=	1.151	7	7
EMAD	=	1.094	7	8
EMAD	=	1.140	7	9
EMAD	=	1.966	16	1
EMAD	=	1.447	16	2
EMAD	=	1.385	16	3
EMAD	=	1.300	16	4
EMAD	=	1.422	16	5
EMAD	=	1.119	16	6
EMAD	=	1.517	16	7
EMAD	=	1.524	16	8
EMAD	=	1.451	16	9
EMAD	=	3.426	17	1
EMAD	=	1.978	17	2
EMAD	=	1.771	17	3
EMAD	=	1.666	17	4
EMAD	=	2.007	17	5
EMAD	=	1.172	17	6
EMAD	=	2.244	17	7
EMAD	=	2.192	17	8
EMAD	=	2.024	17	9
EMAD	=	2.407	18	1
EMAD	=	2.184	18	2
EMAD	=	2.301	18	3
EMAD	=	2.084	18	4
EMAD	=	2.124	18	5
EMAD	=	2.113	18	6
EMAD	=	2.133	18	7
EMAD	=	2.074	18	8

```
          EMAD =        2.120    19     9
          EMAD =        2.470    19     1
          EMAD =        2.266    19     2
          EMAD =        2.099    19     3
          EMAD =        2.175    19     4
          EMAD =        2.211    19     5
          EMAD =        2.201    19     6
          EMAD =        2.219    19     7
          EMAD =        2.165    19     8
          EMAD =        2.207    19     9
          EMAD =        2.426    20     1
          EMAD =        2.295    20     2
          EMAD =        2.194    20     3
          EMAD =        2.241    20     4
          EMAD =        2.264    20     5
          EMAD =        2.258    20     6
          EMAD =        2.269    20     7
          EMAD =        2.235    20     8
          EMAD =        2.262    20     9
                                      VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977      TEMP: 72.0(F)            .850/  .050/  .030/  .020/  .020/  .000
 REGION: 49-STATE     10.0/10.0/10.0 MPH ( 5.0)                20.0/   5.0/  20.0

                            COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV        LDT1       LDT2       HDG        HDD        MC        ALL MODES
   TOTAL HC:   10.74      12.04      16.45      59.23       6.51      15.80       11.86
   *EVAP HC:    2.02       2.22       3.10       2.92        .00       1.94        ----
 EXHAUST  CO: 112.37     119.62     150.72     509.02      53.96      63.65      120.65
 EXHAUST NOX:   2.77       2.78       4.62       9.53      26.79        .13        3.41

                            CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:    2.05       2.46       4.36       4.05        .44       4.94        2.15
   IDLE  CO:   29.93      31.02      44.09      42.93        .93      10.55       30.09
   IDLE NOX:     .34        .28        .28        .03       1.04        .01         .34
--------------------------------------------------------------------------------------------
                                      VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977      TEMP: 75.0(F)           1.000/  .000/  .000/  .000/  .000/  .000
 REGION: 49-STATE     10.0/10.0/10.0 MPH ( 5.0)                  .0/     .0/    .0

                            COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV        LDT1       LDT2       HDG        HDD        MC        ALL MODES
   TOTAL HC:    9.01      10.16      13.65      59.23       6.51      16.42        9.01
   *EVAP HC:    2.02       2.22       3.10       2.92        .00       1.94        ----
 EXHAUST  CO:  91.91      98.18     125.05     509.02      53.96      54.09       91.91
 EXHAUST NOX:   2.47       2.46       4.20       9.83      26.79        .12        2.43

                            CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:    1.66       1.94       3.52       4.05        .44       4.25        1.66
   IDLE  CO:   25.17      26.29      37.67      42.93        .93       8.96       25.17
   IDLE NOX:     .28        .24        .24        .03       1.04        .01         .28
--------------------------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    1 =       .2969+01 GM/VEHICLE
    X(I) =     5.00    25.00   10.00   50.00  166.67   20.00  100.00  333.33  666.67    5.00   25.00  166.67
    SOA =   1.0               POA =    .0
          EMAD =        .274     2     1
          EMAD =        .221     2     2
          EMAD =        .259     2     3
```

EMAD =	.280	2	4
EMAD =	.287	2	5
EMAD =	.204	2	6
EMAD =	.257	2	7
EMAD =	.257	2	8
EMAD =	.253	2	9
EMAD =	.398	4	1
EMAD =	.377	4	2
EMAD =	.413	4	3
EMAD =	.410	4	4
EMAD =	.412	4	5
EMAD =	.404	4	6
EMAD =	.410	4	7
EMAD =	.412	4	8
EMAD =	.413	4	9
EMAD =	.625	5	1
EMAD =	.588	5	2
EMAD =	.639	5	3
EMAD =	.631	5	4
EMAD =	.634	5	5
EMAD =	.613	5	6
EMAD =	.623	5	7
EMAD =	.625	5	8
EMAD =	.626	5	9
EMAD =	.857	6	1
EMAD =	.819	6	2
EMAD =	.887	6	3
EMAD =	.876	6	4
EMAD =	.879	6	5
EMAD =	.869	6	6
EMAD =	.871	6	7
EMAD =	.875	6	8
EMAD =	.878	6	9
EMAD =	1.166	7	1
EMAD =	1.111	7	2
EMAD =	1.218	7	3
EMAD =	1.192	7	4
EMAD =	1.197	7	5
EMAD =	1.204	7	6
EMAD =	1.205	7	7
EMAD =	1.212	7	8
EMAD =	1.216	7	9
EMAD =	1.631	16	1
EMAD =	1.501	16	2
EMAD =	1.532	16	3
EMAD =	1.553	16	4
EMAD =	1.568	16	5
EMAD =	1.417	16	6
EMAD =	1.516	16	7
EMAD =	1.315	16	8
EMAD =	1.306	16	9
EMAD =	2.494	17	1
EMAD =	2.132	17	2
EMAD =	2.235	17	3
EMAD =	2.262	17	4
EMAD =	2.304	17	5
EMAD =	1.687	17	6

EMAD =	2.155	17	7
EMAD =	2.161	17	8
EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.488	19	2
EMAD =	2.572	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.690	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

```
                                         VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977      TEMP: 72.0(F)             .880/  .050/  .030/  .020/  .020/  .000
REGION: 49-STATE      5.0/ 5.0/ 5.0 MPH ( 5.0)               20.0/   5.0/  20.0
```

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.70	20.97	28.37	94.99	8.19	33.72	20.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	224.61	237.75	304.29	762.76	76.55	120.68	235.63
EXHAUST NOX:	2.94	3.02	5.23	9.37	32.37	.15	3.73

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.26	.28	.03	1.04	.01	.34

```
                                         VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977      TEMP: 75.0(F)            1.000/  .000/  .000/  .000/  .000/  .000
REGION: 49-STATE      5.0/ 5.0/ 5.0 MPH ( 5.0)                  .0/    .0/    .0
```

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.56	4.65	9.37	32.37	.14	2.50

```
                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66      1.94      3.52      4.05       .44      4.25        1.66
   IDLE  CO:  25.17     26.29     37.67     42.93       .93      8.96       25.17
   IDLE NOX:    .28       .24       .24       .03      1.04       .01         .28
--------------------------------------------------------------------------------
ACCELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    1 =       .3366+01 GM/VEHICLE
                                      VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977      TEMP: 72.0(F)            .880/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE     20.0/20.0/20.0 MPH ( 5.0)             20.0/  5.0/ 20.0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:   6.87      7.69     10.69     28.76      4.42     11.44        7.42
   *EVAP HC:   2.02      2.22      3.10      2.92       .00      1.94        ----
EXHAUST  CO:  59.83     64.23     78.85    268.72     30.27     35.83       64.21
EXHAUST NOX:   2.95      2.95      4.99     10.75     20.62       .13        3.52

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   2.05      2.40      4.36      4.05       .44      4.94        2.15
   IDLE  CO:  29.93     31.02     44.09     42.93       .93     10.55       30.09
   IDLE NOX:    .34       .28       .29       .03      1.04       .01         .34
--------------------------------------------------------------------------------
                                      VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977      TEMP: 75.0(F)           1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE     20.0/20.0/20.0 MPH ( 5.0)                .0/    .0/   .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:   5.88      6.62      9.24     28.76      4.42     10.10        5.88
   *EVAP HC:   2.02      2.22      3.10      2.92       .00      1.94        ----
EXHAUST  CO:  47.49     51.42     62.98    268.72     30.27     30.45       47.49
EXHAUST NOX:   2.72      2.75      4.69     10.75     20.62       .12        2.72

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66      1.94      3.52      4.05       .44      4.25        1.66
   IDLE  CO:  25.17     26.29     37.67     42.93       .93      8.96       25.17
   IDLE NOX:    .28       .24       .24       .03      1.04       .01         .28
--------------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    1 =       .2601+00 GM/VEHICLE/SEC
    X(I) =    10.00 -100.00  -20.00  200.00 1333.33   40.00 -400.00-2666.67 5333.33   10.00 -100.00 1333.33
    SOA =   1.0            HOA =    .0
         EMAD  =          .548     2     1
         EMAD  =          .337     2     2
         EMAD  =          .261     2     3
         EMAD  =          .176     2     4
         EMAD  =          .227     2     5
         EMAD  =          .062     2     6
         EMAD  =          .274     2     7
         EMAD  =          .271     2     8
         EMAD  =          .240     2     9
         EMAD  =          .530     4     1
         EMAD  =          .445     4     2
         EMAD  =          .373     4     3
         EMAD  =          .385     4     4
         EMAD  =          .402     4     5
         EMAD  =          .386     4     6
         EMAD  =          .409     4     7
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EMAD	=	.393	4	8
EMAD	=	.404	4	9
EMAD	=	.529	5	1
EMAD	=	.680	5	2
EMAD	=	.579	5	3
EMAD	=	.610	5	4
EMAD	=	.436	5	5
EMAD	=	.594	5	6
EMAD	=	.633	5	7
EMAD	=	.616	5	8
EMAD	=	.622	5	9
EMAD	=	1.086	6	1
EMAD	=	.931	6	2
EMAD	=	.794	6	3
EMAD	=	.841	6	4
EMAD	=	.566	6	5
EMAD	=	.545	6	6
EMAD	=	.[illegible]55	6	7
EMAD	=	.[illegible]29	6	8
EMAD	=	.253	6	9
EMAD	=	1.431	7	1
EMAD	=	1.209	7	2
EMAD	=	.994	7	3
EMAD	=	1.097	7	4
EMAD	=	1.136	7	5
EMAD	=	1.150	7	6
EMAD	=	1.151	7	7
EMAD	=	1.094	7	8
EMAD	=	1.140	7	9
EMAD	=	1.966	16	1
EMAD	=	1.447	16	2
EMAD	=	1.385	16	3
EMAD	=	1.300	16	4
EMAD	=	1.422	16	5
EMAD	=	1.119	16	6
EMAD	=	1.517	16	7
EMAD	=	1.524	16	8
EMAD	=	1.451	16	9
EMAD	=	3.426	17	1
EMAD	=	1.978	17	2
EMAD	=	1.771	17	3
EMAD	=	1.666	17	4
EMAD	=	2.007	17	5
EMAD	=	1.172	17	6
EMAD	=	2.244	17	7
EMAD	=	2.192	17	8
EMAD	=	2.024	17	9
EMAD	=	2.407	18	1
EMAD	=	2.184	18	2
EMAD	=	2.301	18	3
EMAD	=	2.084	18	4
EMAD	=	2.124	18	5
EMAD	=	2.113	18	6
EMAD	=	2.133	18	7
EMAD	=	2.074	18	8
EMAD	=	2.120	18	9
EMAD	=	2.470	19	1

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        EMAD =          2.266   19    2
        EMAD =          2.299   19    3
        EMAD =          2.175   19    4
        EMAD =          2.211   19    5
        EMAD =          2.201   19    6
        EMAD =          2.219   19    7
        EMAD =          2.165   19    8
        EMAD =          2.207   19    9
        EMAD =          2.426   20    1
        EMAD =          2.298   20    2
        EMAD =          2.194   20    3
        EMAD =          2.241   20    4
        EMAD =          2.264   20    5
        EMAD =          2.258   20    6
        EMAD =          2.269   20    7
        EMAD =          2.235   20    8
        EMAD =          2.262   20    9
                                     VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
  CAL. YEAR: 1977       TEMP: 72.0(F)           .850/ .050/ .030/ .020/ .020/ .000
  REGION: 49-STATE      10.0/10.0/10.0 MPH ( 5.0)             20.0/  5.0/ 20.0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:    10.74     12.04     16.45     59.23      6.51     18.80      11.86
   *EVAP HC:     2.02      2.22      3.10      2.92       .00      1.94      ----
 EXHAUST  CO:  112.37    119.62    150.72    509.02     53.96     63.65     120.65
 EXHAUST NOX:    2.73      2.78      4.62      9.83     26.79       .13       3.41

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:     2.35      2.40      4.36      4.05       .44      4.94       2.15
   IDLE  CO:    29.93     31.02     44.09     42.93       .93     10.55      30.09
   IDLE NOX:      .34       .28       .28       .03      1.04       .01        .34
-------------------------------------------------------------------------------------
                                     VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
  CAL. YEAR: 1977       TEMP: 75.0(F)          1.000/ .000/ .000/ .000/ .000/ .000
  REGION: 49-STATE      10.0/10.0/10.0 MPH ( 5.0)               .0/   .0/   .0

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:     9.01     10.16     13.65     59.23      6.51     16.42       9.01
   *EVAP HC:     2.02      2.22      3.10      2.92       .00      1.94      ----
 EXHAUST  CO:   91.91     98.18    125.05    509.02     53.96     54.09      91.91
 EXHAUST NOX:    2.43      2.48      4.20      9.83     26.79       .12       2.43

                        CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:     1.66      1.94      3.52      4.05       .44      4.25       1.66
   IDLE  CO:    25.17     26.29     37.67     42.93       .93      8.96      25.17
   IDLE NOX:      .28       .24       .24       .03      1.04       .01        .28
-------------------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    2 =     .2969+01 GM/VEHICLE
    X(I) =     5.00    25.00    10.00    50.00  166.67   20.00  100.00  333.33  666.67    5.00    25.00   166.67
    SOA =   1.0            HOA =    .0
        EMAD =           .274    2    1
        EMAD =           .221    2    2
        EMAD =           .259    2    3
        EMAD =           .280    2    4
        EMAD =           .287    2    5
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EMAD	=	.204	2	6
EMAD	=	.257	2	7
EMAD	=	.257	2	8
EMAD	=	.253	2	9
EMAD	=	.398	4	1
EMAD	=	.377	4	2
EMAD	=	.413	4	3
EMAD	=	.410	4	4
EMAD	=	.412	4	5
EMAD	=	.404	4	6
EMAD	=	.410	4	7
EMAD	=	.412	4	8
EMAD	=	.413	4	9
EMAD	=	.625	5	1
EMAD	=	.538	5	2
EMAD	=	.638	5	3
EMAD	=	.631	5	4
EMAD	=	.634	5	5
EMAD	=	.613	5	6
EMAD	=	.623	5	7
EMAD	=	.625	5	8
EMAD	=	.626	5	9
EMAD	=	.857	6	1
EMAD	=	.819	6	2
EMAD	=	.887	6	3
EMAD	=	.876	6	4
EMAD	=	.879	6	5
EMAD	=	.869	6	6
EMAD	=	.871	6	7
EMAD	=	.875	6	8
EMAD	=	.876	6	9
EMAD	=	1.166	7	1
EMAD	=	1.111	7	2
EMAD	=	1.218	7	3
EMAD	=	1.192	7	4
EMAD	=	1.197	7	5
EMAD	=	1.204	7	6
EMAD	=	1.205	7	7
EMAD	=	1.212	7	8
EMAD	=	1.218	7	9
EMAD	=	1.631	16	1
EMAD	=	1.501	16	2
EMAD	=	1.532	16	3
EMAD	=	1.553	16	4
EMAD	=	1.568	16	5
EMAD	=	1.417	16	6
EMAD	=	1.516	16	7
EMAD	=	1.515	16	8
EMAD	=	1.506	16	9
EMAD	=	2.494	17	1
EMAD	=	2.132	17	2
EMAD	=	2.235	17	3
EMAD	=	2.262	17	4
EMAD	=	2.304	17	5
EMAD	=	1.987	17	6
EMAD	=	2.155	17	7
EMAD	=	2.161	17	8

EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.468	19	2
EMAD =	2.572	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.690	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	18.70	20.97	28.37	94.99	8.19	33.72	20.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	224.81	237.75	304.29	762.76	76.55	120.68	235.63
EXHAUST NOX:	2.94	3.02	5.23	9.37	32.37	.15	3.73

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.55	4.65	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66

IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 2 = .3366+01 GM/VEHICLE

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 72.0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	20.0/20.0/20.0 MPH (5.0)				20.0/	5.0/	20.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.87	7.69	10.69	28.76	4.42	11.44	7.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	59.83	64.23	78.88	268.72	30.27	35.83	64.21
EXHAUST NOX:	2.95	2.99	4.99	10.75	20.62	.13	3.52

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 75.0(F)		1.000/	.000/	.000/	.000/	.000/	.000
REGION: 49-STATE	20.0/20.0/20.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.69	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

CRUISE EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 2 = .2601+00 GM/VEHICLE/SEC

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 72.0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	20.0/20.0/20.0 MPH (5.0)				20.0/	5.0/	20.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.87	7.69	10.69	28.76	4.42	11.44	7.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	59.83	64.23	78.88	268.72	30.27	35.83	64.21
EXHAUST NOX:	2.95	2.99	4.99	10.75	20.62	.13	3.52

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	2.05	2.40	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

FOR LINK 5 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2601+00 GM/VEHICLE/SEC
VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 25.0/25.0/25.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.11	6.85	9.60	22.01	3.77	10.07	6.53
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	49.58	53.42	65.55	211.97	24.05	30.57	52.99
EXHAUST NOX:	3.17	3.21	5.47	11.21	19.18	.13	3.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	2.05	2.45	4.36	4.05	.44	4.94	2.15
IDLE CO:	29.93	31.02	44.09	42.93	.93	10.55	30.09
IDLE NOX:	.34	.28	.28	.03	1.04	.01	.34

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 25.0/25.0/25.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.26
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.18	11.21	19.18	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

FOR LINK 6 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2506+00 GM/VEHICLE/SEC
VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 72.0(F) .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) 20.0/ 5.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	6.87	7.69	10.69	28.76	4.42	11.44	7.42
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----

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 XHAUST  CO:  59.83     64.23     78.88    268.72     30.27     35.83       64.21
 XHAUST NOX:   2.95      2.99      4.99     10.75     20.62       .13        3.52

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE   HC:   2.05      2.40      4.36      4.05       .44      4.94        2.15
   IDLE   CO:  29.97     31.02     44.09     42.93       .93     10.55       30.09
   IDLE  NOX:    .34       .26       .28       .03      1.04       .01         .34
-------------------------------------------------------------------------------------
                                     VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977       TEMP: 75.0(F)           1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE      20.0/20.0/20.0 MPH ( 5.0)               .0/    .0/    .0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1      LDT2       HDG       HDD        MC     ALL MODES
   TOTAL HC:    5.58      6.62      9.24     28.76      4.42     10.10        5.88
   *EVAP HC:    2.02      2.22      3.10      2.92       .00      1.94        ----
 EXHAUST  CO:  47.49     51.42     62.98    268.72     30.27     30.45       47.49
 EXHAUST NOX:   2.72      2.75      4.69     10.75     20.62       .12        2.72

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE   HC:   1.66      1.94      3.52      4.05       .44      4.25        1.66
   IDLE   CO:  25.17     26.29     37.67     42.93       .93      8.96       25.17
   IDLE  NOX:    .28       .24       .24       .03      1.04       .01         .28
-------------------------------------------------------------------------------------
 FOR LINK     7 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE=       .2601+00 GM/VEHICLE/SEC
                                     VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977       TEMP: 72.0(F)            .880/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE      20.0/20.0/20.0 MPH ( 5.0)            20.0/   5.0/ 20.0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1      LDT2       HDG       HDD        MC     ALL MODES
   TOTAL HC:    6.87      7.69     10.69     28.76      4.42     11.44        7.42
   *EVAP HC:    2.02      2.22      3.10      2.92       .00      1.94        ----
 EXHAUST  CO:  59.83     64.23     78.88    268.72     30.27     35.83       64.21
 EXHAUST NOX:   2.95      2.99      4.99     10.75     20.62       .13        3.52

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE   HC:   2.05      2.40      4.36      4.05       .44      4.94        2.15
   IDLE   CO:  29.97     31.02     44.09     42.93       .93     10.55       30.09
   IDLE  NOX:    .34       .26       .28       .03      1.04       .01         .34
-------------------------------------------------------------------------------------
                                     VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977       TEMP: 75.0(F)           1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE      20.0/20.0/20.0 MPH ( 5.0)               .0/    .0/    .0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV      LDT1      LDT2       HDG       HDD        MC     ALL MODES
   TOTAL HC:    5.58      6.62      9.24     28.76      4.42     10.10        5.88
   *EVAP HC:    2.02      2.22      3.10      2.92       .00      1.94        ----
 EXHAUST  CO:  47.49     51.42     62.98    268.72     30.27     30.45       47.49
 EXHAUST NOX:   2.72      2.75      4.69     10.75     20.62       .12        2.72

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE   HC:   1.66      1.94      3.52      4.05       .44      4.25        1.66
   IDLE   CO:  25.17     26.29     37.67     42.93       .93      8.96       25.17
   IDLE  NOX:    .28       .24       .24       .03      1.04       .01         .28
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FOR LINK     (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE=        .2601+00 GM/VEHICLE/SEC
I=    1 J=     1 INS=    1 VOL=        .2500+03 CS=        .2100+04 ISIG=    1
LENTH=        .2169+02 DELAY=        .1489+02 NPHASE=    2
GAP=         .0 LINK=    1 NGND=    0 CY=     34.19 G=      9.43
I=    2 J=     1 INS=    1 VOL=        .2000+03 CS=        .1800+04 ISIG=    1
LENTH=        .1777+02 DELAY=        .1497+02 NPHASE=    2
GAP=         .0 LINK=    2 NGND=    0 CY=     34.19 G=      9.43
I=    1 J=     2 INS=    1 VOL=        .2500+03 CS=        .1200+04 ISIG=    1
LENTH=        .1573+02 DELAY=        .7748+01 NPHASE=    2
GAP=         .0 LINK=    3 NGND=    0 CY=     34.19 G=     18.76
I=    2 J=     2 INS=    1 VOL=        .2500+03 CS=        .1200+04 ISIG=    1
LENTH=        .1573+02 DELAY=        .7748+01 NPHASE=    2
GAP=         .0 LINK=    4 NGND=    0 CY=     34.19 G=     18.76


INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK=    1 LANE=    1
EMISSION RATE=        .1557-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK(PSEUDOLINK)=    9 LANE=    1
EMISSION RATE=        .4032-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK=    1 LANE=    2
EMISSION RATE=        .1557-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    1 LINK(PSEUDOLINK)=    9 LANE=    2
EMISSION RATE=        .4032-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK=    2 LANE=    1
EMISSION RATE=        .1245-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK(PSEUDOLINK)=   10 LANE=    1
EMISSION RATE=        .3103-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK=    2 LANE=    2
EMISSION RATE=        .1245-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    1 APPROACH=    2 LINK(PSEUDOLINK)=   10 LANE=    2
EMISSION RATE=        .3103-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    1 LINK=    3 LANE=    1
EMISSION RATE=        .2020-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    1 LINK(PSEUDOLINK)=   11 LANE=    1
EMISSION RATE=        .3318-01 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    2 LINK=    4 LANE=    1
EMISSION RATE=        .2020-02 GM/METER/SEC
INTERSECTION=    1 PHASE=    2 APPROACH=    2 LINK(PSEUDOLINK)=   12 LANE=    1
EMISSION RATE=        .3318-01 GM/METER/SEC


LINK(NOT APPROACHING INTERSECTION)=    5 LANE=    1 EMISSION RATE=        .1616-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    5 LANE=    2 EMISSION RATE=        .1616-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    6 LANE=    1 EMISSION RATE=        .1495-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    6 LANE=    2 EMISSION RATE=        .9964-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    7 LANE=    1 EMISSION RATE=        .2424-02 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)=    8 LANE=    1 EMISSION RATE=        .2424-02 GM/METER/SEC


          CONTRIBUTION FROM LINK  1

 RECEPTOR LOCATION        HEIGHT     CONCENTRATION
    X           Y          Z(M)      UGM/METER**3     PPM *
  1.4600      1.9700      1.0000           0.         .000
  1.5200      1.9600      1.0000           0.         .000
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1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 2

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	698.	.607
1.5200	1.9800	1.0000	87.	.076
1.5200	1.9800	4.0000	84.	.073
1.4700	2.0200	1.0000	601.	.523
1.4700	1.9800	1.0000	578.	.503

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 3

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	125.	.109
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	414.	.360

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 4

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	179.	.156
1.5200	1.9800	4.0000	107.	.093
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 5

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	52.	.045
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 6

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	386.	.336
1.5200	1.9800	1.0000	387.	.336
1.5200	1.9800	4.0000	348.	.302
1.4700	2.0200	1.0000	258.	.225
1.4700	1.9800	1.0000	268.	.234

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 7

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	93.	.081
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	283.	.246

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 8

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	295.	.257
1.5200	1.9800	4.0000	76.	.066
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 9

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 10

RECEPTOR LOCATION HEIGHT CONCENTRATION

X	Y	Z(M)	UGM/METER**3	PPM *
1.4800	1.9700	1.0000	3284.	2.857
1.5200	1.9600	1.0000	6.	.005
1.5200	1.9600	4.0000	5.	.004
1.4700	2.0200	1.0000	38.	.033
1.4700	1.9800	1.0000	1262.	1.098

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 11

RECEPTOR LOCATION		HEIGHT	CONCENTRATION	
X	Y	Z(M)	UGM/METER**3	PPM *
1.4800	1.9700	1.0000	2046.	1.780
1.5200	1.9600	1.0000	0.	.000
1.5200	1.9600	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	6416.	5.582

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONTRIBUTION FROM LINK 12

RECEPTOR LOCATION		HEIGHT	CONCENTRATION	
X	Y	Z(M)	UGM/METER**3	PPM *
1.4800	1.9700	1.0000	0.	.000
1.5200	1.9600	1.0000	2813.	2.447
1.5200	1.9600	4.0000	1682.	1.463
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.

CONCENTRATION FOR HOUR 1 AT RECEPTOR 1 = .5815+01 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 2 = .3277+01 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 3 = .2092+01 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 4 = .7803+00 PPM
CONCENTRATION FOR HOUR 1 AT RECEPTOR 5 = .8023+01 PPM

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: .0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	5.19	22.24	17.27
EVAP HC:	2.02	2.22	3.15	2.92	.00	1.94	----
EXHAUST CO:	1[illegible].22	19[illegible].72	260.11	762.76	76.55	102.56	200.74

```
EXHAUST NOX:   2.50     2.54     4.65     9.37    32.37      .14      3.30

                    CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:    1.66     1.94     3.52     4.05      .44     4.25      1.75
   IDLE  CO:   25.17    26.29    37.67    42.93      .93     8.96     25.47
   IDLE NOX:     .28      .24      .24      .03     1.04      .01       .29
---------------------------------------------------------------------------
IDLING EMISSIONS=        .4245+00 GM/VEHICLE/SEC

   X(I) =    10.00 -125.00  -25.00  312.50 2083.33   62.50 -781.25-5208.3313020.83   10.00 -125.00 2083.33
   SOA =  1.0          HOA =   .0
        EMAD =         .548    2    1
        EMAD =         .284    2    2
        EMAD =         .189    2    3
        EMAD =         .056    2    4
        EMAD =         .136    2    5
        EMAD =        -.122    2    6
        EMAD =         .292    2    7
        EMAD =         .287    2    8
        EMAD =         .212    2    9
        EMAD =         .502    4    1
        EMAD =         .395    4    2
        EMAD =         .305    4    3
        EMAD =         .324    4    4
        EMAD =         .350    4    5
        EMAD =         .326    4    6
        EMAD =         .370    4    7
        EMAD =         .338    4    8
        EMAD =         .367    4    9
        EMAD =         .791    5    1
        EMAD =         .605    5    2
        EMAD =         .479    5    3
        EMAD =         .527    5    4
        EMAD =         .567    5    5
        EMAD =         .502    5    6
        EMAD =         .576    5    7
        EMAD =         .545    5    8
        EMAD =         .561    5    9
        EMAD =        1.024    6    1
        EMAD =         .831    6    2
        EMAD =         .660    6    3
        EMAD =         .732    6    4
        EMAD =         .771    6    5
        EMAD =         .740    6    6
        EMAD =         .759    6    7
        EMAD =         .707    6    8
        EMAD =         .768    6    9
        EMAD =        1.345    7    1
        EMAD =        1.067    7    2
        EMAD =         .799    7    3
        EMAD =         .960    7    4
        EMAD =        1.020    7    5
        EMAD =        1.043    7    6
        EMAD =        1.045    7    7
        EMAD =         .934    7    8
        EMAD =        1.046    7    9
        EMAD =        1.972   16    1
```

EMAD =	1.222	16	2
EMAD =	1.145	16	3
EMAD =	1.017	16	4
EMAD =	1.203	16	5
EMAD =	.730	16	6
EMAD =	1.507	16	7
EMAD =	1.520	16	8
EMAD =	1.344	16	9
EMAD =	3.319	17	1
EMAD =	1.509	17	2
EMAD =	1.250	17	3
EMAD =	1.085	17	4
EMAD =	1.618	17	5
EMAD =	.313	17	6
EMAD =	2.407	17	7
EMAD =	2.305	17	8
EMAD =	1.696	17	9
EMAD =	2.279	18	1
EMAD =	2.300	18	2
EMAD =	1.772	18	3
EMAD =	1.902	18	4
EMAD =	1.964	18	5
EMAD =	1.946	18	6
EMAD =	1.986	18	7
EMAD =	1.570	18	8
EMAD =	1.982	18	9
EMAD =	2.332	19	1
EMAD =	2.077	19	2
EMAD =	1.369	19	3
EMAD =	1.987	19	4
EMAD =	2.044	19	5
EMAD =	2.028	19	6
EMAD =	2.063	19	7
EMAD =	1.957	19	8
EMAD =	2.060	19	9
EMAD =	2.279	20	1
EMAD =	2.120	20	2
EMAD =	1.989	20	3
EMAD =	2.063	20	4
EMAD =	2.099	20	5
EMAD =	2.089	20	6
EMAD =	2.111	20	7
EMAD =	2.045	20	8
EMAD =	2.109	20	9

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 12.5/12.5/12.5 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	[illegible].66	11.93	48.17	5.86	13.76	8.65
EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	79.42	98.59	424.90	46.00	44.13	80.65
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75

IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

```
                          VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977    TEMP: 75.0(F)      1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE   12.5/12.5/12.5 MPH ( 5.0)        .0/    .0/    .0
```

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.68	11.90	48.17	5.86	13.76	7.70
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	73.13
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	2.46

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

```
DECELERATION EMISSIONS FOR INTERSECTION   1 PHASE   1 APPROACH   1 =    .232E+01 GM/VEHICLE
   X(I) =   12.50  156.25   25.00  312.50 2604.17   50.00  625.00 5208.3310416.67   12.50  156.25 2604.17
   SCA =  1.0          HOA =   .0
```

EMAD =	.685	2	1
EMAD =	.355	2	2
EMAD =	.449	2	3
EMAD =	.583	2	4
EMAD =	.683	2	5
EMAD =	.477	2	6
EMAD =	.508	2	7
EMAD =	.613	2	8
EMAD =	.753	2	9
EMAD =	1.115	4	1
EMAD =	.981	4	2
EMAD =	1.071	4	3
EMAD =	1.052	4	4
EMAD =	1.084	4	5
EMAD =	1.064	4	6
EMAD =	1.100	4	7
EMAD =	1.132	4	8
EMAD =	1.155	4	9
EMAD =	1.685	5	1
EMAD =	1.452	5	2
EMAD =	1.578	5	3
EMAD =	1.530	5	4
EMAD =	1.581	5	5
EMAD =	1.528	5	6
EMAD =	1.589	5	7
EMAD =	1.622	5	8
EMAD =	1.634	5	9
EMAD =	2.213	6	1
EMAD =	1.972	6	2
EMAD =	2.143	6	3
EMAD =	2.071	6	4
EMAD =	2.120	6	5
EMAD =	2.095	6	6
EMAD =	2.111	6	7
EMAD =	2.163	6	8

EMAD =	2.212	6	9
EMAD =	2.934	7	1
EMAD =	2.786	7	2
EMAD =	2.[illegible]55	7	3
EMAD =	2.693	7	4
EMAD =	2.769	7	5
EMAD =	2.786	7	6
EMAD =	2.708	7	7
EMAD =	2.900	7	8
EMAD =	2.990	7	9
EMAD =	4.023	16	1
EMAD =	3.210	16	2
EMAD =	3.258	16	3
EMAD =	3.420	16	4
EMAD =	3.657	16	5
EMAD =	3.278	16	6
EMAD =	3.900	16	7
EMAD =	3.[illegible]87	16	8
EMAD =	3.746	16	9
EMAD =	6.214	17	1
EMAD =	3.752	17	2
EMAD =	4.211	17	3
EMAD =	4.376	17	4
EMAD =	5.043	17	5
EMAD =	3.999	17	6
EMAD =	5.674	17	7
EMAD =	5.776	17	8
EMAD =	5.449	17	9
EMAD =	5.928	18	1
EMAD =	5.579	18	2
EMAD =	5.507	18	3
EMAD =	5.677	18	4
EMAD =	5.755	18	5
EMAD =	5.741	18	6
EMAD =	5.772	18	7
EMAD =	5.388	18	8
EMAD =	5.978	18	9
EMAD =	6.416	19	1
EMAD =	6.097	19	2
EMAD =	6.306	19	3
EMAD =	6.187	19	4
EMAD =	6.258	19	5
EMAD =	6.245	19	6
EMAD =	6.274	19	7
EMAD =	6.380	19	8
EMAD =	6.462	19	9
EMAD =	6.736	20	1
EMAD =	6.536	20	2
EMAD =	6.667	20	3
EMAD =	6.992	20	4
EMAD =	6.637	20	5
EMAD =	6.629	20	6
EMAD =	6.647	20	7
EMAD =	6.713	20	8
EMAD =	6.764	20	9

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000

REGION: 49-STATE   12.5/12.5/12.5 MPH (5.0)   .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.68	11.90	48.17	5.86	13.76	8.65
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	80.65
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977   TEMP: 75.0(F)   1.000/ .000/ .000/ .000/ .000/ .000

REGION: 49-STATE   12.5/12.5/12.5 MPH (5.0)   .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.68	11.90	48.17	5.86	13.76	7.70
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	73.13
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	2.46

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 1 = .7460+01 GM/VEHICLE

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977   TEMP: .0(F)   .880/ .050/ .030/ .020/ .020/ .000

REGION: 49-STATE   25.0/25.0/25.0 MPH (5.0)   .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.69
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	42.44
EXHAUST NOX:	2.93	2.96	5.19	11.21	19.18	.12	3.49

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977   TEMP: 75.0(F)   1.000/ .000/ .000/ .000/ .000/ .000

REGION: 49-STATE   25.0/25.0/25.0 MPH (5.0)   .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.26
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.19	11.21	19.18	.12	2.93

```
                       CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:   1.66      1.94      3.52      4.05       .44      4.25       1.66
  IDLE  CO:  25.17     26.29     37.67     42.93       .93      8.96      25.17
  IDLE NOX:    .28       .24       .24       .03      1.04       .01        .28
--------------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION     1 PHASE     1 APPROACH     1 =      .2007+00 GM/VEHICLE/SEC
  Y(I) =    12.50 -156.25  -25.00  312.50 2604.17   50.00 -625.00-5208.3310416.67   12.50 -156.25 2604.17
  VOA =  1.0            HOA =   .0
       EMAD =          .685    2    1
       EMAD =          .355    2    2
       EMAD =          .360    2    3
       EMAD =          .127    2    4
       EMAD =          .228    2    5
       EMAD =          .021    2    6
       EMAD =          .352    2    7
       EMAD =          .347    2    8
       EMAD =          .387    2    9
       EMAD =          .649    4    1
       EMAD =          .516    4    2
       EMAD =          .426    4    3
       EMAD =          .445    4    4
       EMAD =          .478    4    5
       EMAD =          .458    4    6
       EMAD =          .493    4    7
       EMAD =          .461    4    8
       EMAD =          .434    4    9
       EMAD =         1.015    5    1
       EMAD =          .782    5    2
       EMAD =          .656    5    3
       EMAD =          .704    5    4
       EMAD =          .755    5    5
       EMAD =          .702    5    6
       EMAD =          .763    5    7
       EMAD =          .730    5    8
       EMAD =          .743    5    9
       EMAD =         1.322    6    1
       EMAD =         1.081    6    2
       EMAD =          .910    6    3
       EMAD =          .982    6    4
       EMAD =         1.031    6    5
       EMAD =         1.006    6    6
       EMAD =         1.021    6    7
       EMAD =          .969    6    8
       EMAD =         1.017    6    9
       EMAD =         1.739    7    1
       EMAD =         1.392    7    2
       EMAD =         1.123    7    3
       EMAD =         1.285    7    4
       EMAD =         1.360    7    5
       EMAD =         1.378    7    6
       EMAD =         1.380    7    7
       EMAD =         1.269    7    8
       EMAD =         1.350    7    9
       EMAD =         2.391   16    1
       EMAD =         1.579   16    2
       EMAD =         1.501   16    3
       EMAD =         1.309   16    4
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EMAD =    1.607   16   5
EMAD =    1.229   16   6
EMAD =    1.950   16   7
EMAD =    1.363   16   8
EMAD =    1.722   16   9
EMAD =    4.190   17   1
EMAD =    1.928   17   2
EMAD =    1.669   17   3
EMAD =    1.505   17   4
EMAD =    2.171   17   5
EMAD =    1.127   17   6
EMAD =    2.502   17   7
EMAD =    2.700   17   8
EMAD =    2.373   17   9
EMAD =    2.852   18   1
EMAD =    2.503   18   2
EMAD =    2.275   18   3
EMAD =    2.405   18   4
EMAD =    2.482   18   5
EMAD =    2.468   18   6
EMAD =    2.500   18   7
EMAD =    2.384   18   8
EMAD =    2.474   18   9
EMAD =    2.912   19   1
EMAD =    2.592   19   2
EMAD =    2.283   19   3
EMAD =    2.502   19   4
EMAD =    2.573   19   5
EMAD =    2.561   19   6
EMAD =    2.589   19   7
EMAD =    2.483   19   8
EMAD =    2.565   19   9
EMAD =    2.839   20   1
EMAD =    2.640   20   2
EMAD =    2.509   20   3
EMAD =    2.583   20   4
EMAD =    2.628   20   5
EMAD =    2.620   20   6
EMAD =    2.638   20   7
EMAD =    2.571   20   8
EMAD =    2.623   20   9
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC.
CAL. YEAR: 1977     TEMP:   .0(F)             .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE    12.5/12.5/12.5 MPH ( 5.0)             .0/   .0/   .0
```

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	7.70	8.68	11.90	48.17	5.36	13.76	8.65
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	73.13	78.42	98.59	424.90	46.00	44.13	80.65
EXHAUST NOX:	2.46	2.50	4.20	10.06	24.73	.11	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

```
                          VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977    TEMP: 75.0(F)      1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STAT.   12.5/12.5/12.5 MPH ( 5.0)        .0/    .0/    .0

                   COMPOSITE EMISSION FACTORS (GM/MILE)
              LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
 TOTAL HC:    7.70     [illegible].66    11.90    45.17    5.36     13.76      7.70
 EVAP HC:     3.02     2.22     3.10     2.92      .00     1.94      ----
XHAUST  CO:  73.17    7[illegible].42    [illegible]8.59   424.90    46.00    44.13     73.13
XHAUST NOX:   2.46     2.5[illegible]     4.23    10.06    24.73      .11      2.46

                   CORRECTED IDLE EMISSION FACTORS (GM/MIN)
 IDLE  HC:    1.66     1.94     3.52     4.05      .44     4.25      1.66
 IDLE  CO:   25.17    2[illegible].29    37.67    42.93      .93     8.96     25.17
 IDLE NOX:     .2[illegible]      .24      .24      .03     1.04      .01       .28
------------------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION   1 PHASE   1 APPROACH   2 =    .2892+01 GM/VEHICLE
   X(I) =   4.00  20.00  10.00  50.00 133.33  25.00 125.00 333.33 .833.33  4.00  20.00 133.33
   SOA =  1.0            HOA =   .0
        EMAD =       .219   2   1
        EMAD =       .177   2   2
        EMAD =       .219   2   3
        EMAD =       .236   2   4
        EMAD =       .241   2   5
        EMAD =       .138   2   6
        EMAD =       .204   2   7
        EMAD =       .204   2   8
        EMAD =       .200   2   9
        EMAD =       .316   4   1
        EMAD =       .298   4   2
        EMAD =       .334   4   3
        EMAD =       .331   4   4
        EMAD =       .333   4   5
        EMAD =       .327   4   6
        EMAD =       .330   4   7
        EMAD =       .332   4   8
        EMAD =       .334   4   9
        EMAD =       .504   5   1
        EMAD =       .474   5   2
        EMAD =       .524   5   3
        EMAD =       .517   5   4
        EMAD =       .519   5   5
        EMAD =       .493   5   6
        EMAD =       .505   5   7
        EMAD =       .507   5   8
        EMAD =       .503   5   9
        EMAD =       .694   6   1
        EMAD =       .663   6   2
        EMAD =       .731   6   3
        EMAD =       .720   6   4
        EMAD =       .722   6   5
        EMAD =       .709   6   6
        EMAD =       .713   6   7
        EMAD =       .716   6   8
        EMAD =       .720   6   9
        EMAD =       .951   7   1
        EMAD =       .906   7   2
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EMAD =	1.014	7	3
EMAD =	.988	7	4
EMAD =	.992	7	5
EMAD =	1.001	7	6
EMAD =	1.001	7	7
EMAD =	1.005	7	8
EMAD =	1.016	7	9
EMAD =	1.346	16	1
EMAD =	1.242	16	2
EMAD =	1.273	16	3
EMAD =	1.294	16	4
EMAD =	1.306	16	5
EMAD =	1.117	16	6
EMAD =	1.241	16	7
EMAD =	1.240	16	8
EMAD =	1.229	16	9
EMAD =	2.019	17	1
EMAD =	1.729	17	2
EMAD =	1.833	17	3
EMAD =	1.859	17	4
EMAD =	1.894	17	5
EMAD =	1.872	17	6
EMAD =	1.707	17	7
EMAD =	1.713	17	8
EMAD =	1.687	17	9
EMAD =	1.840	18	1
EMAD =	1.796	18	2
EMAD =	1.887	18	3
EMAD =	1.866	18	4
EMAD =	1.870	18	5
EMAD =	1.863	18	6
EMAD =	1.869	18	7
EMAD =	1.877	18	8
EMAD =	1.884	18	9
EMAD =	2.024	19	1
EMAD =	1.983	19	2
EMAD =	2.067	19	3
EMAD =	2.048	19	4
EMAD =	2.052	19	5
EMAD =	2.045	19	6
EMAD =	2.051	19	7
EMAD =	2.058	19	8
EMAD =	2.064	19	9
EMAD =	2.152	20	1
EMAD =	2.126	20	2
EMAD =	2.179	20	3
EMAD =	2.167	20	4
EMAD =	2.169	20	5
EMAD =	2.165	20	6
EMAD =	2.169	20	7
EMAD =	2.173	20	8
EMAD =	2.177	20	9

```
                                     VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977     TEMP:   .0(F)              .380/  .050/  .030/  .020/  .020/  .000
REGION: 49-STATE     5.0/ 5.0/ 5.0 MPH ( 5.0)                .0/    .0/    .0
```

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	17.27
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	158.82	199.72	260.11	762.76	76.55	102.56	200.74
EXHAUST NOX:	2.50	2.58	4.65	9.37	32.37	.14	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 75.0(F)		1.000/	.000/	.000/	.000/	.000/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	158.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.56	4.65	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 1 APPROACH 2 = .2314+01 GM/VEHICLE

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: .0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	25.0/25.0/25.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.69
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	42.44
EXHAUST NOX:	2.93	2.96	5.15	11.21	19.18	.12	3.49

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 75.0(F)		1.000/	.000/	.000/	.000/	.000/	.000
REGION: 49-STATE	25.0/25.0/25.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	8.93	5.26
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.15	11.21	19.18	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66

```
IDLE CO:  25.17    26.29    37.67    42.93     .93     8.96     25.17
IDLE NOX:   .25      .24      .14      .03    1.04      .01       .28
--------------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION    1 PHASE    1 APPROACH    2 =      .2007+00 GM/VEHICLE/SEC
   X(I) =   10.00 -100.00  -20.00  200.00 1333.33   40.00 -400.00-2666.67 5333.33   10.00 -100.00 1333.33
   SOA =   1.0          HOA =   .0
        EMAD =        .545    2    1
        EMAD =        .737    2    2
        EMAD =        .261    2    3
        EMAD =        .176    2    4
        EMAD =        .227    2    5
        EMAD =        .062    2    6
        EMAD =        .274    2    7
        EMAD =        .271    2    8
        EMAD =        .240    2    9
        EMAD =        .530    4    1
        EMAD =        .445    4    2
        EMAD =        .373    4    3
        EMAD =        .385    4    4
        EMAD =        .402    4    5
        EMAD =        .386    4    6
        EMAD =        .409    4    7
        EMAD =        .393    4    8
        EMAD =        .404    4    9
        EMAD =        .829    5    1
        EMAD =        .680    5    2
        EMAD =        .579    5    3
        EMAD =        .610    5    4
        EMAD =        .636    5    5
        EMAD =        .594    5    6
        EMAD =        .633    5    7
        EMAD =        .616    5    8
        EMAD =        .622    5    9
        EMAD =       1.086    6    1
        EMAD =        .931    6    2
        EMAD =        .794    6    3
        EMAD =        .841    6    4
        EMAD =        .866    6    5
        EMAD =        .945    6    6
        EMAD =        .855    6    7
        EMAD =        .929    6    8
        EMAD =        .953    6    9
        EMAD =       1.431    7    1
        EMAD =       1.209    7    2
        EMAD =        .994    7    3
        EMAD =       1.097    7    4
        EMAD =       1.136    7    5
        EMAD =       1.150    7    6
        EMAD =       1.151    7    7
        EMAD =       1.094    7    8
        EMAD =       1.140    7    9
        EMAD =       1.966   16    1
        EMAD =       1.447   16    2
        EMAD =       1.385   16    3
        EMAD =       1.300   16    4
        EMAD =       1.422   16    5
        EMAD =       1.119   16    6
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EMAD	=	1.517	16	7
EMAD	=	1.524	16	8
EMAD	=	1.451	16	9
EMAD	=	3.426	17	1
EMAD	=	1.978	17	2
EMAD	=	1.771	17	3
EMAD	=	1.666	17	4
EMAD	=	2.007	17	5
EMAD	=	1.172	17	6
EMAD	=	2.344	17	7
EMAD	=	2.192	17	8
EMAD	=	2.024	17	9
EMAD	=	2.407	18	1
EMAD	=	2.154	18	2
EMAD	=	2.301	18	3
EMAD	=	2.084	18	4
EMAD	=	2.124	18	5
EMAD	=	2.113	18	6
EMAD	=	2.133	18	7
EMAD	=	2.074	18	8
EMAD	=	2.120	18	9
EMAD	=	2.470	19	1
EMAD	=	2.266	19	2
EMAD	=	2.099	19	3
EMAD	=	2.175	19	4
EMAD	=	2.211	19	5
EMAD	=	2.201	19	6
EMAD	=	2.219	19	7
EMAD	=	2.165	19	8
EMAD	=	2.207	19	9
EMAD	=	2.426	20	1
EMAD	=	2.298	20	2
EMAD	=	2.194	20	3
EMAD	=	2.241	20	4
EMAD	=	2.264	20	5
EMAD	=	2.258	20	6
EMAD	=	2.269	20	7
EMAD	=	2.235	20	8
EMAD	=	2.262	20	9

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000

REGION: 49-STATE 10.0/10.0/10.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.01	10.16	13.85	59.23	6.51	16.42	10.17
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	91.91	99.18	125.05	509.02	53.96	54.09	100.80
EXHAUST NOX:	2.47	2.46	4.20	9.83	26.79	.12	3.12

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	24.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000

REGION: 49-STATE 10.0/10.0/10.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	9.01	10.16	13.85	59.23	6.51	16.42	9.01
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	91.91	98.12	125.05	509.02	53.96	54.09	91.91
EXHAUST NOX:	2.43	2.48	4.20	9.83	26.79	.12	2.43

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

DECELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 1 = .2480+01 GM/VEHICLE

X(I) = 5.00 25.00 10.00 50.00 166.67 20.00 100.00 333.33 666.67 5.00 25.00 166.67

SOA = 1.0 HOA = .0

EMAD =	.274	2	1
EMAD =	.221	2	2
EMAD =	.259	2	3
EMAD =	.280	2	4
EMAD =	.287	2	5
EMAD =	.204	2	6
EMAD =	.257	2	7
EMAD =	.257	2	8
EMAD =	.253	2	9
EMAD =	.398	4	1
EMAD =	.377	4	2
EMAD =	.413	4	3
EMAD =	.410	4	4
EMAD =	.412	4	5
EMAD =	.404	4	6
EMAD =	.410	4	7
EMAD =	.412	4	8
EMAD =	.413	4	9
EMAD =	.625	5	1
EMAD =	.588	5	2
EMAD =	.638	5	3
EMAD =	.631	5	4
EMAD =	.634	5	5
EMAD =	.613	5	6
EMAD =	.623	5	7
EMAD =	.625	5	8
EMAD =	.626	5	9
EMAD =	.857	6	1
EMAD =	.819	6	2
EMAD =	.587	6	3
EMAD =	.576	6	4
EMAD =	.579	6	5
EMAD =	.869	6	6
EMAD =	.571	6	7
EMAD =	.575	6	8
EMAD =	.878	6	9
EMAD =	1.166	7	1
EMAD =	1.111	7	2
EMAD =	1.218	7	3
EMAD =	1.192	7	4

EMAD =	1.197	7	5
EMAD =	1.204	7	6
EMAD =	1.205	7	7
EMAD =	1.212	7	8
EMAD =	1.215	7	9
EMAD =	1.631	16	1
EMAD =	1.501	16	2
EMAD =	1.532	16	3
EMAD =	1.553	16	4
EMAD =	1.565	16	5
EMAD =	1.417	16	6
EMAD =	1.516	16	7
EMAD =	1.515	16	8
EMAD =	1.506	16	9
EMAD =	2.494	17	1
EMAD =	2.132	17	2
EMAD =	2.239	17	3
EMAD =	2.262	17	4
EMAD =	2.304	17	5
EMAD =	1.987	17	6
EMAD =	2.155	17	7
EMAD =	2.161	17	8
EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.488	19	2
EMAD =	2.572	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.590	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: .0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	5.0/ 5.0/ 5.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.59	94.99	8.19	29.24	17.27

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	200.74
EXHAUST NOX:	2.50	2.58	4.65	9.37	32.37	.14	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 5.0/ 5.0/ 5.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	3.19	29.24	15.49
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	188.82
EXHAUST NOX:	2.50	2.58	4.65	9.37	32.37	.14	2.50

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

ACCELERATION EMISSIONS FOR INTERSECTION 1 PHASE 2 APPROACH 1 = .2867+01 GM/VEHICLE

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.98	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

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CRUISE EMISSIONS FOR INTERSECTION     1 PHASE     2 APPROACH     1 =        .2116+00 GM/VEHICLE/SEC
   V(I) =    10.00 -100.00  -20.00  200.00 1333.33   40.00 -400.00-2666.67 5333.33   10.00 -100.00 1333.33
    DA =   1.0             HOA =    .0
        EMAD =          .548    2    1
        EMAD =          .337    2    2
        EMAD =          .261    2    3
        EMAD =          .176    2    4
        EMAD =          .227    2    5
        EMAD =          .262    2    6
        EMAD =          .274    2    7
        EMAD =          .271    2    8
        EMAD =          .240    2    9
        EMAD =          .530    4    1
        EMAD =          .445    4    2
        EMAD =          .373    4    3
        EMAD =          .365    4    4
        EMAD =          .402    4    5
        EMAD =          .386    4    6
        EMAD =          .409    4    7
        EMAD =          .397    4    8
        EMAD =          .404    4    9
        EMAD =          .529    5    1
        EMAD =          .680    5    2
        EMAD =          .579    5    3
        EMAD =          .610    5    4
        EMAD =          .636    5    5
        EMAD =          .594    5    6
        EMAD =          .633    5    7
        EMAD =          .616    5    8
        EMAD =          .622    5    9
        EMAD =         1.086    6    1
        EMAD =          .931    6    2
        EMAD =          .794    6    3
        EMAD =          .841    6    4
        EMAD =          .866    6    5
        EMAD =          .845    6    6
        EMAD =          .855    6    7
        EMAD =          .829    6    8
        EMAD =          .853    6    9
        EMAD =         1.431    7    1
        EMAD =         1.209    7    2
        EMAD =          .994    7    3
        EMAD =         1.097    7    4
        EMAD =         1.136    7    5
        EMAD =         1.150    7    6
        EMAD =         1.151    7    7
        EMAD =         1.094    7    8
        EMAD =         1.140    7    9
        EMAD =         1.366   16    1
        EMAD =         1.447   16    2
        EMAD =         1.385   16    3
        EMAD =         1.300   16    4
        EMAD =         1.422   16    5
        EMAD =         1.119   16    6
        EMAD =         1.517   16    7
        EMAD =         1.524   16    8
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        EMAD =        1.451    16    9
        EMAD =        3.426    17    1
        EMAD =        1.375    17    2
        EMAD =        1.771    17    3
        EMAD =        1.466    17    4
        EMAD =        2.007    17    5
        EMAD =        1.172    17    6
        EMAD =        2.244    17    7
        EMAD =        2.192    17    8
        EMAD =        2.224    17    9
        EMAD =        2.407    18    1
        EMAD =        2.154    18    2
        EMAD =        2.001    18    3
        EMAD =        2.084    18    4
        EMAD =        2.124    18    5
        EMAD =        2.113    18    6
        EMAD =        2.133    18    7
        EMAD =        2.074    18    8
        EMAD =        2.120    18    9
        EMAD =        2.470    19    1
        EMAD =        2.266    19    2
        EMAD =        2.399    19    3
        EMAD =        2.175    19    4
        EMAD =        2.211    19    5
        EMAD =        2.201    19    6
        EMAD =        2.219    19    7
        EMAD =        2.165    19    8
        EMAD =        2.207    19    9
        EMAD =        2.426    20    1
        EMAD =        2.295    20    2
        EMAD =        2.194    20    3
        EMAD =        2.241    20    4
        EMAD =        2.264    20    5
        EMAD =        2.258    20    6
        EMAD =        2.269    20    7
        EMAD =        2.235    20    8
        EMAD =        2.262    20    9
                                 VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977     TEMP:   .0(F)          .880/ .050/ .030/ .020/ .020/ .000
 REGION: 49-STATE    10.0/10.0/10.0 MPH ( 5.0)           .0/   .0/   .0

                         COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV       LDT1      LDT2      HDG       HDD       MC       ALL MODES
   TOTAL HC:    9.01     10.16     13.85     59.23      6.51     16.42       10.17
   *EVAP HC:    2.02      2.22      3.10      2.92       .00      1.94        ----
 EXHAUST  CO:  91.91     95.18    125.05    509.02     53.96     54.09      100.80
 EXHAUST NOX:   2.43      2.48      4.20      9.83     26.79       .12        3.12

                         CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:    1.66      1.94      3.52      4.05       .44      4.25        1.75
   IDLE  CO:   25.17     26.29     37.67     42.93       .93      8.96       25.47
   IDLE NOX:     .25       .24       .24       .03      1.04       .01         .29
-------------------------------------------------------------------------------------
                                 VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1977     TEMP: 75.0(F)         1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE    10.0/10.0/10.0 MPH ( 5.0)           .0/   .0/   .0
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                          COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
  TOTAL HC:     9.01     1[illegible].1[illegible]     13.[illegible]5     59.23      6.51     16.42       9.01
  EVAP HC.      [illegible].02     [illegible].2[illegible]      3.1[illegible]      2.92       .00      1.94       ----
XHAUST CO:     91.91     9[illegible].1[illegible]    135.05    509.02     53.96     54.09      91.91
XHAUST NOX:     2.47     2.46      4.2[illegible]      9.83     26.79       .12       2.43

                          CORRECTED IDLE EMISSION FACTORS (GM/MIN)
  IDLE  HC:     1.6[illegible]      1.54      3.52      4.05       .44      4.25       1.66
  IDLE  CO:    25.17     2[illegible].2[illegible]     27.67     42.93       .93      [illegible].96      25.17
  IDLE NOX:      .[illegible]       .24       .24       .0[illegible]      1.04       .01        .28
-------------------------------------------------------------------------------------
DECELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    2 =       .2480+01 GM/VEHICLE
    V(I) =    5.00   25.00   10.00   50.00  166.67   20.00  100.00  333.33  666.67    5.00   25.00  166.67
    SOA =  1.            HOA =   .0
        EMAD =        .274    2    1
        EMAD =        .[illegible]21    2    2
        EMAD =        .259    2    3
        EMAD =        .280    2    4
        EMAD =        .287    2    5
        EMAD =        .[illegible]04    2    6
        EMAD =        .257    2    7
        EMAD =        .257    2    8
        EMAD =        .253    2    9
        EMAD =        .[illegible]98    4    1
        EMAD =        .377    4    2
        EMAD =        .413    4    3
        EMAD =        .410    4    4
        EMAD =        .412    4    5
        EMAD =        .404    4    6
        EMAD =        .410    4    7
        EMAD =        .412    4    8
        EMAD =        .413    4    9
        EMAD =        .625    5    1
        EMAD =        .598    5    2
        EMAD =        .638    5    3
        EMAD =        .631    5    4
        EMAD =        .634    5    5
        EMAD =        .613    5    6
        EMAD =        .623    5    7
        EMAD =        .625    5    8
        EMAD =        .626    5    9
        EMAD =        .[illegible]57    6    1
        EMAD =        .[illegible]19    6    2
        EMAD =        .[illegible]87    6    3
        EMAD =        .[illegible]76    6    4
        EMAD =        .[illegible]79    6    5
        EMAD =        .[illegible]69    6    6
        EMAD =        .[illegible]71    6    7
        EMAD =        .[illegible]75    6    8
        EMAD =        .[illegible]7[illegible]    6    9
        EMAD =       1.[illegible]66    7    1
        EMAD =       1.111    7    2
        EMAD =       1.[illegible]1[illegible]    7    3
        EMAD =       1.192    7    4
        EMAD =       1.1[illegible]7    7    5
        EMAD =       1.[illegible]0[illegible]    7    6
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EMAD =	1.205	7	7
EMAD =	1.212	7	8
EMAD =	1.215	7	9
EMAD =	1.631	16	1
EMAD =	1.501	16	2
EMAD =	1.532	16	3
EMAD =	1.553	16	4
EMAD =	1.561	16	5
EMAD =	1.417	16	6
EMAD =	1.516	16	7
EMAD =	1.515	16	8
EMAD =	1.506	16	9
EMAD =	2.494	17	1
EMAD =	2.132	17	2
EMAD =	2.235	17	3
EMAD =	2.262	17	4
EMAD =	2.304	17	5
EMAD =	1.887	17	6
EMAD =	2.155	17	7
EMAD =	2.161	17	8
EMAD =	2.140	17	9
EMAD =	2.332	18	1
EMAD =	2.276	18	2
EMAD =	2.367	18	3
EMAD =	2.347	18	4
EMAD =	2.352	18	5
EMAD =	2.346	18	6
EMAD =	2.351	18	7
EMAD =	2.358	18	8
EMAD =	2.364	18	9
EMAD =	2.539	19	1
EMAD =	2.488	19	2
EMAD =	2.372	19	3
EMAD =	2.553	19	4
EMAD =	2.557	19	5
EMAD =	2.552	19	6
EMAD =	2.557	19	7
EMAD =	2.564	19	8
EMAD =	2.569	19	9
EMAD =	2.679	20	1
EMAD =	2.647	20	2
EMAD =	2.699	20	3
EMAD =	2.687	20	4
EMAD =	2.690	20	5
EMAD =	2.687	20	6
EMAD =	2.690	20	7
EMAD =	2.694	20	8
EMAD =	2.697	20	9

```
                                          VEH. TYPE:   LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977     TEMP:    .0(F)                    .880/  .050/  .030/  .020/  .020/  .000
REGION: 49-STATE    5.0/ 5.0/ 5.0 MPH ( 5.0)                         .0/    .0/    .0
```

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	15.49	17.47	23.50	94.99	8.19	29.24	17.27
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	188.82	199.72	260.11	762.76	76.55	102.56	200.74

```
EXHAUST NOX:   2.50     2.56     4.65     9.37    32.37      .14      3.30

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66     1.94     3.52     4.05      .44     4.25      1.75
   IDLE  CO:  25.17    26.29    37.67    42.93      .93     8.96     25.47
   IDLE NOX:    .28      .24      .24      .03     1.04      .01       .29
------------------------------------------------------------------------------
                            VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977     TEMP: 75.0(F)      1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE    5.0/ 5.0/ 5.0 MPH ( 5.0)             .0/    .0/    .0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2      HDG      HDD       MC    ALL MODES
  TOTAL HC:   15.49    17.47    23.55    94.99     8.19    29.24     15.49
  *EVAP HC:    2.02     2.22     3.10     2.92      .00     1.94      ----
EXHAUST CO:  188.82   199.72   260.11   762.76    76.55   102.56    188.82
EXHAUST NOX:   2.50     2.56     4.65     9.37    32.37      .14      2.50

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66     1.94     3.52     4.05      .44     4.25      1.66
   IDLE  CO:  25.17    26.29    37.67    42.93      .93     8.96     25.17
   IDLE NOX:    .28      .24      .24      .03     1.04      .01       .28
------------------------------------------------------------------------------
ACCELERATION EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    2 =       .2867+01 GM/VEHICLE
                            VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977     TEMP:  .0(F)        .880/ .050/ .030/ .020/ .020/ .000
REGION: 49-STATE    20.0/20.0/20.0 MPH ( 5.0)            .0/    .0/    .0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2      HDG      HDD       MC    ALL MODES
  TOTAL HC:    5.89     6.62     9.24    28.76     4.42    10.10      6.45
  *EVAP HC:    2.02     2.22     3.10     2.92      .00     1.94      ----
EXHAUST CO:   47.49    51.42    62.95   268.72    30.27    30.45     52.23
EXHAUST NOX:   2.72     2.75     4.65    10.75    20.62      .12      3.30

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66     1.94     3.52     4.05      .44     4.25      1.75
   IDLE  CO:  25.17    26.29    37.67    42.93      .93     8.96     25.47
   IDLE NOX:    .28      .24      .24      .03     1.04      .01       .29
------------------------------------------------------------------------------
                            VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
CAL. YEAR: 1977     TEMP: 75.0(F)      1.000/ .000/ .000/ .000/ .000/ .000
REGION: 49-STATE    20.0/20.0/20.0 MPH ( 5.0)            .0/    .0/    .0

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                LDV     LDT1     LDT2      HDG      HDD       MC    ALL MODES
  TOTAL HC:    5.89     6.62     9.24    28.76     4.42    10.10      5.88
  *EVAP HC:    2.02     2.22     3.10     2.92      .00     1.94      ----
EXHAUST CO:   47.49    51.42    62.95   268.72    30.27    30.45     47.49
EXHAUST NOX:   2.72     2.75     4.65    10.75    20.62      .12      2.72

                      CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66     1.94     3.52     4.05      .44     4.25      1.66
   IDLE  CO:  25.17    26.29    37.67    42.93      .93     8.96     25.17
   IDLE NOX:    .28      .24      .24      .03     1.04      .01       .28
------------------------------------------------------------------------------
CRUISE EMISSIONS FOR INTERSECTION    1 PHASE    2 APPROACH    2 =       .2116+00 GM/VEHICLE/SEC
```

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: .0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	20.0/20.0/20.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 75.0(F)		1.000/	.000/	.000/	.000/	.000/	.000
REGION: 49-STATE	20.0/20.0/20.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

FOR LINK 5 (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2116+00 GM/VEHICLE/SEC

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: .0(F)		.880/	.050/	.030/	.020/	.020/	.000
REGION: 49-STATE	25.0/25.0/25.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.26	22.01	3.77	8.93	5.69
*EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	42.44
EXHAUST NOX:	2.97	2.96	5.18	11.21	19.18	.12	3.49

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.29

		VEH. TYPE:	LDV	LDT1	LDT2	HDG	HDD	MC
CAL. YEAR: 1977	TEMP: 75.0(F)		1.000/	.000/	.000/	.000/	.000/	.000
REGION: 49-STATE	25.0/25.0/25.0 MPH (5.0)				.0/	.0/	.0	

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.26	5.91	8.36	22.01	3.77	3.93	5.26
EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	38.71	42.16	51.56	211.97	24.05	25.98	38.71
EXHAUST NOX:	2.93	2.96	5.15	11.21	19.18	.12	2.93

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.28	.24	.24	.03	1.04	.01	.28

FOR LINK (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2007+00 GM/VEHICLE/SEC

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000

REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	6.45
EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.75
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.47
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.29

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 1.000/ .000/ .000/ .000/ .000/ .000

REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.88	6.62	9.24	28.76	4.42	10.10	5.88
EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	47.49
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	2.72

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
IDLE HC:	1.66	1.94	3.52	4.05	.44	4.25	1.66
IDLE CO:	25.17	26.29	37.67	42.93	.93	8.96	25.17
IDLE NOX:	.29	.24	.24	.03	1.04	.01	.28

FOR LINK (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE= .2116+00 GM/VEHICLE/SEC

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: .0(F) .880/ .050/ .030/ .020/ .020/ .000

REGION: 49-STATE 20.0/20.0/20.0 MPH (5.0) .0/ .0/ .0

COMPOSITE EMISSION FACTORS (GM/MILE)

	LDV	LDT1	LDT2	HDG	HDD	MC	ALL MODES
TOTAL HC:	5.89	6.62	9.24	28.76	4.42	10.10	6.45
EVAP HC:	2.02	2.22	3.10	2.92	.00	1.94	----
EXHAUST CO:	47.49	51.42	62.95	268.72	30.27	30.45	52.23
EXHAUST NOX:	2.72	2.75	4.69	10.75	20.62	.12	3.30

CORRECTED IDLE EMISSION FACTORS (GM/MIN)

```
   IDLE  HC:   1.66      1.94      3.52      4.05       .44      4.25       1.75
   IDLE  CO:  25.17     26.29     37.67     42.93       .93      8.96      25.47
   IDLE NOX:    .29       .24       .24       .03      1.04       .01        .29
----------------------------------------------------------------------------------
                              VEH. TYPE:  LDV    LDT1   LDT2   HDG    HDD    MC
 CAL. YEAR: 1977     TEMP: 75.0(F)       1.000/ .000/ .000/ .000/ .000/ .000
 REGION: 49-STATE    20.0/20.0/20.0 MPH ( 5.0)             .0/    .0/    .0

                         COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV       LDT1      LDT2      HDG       HDD       MC      ALL MODES
   TOTAL HC:   5.89      6.62      9.24     28.76      4.42     10.10       5.88
   *EVAP HC:   2.02      2.22      3.10      2.92       .00      1.94       ----
EXHAUST  CO:  47.49     51.42     62.95    268.72     30.27     30.45      47.49
EXHAUST NOX:   2.72      2.75      4.09     10.75     20.62       .12       2.72

                         CORRECTED IDLE EMISSION FACTORS (GM/MIN)
   IDLE  HC:   1.66      1.94      3.52      4.05       .44      4.25       1.66
   IDLE  CO:  25.17     26.29     37.67     42.93       .93      8.96      25.17
   IDLE NOX:    .28       .24       .24       .03      1.04       .01        .28
----------------------------------------------------------------------------------
FOR LINK    . (NOT APPROACHING AN INTERSECTION)---CRUISE EMISSION RATE=       .2116+00 GM/VEHICLE/SEC
I=    1 J=     1 INS=    1 VOL=        .1000+03 CS=         .2100+04 ISIG=     1
QLENTH=       .6509+01 DELAY=        .9419+01 NPHASE=    2
GAP=        .0 LINK=     1 NGND=     0 CY=      26.47 G=       6.62
I=    2 J=     1 INS=    1 VOL=        .5000+02 CS=         .1800+04 ISIG=     1
QLENTH=       .5419+01 DELAY=        .9509+01 NPHASE=    2
GAP=        .0 LINK=     2 NGND=     0 CY=      26.47 G=       6.62
I=    1 J=     2 INS=    1 VOL=        .1000+03 CS=         .1200+04 ISIG=     1
QLENTH=       .4577+01 DELAY=        .4372+01 NPHASE=    2
GAP=        .0 LINK=     3 NGND=     0 CY=      26.47 G=      13.84
I=    2 J=     2 INS=    1 VOL=        .1000+03 CS=         .1200+04 ISIG=     1
QLENTH=       .4577+01 DELAY=        .4372+01 NPHASE=    2
GAP=        .0 LINK=     4 NGND=     0 CY=      26.47 G=      13.84


INTERSECTION=     1 PHASE=     1 APPROACH=     1 LINK=     1 LANE=      1
EMISSION RATE=         .4997-03 GM/METER/SEC
INTERSECTION=     1 PHASE=     1 APPROACH=     1 LINK(PSEUDOLINK)=     9 LANE=     1
EMISSION RATE=         .1718-02 GM/METER/SEC
INTERSECTION=     1 PHASE=     1 APPROACH=     1 LINK=     1 LANE=      2
EMISSION RATE=         .4987-03 GM/METER/SEC
INTERSECTION=     1 PHASE=     1 APPROACH=     1 LINK(PSEUDOLINK)=     9 LANE=     2
EMISSION RATE=         .1718-02 GM/METER/SEC
INTERSECTION=     1 PHASE=     1 APPROACH=     2 LINK=     2 LANE=      1
EMISSION RATE=         .3990-03 GM/METER/SEC
INTERSECTION=     1 PHASE=     1 APPROACH=     2 LINK(PSEUDOLINK)=    10 LANE=     1
EMISSION RATE=         .2494-01 GM/METER/SEC
INTERSECTION=     1 PHASE=     1 APPROACH=     2 LINK=     2 LANE=      2
EMISSION RATE=         .3990-03 GM/METER/SEC
INTERSECTION=     1 PHASE=     1 APPROACH=     2 LINK(PSEUDOLINK)=    10 LANE=     2
EMISSION RATE=         .2494-01 GM/METER/SEC
INTERSECTION=     1 PHASE=     2 APPROACH=     1 LINK=     3 LANE=      1
EMISSION RATE=         .6574-03 GM/METER/SEC
INTERSECTION=     1 PHASE=     2 APPROACH=     1 LINK(PSEUDOLINK)=    11 LANE=     1
EMISSION RATE=         .2264-02 GM/METER/SEC
INTERSECTION=     1 PHASE=     2 APPROACH=     2 LINK=     4 LANE=      1
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MI[illegible]ION RAT[illegible] .6524-0[illegible] GM/METER/SEC
INTERSECTION 1 PHASE [illegible] APPROACH= 2 LINK(PSEUDOLINK)= 12 LANE= 1
MI[illegible]ION RAT[illegible] .2[illegible]24-0[illegible] GM/METER/SEC

LINK(NOT APPROACHING INTERSECTION)= 5 LANE= 1 EMISSION RATE= .5259-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 5 LANE= 2 EMISSION RATE= .5259-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 6 LANE= 1 EMISSION RATE= .4798-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 6 LANE= 2 EMISSION RATE= .3192-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 7 LANE= 1 EMISSION RATE= .7889-03 GM/METER/SEC
LINK(NOT APPROACHING INTERSECTION)= 9 LANE= 1 EMISSION RATE= .7889-03 GM/METER/SEC

CONTRIBUTION FROM LINK 1

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4[illegible]	1.9700	1.0000	0.	.000
1.5270	1.9600	1.0000	0.	.000
1.5270	1.9600	4.0000	0.	.000
1.4770	2.0200	1.0000	0.	.000
1.4770	1.9500	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 37.500 THETPP = -4.6
YLL = 42.500 THETPP = -5.0

CONTRIBUTION FROM LINK 2

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4870	1.9700	1.0000	0.	.000
1.5220	1.9800	1.0000	0.	.000
1.5270	1.9600	4.0000	0.	.000
1.4770	2.0200	1.0000	159.	.139
1.4770	1.9500	1.0000	12.	.010

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 16.250 THETPP = -90.0
YLL = 23.750 THETPP = -26.6

CONTRIBUTION FROM LINK 3

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4970	1.9700	1.0000	0.	.000
1.5270	1.9800	1.0000	0.	.000
1.5270	1.9600	4.0000	0.	.000
1.4720	2.0200	1.0000	0.	.000
1.4770	1.9[illegible]	1.0000	67.	.075

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 70.000 THETPP = -1.7
YLL = 70.000 THETPP =

STREET CANYON RECEPTOR 4 HOUR = 2 CONCENTRATION = .575+02 LINK = 3 LANE = 1
XLL = 10.000 THETPP = .6
XLL = 10.000 THETPP =

STREET CANYON RECEPTOR 5 HOUR = 2 CONCENTRATION = .361+02 LINK = 3 LANE = 1

CONTRIBUTION FROM LINK 4

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	22.	.019
1.5200	1.9800	1.0000	99.	.086
1.5200	1.9800	4.0000	50.	.043
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	1.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 10.000 THETPP = -11.3
XLL = 70.000 THETPP = 31.0

CONTRIBUTION FROM LINK 5

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	103.	.089
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 13.125 THETPP = -2.3
YLL = 31.875 THETPP = -2.5

CONTRIBUTION FROM LINK 6

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4800	1.9700	1.0000	15.	.013
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9800	4.0000	0.	.000
1.4700	2.0200	1.0000	114.	.099
1.4700	1.9800	1.0000	83.	.072

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 33.125 THETPP = -90.0
YLL = 41.875 THETPP = -45.0

CONTRIBUTION FROM LINK 7

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *

1.4600	1.9700	1.0000	0.	.000
1.5200	1.9600	1.0000	0.	.000
1.5200	1.9600	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	2.	.002

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 10.000 THETPP = -.6
XLL = 10.000 THETPP =

STREET CANYON RECEPTOR 4 HOUR = 2 CONCENTRATION = .183+03 LINK = 7 LANE = 1
XLL = 70.000 THETPP = 1.7
XLL = 70.000 THETPP =

STREET CANYON RECEPTOR 5 HOUR = 2 CONCENTRATION = .433+02 LINK = 7 LANE = 1

CONTRIBUTION FROM LINK 8

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4600	1.9700	1.0000	0.	.000
1.5200	1.9600	1.0000	164.	.142
1.5200	1.9600	4.0000	34.	.030
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9600	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 30.000 THETPP = -31.0
XLL = 10.000 THETPP = 11.3

CONTRIBUTION FROM LINK 9

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4600	1.9700	1.0000	1.	.001
1.5200	1.9800	1.0000	0.	.000
1.5200	1.9600	4.0000	0.	.000
1.4700	2.0200	1.0000	0.	.000
1.4700	1.9800	1.0000	0.	.000

* PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
XLL = 37.500 THETPP = -13.1
XLL = 42.500 THETPP = -16.9

CONTRIBUTION FROM LINK 10

RECEPTOR LOCATION X	Y	HEIGHT Z(M)	CONCENTRATION UGM/METER**3	PPM *
1.4600	1.9700	1.0000	3.	.003
1.5200	1.9600	1.0000	0.	.000
1.5200	1.9600	4.0000	0.	.000
1.4700	2.0200	1.0000	92.	.080
1.4700	1.9800	1.0000	404.	.352

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*  PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
        XLL =    10.250          THETPP =  -90.0
        XLL =    23.750          THETPP =  -26.6


            CONTRIBUTION FROM LINK 11

  RECEPTOR LOCATION       HEIGHT      CONCENTRATION
     X          Y           Z(M)      UGM/METER**3       PPM *
   1.4800     1.9700      1.0000           1.           .001
   1.5200     1.9800      1.0000           0.           .000
   1.5200     1.9600      4.0000           0.           .000
   1.4700     2.0200      1.0000           0.           .000
   1.4700     1.9800      1.0000         298.           .259

*  PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
        XLL =    30.000          THETPP =  -31.6
IR=     4 L=    11 XX=      1.470 YY=      2.020 X1=      1.421 Y1=      1.990 X2=      1.480 Y2=      1.990 IANS=     1
        XLL =    70.000          THETPP =

STREET CANYON RECEPTOR  4      HOUR =  2      CONCENTRATION =      .198+03      LINK =    11      LANE =    1
        XLL =    10.000          THETPP =   11.6
IR=     5 L=    11 XX=      1.470 YY=      1.980 X1=      1.421 Y1=      1.990 X2=      1.480 Y2=      1.990 IANS=     1
        XLL =    10.000          THETPP =

STREET CANYON RECEPTOR  5      HOUR =  2      CONCENTRATION =      .124+03      LINK =    11      LANE =    1


            CONTRIBUTION FROM LINK 12

  RECEPTOR LOCATION       HEIGHT      CONCENTRATION
     X          Y           Z(M)      UGM/METER**3       PPM *
   1.4800     1.9700      1.0000          77.           .067
   1.5200     1.9800      1.0000         341.           .297
   1.5200     1.9600      4.0000         171.           .149
   1.4700     2.0200      1.0000           0.           .000
   1.4700     1.9800      1.0000           2.           .002

*  PPM CONCENTRATIONS CORRECT FOR CARBON MONOXIDE ONLY.
        XLL =    10.000          THETPP =  -11.3
        XLL =    70.000          THETPP =   31.0


CONCENTRATION FOR HOUR    2 AT RECEPTOR    1 =        .1931+00 PPM
CONCENTRATION FOR HOUR    2 AT RECEPTOR    2 =        .5260+00 PPM
CONCENTRATION FOR HOUR    2 AT RECEPTOR    3 =        .2222+00 PPM
CONCENTRATION FOR HOUR    2 AT RECEPTOR    4 =        .6995+00 PPM
CONCENTRATION FOR HOUR    2 AT RECEPTOR    5 =        .6133+00 PPM
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NORMAL EXIT. EXECUTION TIME: 29652 MILLISECONDS.

WORKPT PRINT1

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-450/3-78-037	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Carbon Monoxide Hot Spot Guidelines Volume V: User's Manual For the Intersection Midblock Model - Version 2		5. REPORT DATE August 1978 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Frank Benesh		8. PERFORMING ORGANIZATION REPORT NO. GCA-TR-78-32-G(5)
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15. SUPPLEMENTARY NOTES

16. ABSTRACT

As an aid to the identification and analysis of carbon monoxide hot spot locations the Intersection-Midblock Model (IMM) has been developed for the calculation of hourly carbon monoxide concentrations at user specified locations near streets or intersections. The IMM calculates carbon monoxide emissions due to vehicle cruising, acceleration-deceleartion and idling by use of the EPA Modal Analysis Model. These emissions are then assigned to traffic links or portions of links based upon calculated intersection parameters such as cycle time, green time, queue length and delay time. After the emissions have been calculated and distributed among the individual lanes of each link, the EPA HIWAY Model is called to calculate carbon monoxide concentrations at each receptor location based upon input values of hourly wind speed, wind direction and atmospheric stability. If the street-building configuration, the wind speed and the atmospheric stability is such that a street canyon vortex will develop, the "Street Canyon Model" is used to calculate the concentration of a street oriented receptor.

This manual documents version 2 of the IMM (IMM-2). The principal changes from version 1 is the incorporation of the Motor Vehicle Emission Factors released in 1978 and the Modal Analysis Model coefficients and deterioration released in late 1977. Otherwise IMM-2 is substantially the same as the first version written by Victor Corbin and Michael T. Mills.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
	Air Quality Models Carbon Monoxide	

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