OAR Box 1219

Prepped by Ollie Stewart

Document Number:

198) IV-B-5

Docket Number:

A-91-46

A-91-46
IV-B-5

Data Regarding Driving Cycles

. . . .

Docket A-91-46
Number IV-B-5

RECEIVED
JAN - 9 1992
EPA AIR DOCKET

United States Environmental Protection Agency
Motor Vehicle Emission Laboratory
Ann Arbor, Michigan 48105

FAX TO
Dave Korhum

FAX NUMBER	PHONE NUMBER
	260 - 8891

LOCATION

FROM
LOIS PLATTE

FAX NUMBER	PHONE NUMBER
Canon Fax L020 FTS: 374-8368 COMMERCIAL: 313-668-4368	FTS: 374-8300 COMMERCIAL: 313-668-4300

DIVISION/BRANCH
TEST AND EVALUATION BRANCH

DATE	NUMBER OF PAGES INCLUDING THIS COVER SHEET
11-21-91	2

MESSAGE

Dave - there are 47 cars in the OCS (Oper. Char. Study).

— Lois

PAGE ___ OF ___ PAGES

National Purchase Diary Data

<ONEWAY OPTIONS=MARG% VAR=104>

Oneway Tabulations

% VMT on trips with avg spds >55mph

104.PCT55C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	
N= 1959	1484	282	100	31	22	23	8	5	3	1	Number of Vehicles
MARG%	75.8	14.4	5.1	1.6	1.1	1.2	.4	.3	.2	.1	% of Vehicles

Sum of these is % that has over 10% of VMT @ speeds > than

<ONEWAY OPTIONS=MARG% VAR=104>

Oneway Tabulations

% VMT on trips with avg spds > 45 mph

104.PCT45C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	90_100	
N= 1959	977	358	196	124	87	70	46	49	29	14	9	Number of vehicles
MARG%	49.9	18.3	10.0	6.3	4.4	3.6	2.3	2.5	1.5	.7	.5	% of Vehicles

Table 10.3.1

1979 GM-NPD Data
Percent VMT
10 Minute Engine Off Time

	Cycle	Bag	Distance (Miles)	N	(A) Percent	(B) Average Distance (miles)	(A)*(B)	Percent VMT
less than 16 mph	NYCC	1	≤ 1	5633	10.41	0.54	5.621	0.68
		2	2	9163	16.93	1.72	29.120	3.54
		3	3-4	1838	3.40	3.40	11.560	1.40
		4	5	923	1.71	4.41	7.541	0.92
		5	6	1093	2.02	5.75	11.615	1.41
		6	≥ 7	1302	2.41	13.61	32.800	3.98
								(11.93) ←
6 to 35mph	LA4	1	≤ 4	9826	18.15	2.35	42.653	5.18
		2	5- 8	9470	17.49	6.01	105.115	12.76
		3	9-11	2850	5.26	10.31	54.231	6.58
		4	12-15	2024	3.74	13.68	51.163	6.21
		5	16-18	779	1.44	17.31	24.926	3.03
		6	≥ 19	1670	3.09	32.31	99.838	12.12
								(45.88) ←
greater than 35mph	HFET		≤ 4	748	1.38	2.62	3.616	0.44
			5- 8	1222	2.26	6.25	14.125	1.71
			9-11	841	1.55	10.19	15.795	1.92
			12-15	1068	1.97	13.71	27.009	3.28
			16-18	572	1.06	17.39	18.433	2.24
			19-35	1734	3.20	25.98	83.136	10.09
			36-45	423	0.78	40.71	31.754	3.86
			≥ 46	953	1.75	87.78	153.615	18.65
								(42.19) ←
			Total:	54132	100.00		823.666	100.00

Table 10.3.2

CCS Data (Urban Only)
Percent VMT
10 Minute Engine Off Time

Cold	Distance (Miles)	N	(A) Percent	(B) Average Distance (miles)	(A)*(B)	Percent VMT
NoCC	< 1	283	20.20	0.32	6.464	1.41
	2	190	13.56	1.75	23.730	5.19
	3-4	32	2.28	3.42	7.798	1.70
	5	19	1.36	4.46	6.066	1.33
	6	19	1.36	5.84	7.942	1.74
	> 7	13	0.93	11.24	10.453	2.29
						(13.66)
Low	< 4	310	22.13	2.51	55.546	12.14
	8	321	22.91	5.87	134.482	29.40
	11	78	5.57	10.44	58.151	12.71
	15	53	3.78	13.57	51.295	11.21
	18	13	0.93	17.62	16.387	3.58
	19	13	0.93	22.17	20.618	4.51
						(73.55)
High	< 4	1	0.07	3.74	0.262	0.05
	8	9	0.64	7.17	4.586	1.00
	11	19	1.36	10.58	14.389	3.15
	15	14	1.00	13.26	13.260	2.90
	18	5	0.36	17.86	6.431	1.41
	35	8	0.57	28.76	16.391	3.58
	36	1	0.07	45.91	3.214	0.70
						(12.79)
	Total	1401	100.00		457.465	100.00

Table 10.3.3

Percent VMT
10 Minute Engine Off Time

Cycle	Bag	Distance (Miles)	1979 GM-NPD Data	OCS Data (Urban Only)	Adjusted
NYCC	1	≤ 1	0.68	1.41	0.78
	2	2	3.54	5.19	4.05
	3	3-4	1.40	1.70	1.60
	4	5	0.92	1.33	1.05
	5	6	1.41	1.74	1.61
	6	≥ 7	3.98	2.29	4.56
			(11.93)	(13.66)	(13.65)
LA4	1	≤ 4	5.18	12.14	8.30
	2	5-8	12.76	29.40	20.46
	3	9-11	6.58	12.71	10.55
	4	12-15	6.21	11.21	9.96
	5	16-18	3.03	3.58	4.86
	6	≥ 19	12.12	4.51	19.43
			(45.88)	(73.55)	(73.56)
HWY		≤ 4	0.44	0.05	0.14
		5-8	1.71	1.00	0.52
		9-11	1.92	3.15	0.58
		12-15	3.28	2.90	0.99
		16-18	2.24	1.41	0.68
		19-35	10.09	3.58	3.06
		36-45	3.86	0.70	1.17
		≥ 46	18.65	-	5.65
			(42.19)	(12.79)	(12.79)

Table 10.3.4

% VMT and Average Speed (mph)
Urban vs. Rural

Data* Source	Category	Urban Freeway	Urban Artery	Urban Local	Rural Freeway	Rural Artery	Rural Local
% VMT							
1	All Follows	14.27	52.49	5.32	18.99	7.53	1.41
	Urban-Rural	15.25	27.72	2.02	39.96	13.87	1.18
	Urban Follows	15.11	76.56	8.34			
2		18.40	27.50	13.40	8.90	15.70	16.00
3	Urban Only	12.79	73.55	13.66			
Average Speed (mph)							
1	All Follows	47.07	23.12	16.86	53.24	44.11	28.74
	Urban-Rural	50.60	27.05	18.09	52.57	44.31	20.82
	Urban Follows	44.74	22.26	16.66			
2		46.00	19.00	19.00	58.00	43.00	32.00 ?

W urban is 57 mph

*Data Source:

1: GM Chase-Car and CAPE-10 Study, "Development of Revised Light-Duty Vehicle Emission-Average Speed Relationships, August 1977 (EPA-460/3-77-011).

2: Highway Statistics, 1987, Federal Highway Administration.

3: OCS Data (Ref. 10.3).

Table 2

FHWA Modeled Roadway Speeds by Functional Class (1987)

Roadway Functional Classes	All autos, vans and pickups	All trucks
Rural - interstate	57.7 mph	43.2 mph
- other principal arterial	46.3	35.8
- minor arterial	40.5	33.1
- major collector	34.3	28.8
- minor collector	29.3	24.3
Urban - interstate	46.8	38.9
- other freeways and expwys	46.2	36.8
- other principal arterials	19.1	16.1
- minor arterial	19.2	16.1
- collector	19.5	16.2

Source: Federal Highway Administration, Highway Performance Monitoring System

SPEED DATA[1]

IN MILES PER HOUR

BASED ON STATE CERTIFICATION REPORTS FOR FISCAL YEAR 1987

TRAVEL MONITORING AND TRANSPORTATION SURVEYS DIVISION
OFFICE OF HIGHWAY INFORMATION MANAGEMENT

(OCTOBER 1986 - SEPTEMBER 1987)

TABLE VS-1
SEPTEMBER 1988

STATE	URBAN									RURAL									STATEWIDE		
	INTERSTATE			OTHER FREEWAYS AND EXPRESSWAYS			OTHER PRINCIPAL AND MINOR ARTERIALS			INTERSTATE			OTHER PRINCIPAL AND MINOR ARTERIALS			MAJOR COLLECTORS					
	AVERAGE	MEDIAN 2/	85TH PERCENTILE 3/	AVERAGE	MEDIAN 2/	85TH PERCENTILE 3/	AVERAGE	MEDIAN 2/	85TH PERCENTILE 3/	AVERAGE	MEDIAN 2/	85TH PERCENTILE 3/	AVERAGE	MEDIAN 2/	85TH PERCENTILE 3/	AVERAGE	MEDIAN 2/	85TH PERCENTILE 3/	AVERAGE	MEDIAN 2/	85TH PERCENTILE 3/
ALABAMA	59.2	56.1	66.6	(4/)	(4/)	(4/)	54.2	54.8	60.7	(4/)	(4/)	(4/)	56.1	56.0	62.9	54.6	54.8	61.1	56.3	55.3	62.9
ALASKA	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	59.8	58.5	64.2	(4/)	(4/)	(4/)	58.1	57.7	64.3	51.5	51.2	58.3	57.5	57.1	62.7
ARIZONA	55.4	56.0	61.9	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	59.2	58.7	65.1	55.8	55.0	62.4	57.7	57.5	63.1
ARKANSAS	57.6	57.7	65.2	[illegible]	[illegible]	[illegible]	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	57.2	56.7	62.9	55.1	55.5	62.2	59.8	59.1	63.1
CALIFORNIA	55.0	57.6	65.5	56.9	58.5	65.4	52.7	53.2	60.2	62.6	63.3	69.4	59.9	59.2	66.7	52.7	58.2	65.4	56.7	58.3	65.5
COLORADO	54.2	56.2	62.0	61.0	60.5	66.8	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	55.4	55.8	62.2	50.1	50.5	56.9	54.9	53.9	62.0
CONNECTICUT	56.2	56.7	63.8	56.2	56.1	63.0	(4/)	(4/)	(4/)	53.6	53.3	59.1	57.4	57.7	65.4	(4/)	(4/)	(4/)	55.8	53.9	61.1
DELAWARE	59.9	58.2	64.9	[illegible]	[illegible]	[illegible]	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	56.2	55.6	61.5	(4/)	(4/)	(4/)	57.4	56.9	62.9
DIST. OF COL.	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)
FLORIDA	59.0	58.6	65.9	(4/)	(4/)	(4/)	56.2	55.9	63.3	61.1	61.1	67.6	58.1	57.7	64.6	54.7	54.1	61.5	57.9	57.9	64.5
GEORGIA	60.7	61.4	68.4	57.7	58.7	65.5	51.6	53.8	60.8	60.6	61.5	71.2	53.3	54.0	62.6	51.9	52.0	60.3	56.3	57.4	65.3
HAWAII	58.6	58.5	65.7	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	51.3	51.5	58.7	52.1	52.6	58.8	55.0	55.2	62.3
IDAHO	59.8	59.8	65.6	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	60.0	60.6	66.0	53.0	53.6	59.7	50.7	56.5	63.0	55.1	56.0	62.1
ILLINOIS	56.4	57.2	65.0	56.5	56.4	62.4	53.8	53.7	59.5	(4/)	(4/)	(4/)	56.0	55.9	62.3	54.0	53.8	60.6	55.3	55.5	62.5
INDIANA	61.0	60.5	66.4	60.3	59.4	64.8	53.6	53.1	59.5	62.1	61.0	66.9	56.4	55.8	61.9	55.0	55.0	61.7	57.1	56.7	63.5
IOWA	55.4	55.8	60.7	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	55.8	55.9	61.2	55.1	55.1	62.1	55.6	55.7	61.4
KANSAS	58.5	59.2	65.2	57.6	57.8	64.9	56.4	57.4	62.7	(4/)	(4/)	(4/)	56.9	57.4	64.0	55.5	57.5	64.9	56.9	56.6	64.4
KENTUCKY	54.6	51.0	60.6	53.8	50.7	55.7	48.3	45.7	55.7	(4/)	(4/)	(4/)	54.5	50.9	60.6	45.9	45.8	55.3	51.3	48.9	58.3
LOUISIANA	58.7	58.9	64.9	(4/)	(4/)	(4/)	54.7	55.8	61.0	62.6	62.4	68.5	55.7	56.1	62.3	54.3	54.9	62.6	56.0	56.4	63.1
MAINE	59.9	60.8	67.0	57.8	58.1	64.3	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	56.0	56.6	60.8	55.2	55.5	62.5	55.1	55.5	62.0
MARYLAND	56.6	58.7	65.3	53.4	54.6	61.0	51.8	52.0	58.6	57.7	58.4	65.0	55.5	56.3	62.2	(2/)	(2/)	(2/)	56.0	57.3	63.7
MASSACHUSETTS	57.6	58.9	66.6	53.6	54.8	61.8	55.7	56.8	66.9	59.3	55.1	65.6	55.5	56.4	63.1	(5/)	(5/)	(5/)	57.1	58.2	65.7
MICHIGAN	62.6	63.3	70.4	59.5	60.1	65.7	57.6	58.6	65.2	63.4	63.8	70.5	55.5	56.0	62.4	54.4	55.3	61.0	58.1	58.8	65.1
MINNESOTA	58.0	57.6	62.4	57.6	58.7	63.9	57.0	58.5	67.8	(4/)	(4/)	(4/)	57.2	57.3	62.0	52.7	54.5	63.0	56.7	57.8	62.4
MISSISSIPPI	59.5	60.2	66.6	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	56.1	57.5	65.5	52.7	55.6	65.4	55.2	57.8	65.5
MISSOURI	58.8	59.1	65.5	54.5	54.9	61.7	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	56.8	57.6	63.8	53.2	52.7	62.1	56.2	56.9	63.7
MONTANA	57.5	58.0	64.1	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	57.1	58.2	65.9	52.2	49.9	60.0	56.2	56.7	64.8
NEBRASKA	59.1	59.4	64.4	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	57.8	57.9	62.1	56.7	57.8	63.3	57.2	57.6	62.6
NEVADA	57.6	58.2	64.5	56.5	57.8	63.7	54.4	54.6	60.6	59.7	61.0	67.8	58.2	59.0	65.9	55.8	56.0	63.4	57.3	57.9	64.7
NEW HAMPSHIRE	58.8	59.1	66.4	58.4	59.8	66.4	54.8	55.6	60.7	59.3	60.2	66.4	55.6	56.0	62.5	54.2	54.9	60.7	56.3	57.1	63.7
NEW JERSEY	57.7	57.8	63.9	56.9	56.0	61.3	54.1	53.6	60.2	54.9	53.8	60.5	54.1	53.5	60.3	(5/)	(5/)	(5/)	56.4	55.7	61.2
NEW MEXICO	59.5	59.3	70.8	(4/)	(4/)	(4/)	50.7	50.7	59.1	(4/)	(4/)	(4/)	52.8	52.6	61.1	57.6	58.5	68.3	54.8	54.9	64.0
NEW YORK	61.8	61.4	68.8	58.3	58.2	64.5	54.9	54.5	62.8	64.6	62.3	69.6	54.0	54.1	60.8	53.3	53.8	61.2	57.9	57.6	64.5
NORTH CAROLINA	56.8	57.1	63.3	(4/)	(4/)	(4/)	57.3	58.1	63.8	60.6	61.0	66.9	55.3	56.8	63.1	52.5	54.2	60.4	55.2	56.5	62.6
NORTH DAKOTA	57.9	58.3	64.2	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	58.2	59.0	64.8	57.9	59.1	66.3	58.1	58.9	65.1
OHIO	58.9	59.4	65.9	57.8	57.9	63.8	57.7	58.0	64.2	59.9	60.0	65.8	58.1	58.4	64.2	55.7	56.2	62.4	57.8	58.2	64.4
OKLAHOMA	56.6	57.8	63.0	56.2	57.8	63.0	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	56.9	57.0	63.0	56.8	57.0	63.0	56.8	57.0	63.0
OREGON	58.7	58.2	64.4	55.4	54.7	61.0	52.9	52.8	59.1	61.6	61.4	68.2	56.5	56.2	63.2	50.7	49.8	58.4	57.8	56.8	63.6
PENNSYLVANIA	59.6	60.3	66.8	58.2	58.8	65.9	48.7	49.2	58.2	60.3	60.2	68.6	53.8	54.2	60.6	54.3	54.8	63.1	56.1	56.7	63.9
RHODE ISLAND	57.0	57.2	64.8	56.3	56.3	63.9	(4/)	(4/)	(4/)	57.7	57.9	64.9	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	56.9	57.1	64.6
SOUTH CAROLINA	55.3	59.3	65.5	(4/)	(4/)	(4/)	49.1	49.8	56.2	(4/)	(4/)	(4/)	56.9	56.3	62.4	51.5	50.5	59.2	55.2	54.2	61.4
SOUTH DAKOTA	57.3	54.5	60.5	(4/)	(4/)	(4/)	53.8	54.8	57.9	61.3	58.9	65.3	57.6	55.2	61.3	54.2	51.6	58.7	56.9	54.5	60.8
TENNESSEE	58.4	59.2	66.2	(4/)	(4/)	(4/)	55.3	55.1	61.6	(4/)	(4/)	(4/)	55.3	55.2	62.1	45.9	44.7	53.4	55.3	55.1	62.2
TEXAS	56.4	56.4	63.6	56.5	56.0	63.8	53.0	54.2	61.4	(4/)	(4/)	(4/)	57.0	57.6	64.3	51.3	50.5	59.5	55.7	55.6	63.0
UTAH	59.2	54.5	60.8	54.1	50.0	56.5	52.3	52.8	59.2	(4/)	(4/)	(4/)	58.0	55.5	63.2	53.0	54.0	60.0	56.7	54.6	61.2
VERMONT	57.2	57.4	64.0	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	59.1	59.1	66.3	56.3	56.5	63.3	(4/)	(4/)	(4/)	57.0	57.2	64.0
VIRGINIA	53.8	56.0	63.0	55.0	55.0	61.0	51.1	51.0	58.0	59.0	59.0	65.0	51.4	53.0	60.0	47.9	49.0	57.0	53.0	54.2	61.8
WASHINGTON	57.7	58.4	63.9	57.2	57.9	63.4	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	52.2	52.6	59.2	57.8	58.1	66.7	55.6	56.2	62.2
WEST VIRGINIA	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	55.0	55.6	63.7	(4/)	(4/)	(4/)	53.0	54.8	60.9	46.1	46.2	55.6	51.0	51.7	59.6
WISCONSIN	57.9	58.3	64.3	58.0	58.6	63.7	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	58.3	58.2	63.6	50.2	52.0	60.4	56.5	57.0	63.0
WYOMING	60.6	59.8	68.3	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)	58.0	59.1	66.9	54.9	55.7	64.0	57.4	58.2	66.3
AVERAGE	58.0	58.0	64.8	56.8	56.9	63.4	54.0	54.1	60.7	59.7	59.7	66.5	55.9	56.1	62.8	53.4	53.7	61.3	56.1	56.3	63.2

1/ SPEED DATA ARE FOR ALL VEHICLES RATHER THAN FREE FLOWING VEHICLES AS IN VS-3 TABLES PRIOR TO 1980. DATA HAVE NOT BEEN ADJUSTED FOR SPEEDOMETER OR EQUIPMENT ERRORS. DATA IN THIS TABLE ARE ONLY FOR HIGHWAYS WITH A 55 MPH SPEED LIMIT.

2/ MEDIAN SPEED IS THE SPEED AT OR BELOW WHICH 50 PERCENT OF THE VEHICLES ARE TRAVELING.

3/ 85TH PERCENTILE SPEED IS THE SPEED AT OR BELOW WHICH 85 PERCENT OF THE VEHICLES ARE TRAVELING.

4/ NO MILEAGE IN THIS HIGHWAY CATEGORY WHERE THE 55 MPH SPEED LIMIT IS THE PRIMARY CONSTRAINT ON VEHICLE SPEEDS.

5/ MILEAGE REPORTED BUT NO SPEED DATA SUBMITTED.

6/ WILSON BRIDGE ONLY SECTION WITH 55 MPH SPEED LIMIT. MARYLAND MONITORS BEAR BRIDGE.

7/ FINAL MARYLAND DATA NOT AVAILABLE AT TIME OF PRINTING.

TABLE 2A

MEAN VALUES FOR URBAN ONLY TRIPS

CHARACTERISTIC	Engine Off Time☆ 0 MIN.	5 MIN.	10 MIN.	15 MIN.	20 MIN.
1. # of trips/day☆☆	6.6	5.4	4.7	4.3	3.9
2. Time since last trip (hrs)	3.3	4.0	4.6	5.1	5.5
3. Average trip speed (mph)	21.1	20.1	18.5	17.1	15.9
4. Ave. driving speed (mph)	28.8	28.8	28.8	28.8	28.8
5. Distance of trip (miles)	3.3	4.0	4.6	5.1	5.6
6. # of stops during trip	6.0	7.4	8.5	9.4	10.2
7. Distance btwn stops (miles)	0.55	0.55	0.55	0.55	0.55
8. Total time of trip (min)	9.3	12.0	15.1	18.0	21.0
9. Total time stopped (min)	2.5	3.6	5.4	7.3	9.4
10. Total time moving (min)	6.8	8.4	9.7	10.7	11.6
11. # of trips analyzed	1434	1158	1000	900	828
12. Hot start/cold start ratios					
a. 1 hr min for cold start	1.4	0.94	0.69	0.52	0.40
b. 4 hr min for cold start	3.5	2.7	2.2	1.9	1.7
c. 6 hr min for cold start	4.8	3.7	3.1	2.7	2.4
d. 8 hr min for cold start	5.2	4.1	3.4	3.0	2.7
e. 12 hr min for cold start	11.7	9.2	8.0	7.1	6.5

TABLE 2B

MEAN VALUES FOR URBAN AND/OR RURAL TRIPS

CHARACTERISTIC	Engine Off Time☆ 0 MIN.	5 MIN.	10 MIN.	15 MIN.	20 MIN.
1. # of trips/day	7.2	5.8	5.0	4.5	4.2
2. Time since last trip (hrs)	3.2	3.9	4.5	5.0	5.3
3. Average trip speed (mph)	25.1	23.8	22.2	20.6	19.3
4. Ave. driving speed (mph)	32.7	32.7	32.7	32.7	32.7
5. Distance of trip (miles)	4.4	5.5	6.3	7.0	7.5
6. # of stops during trip	6.0	7.5	8.6	9.5	10.3
7. Distance btwn stops (miles)	0.73	0.73	0.73	0.73	0.73
8. Total time of trip (min)	10.5	13.8	17.0	20.3	23.4
9. Total time stopped (min)	2.4	3.7	5.5	7.5	9.5
10. Total time moving (min)	8.1	10.0	11.5	12.8	13.8
11. # trips analyzed	1795	1443	1255	1131	1047
12. Hot start/cold start ratios					
a. 1 hr min for cold start	1.4	0.93	0.68	0.52	0.40
b. 4 hr min for cold start	3.7	2.7	2.3	1.9	1.7
c. 6 hr min for cold start	5.0	3.8	3.2	2.8	2.5
d. 8 hr min for cold start	5.4	4.1	3.5	3.0	2.7
e. 12 hr min for cold start	11.9	9.4	8.0	7.1	6.5

☆ Engine Off Time = the minimum time an engine off period must exceed before a trip is considered ended. Sequential operations with engine off periods less than or equal to these amounts were included in the same trip.

☆☆ For calculating this parameter, we have excluded all days where any non-urban trip occurred. (The 251 days was therefore reduced to 188 urban days.)

Figure 2

AVERAGE TRIP SPEED (0-64 mph) each X = 2 trips

URBAN TRIPS

LEFT-END	TOT%	COUNT	
0.	4.4	44	+XXXXXXXXXXXXXXXXXXXXXX
2.0000	2.2	22	+XXXXXXXXXXXX
4.0000	3.7	37	+XXXXXXXXXXXXXXXXXXXX
6.0000	4.2	42	+XXXXXXXXXXXXXXXXXXXXXX
8.0000	5.4	54	+XXXXXXXXXXXXXXXXXXXXXXXXXXXX
10.000	6.0	60	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
12.000	9.3	93	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
14.000	10.4	104	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
16.000	9.7	97	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
18.000	7.9	79	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
20.000	10.3	103	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
22.000	7.7	77	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
24.000	5.6	56	+XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
26.000	3.5	35	+XXXXXXXXXXXXXXXXXXXX
28.000	2.5	25	+XXXXXXXXXXXXXXX
30.000	1.9	19	+XXXXXXXXXXX
32.000	1.5	15	+XXXXXXXXX
34.000	1.4	14	+XXXXXXXX
36.000	.5	5	+XXX
38.000	.3	3	+XX
40.000	.3	3	+XX
42.000	.3	3	+XX
44.000	.3	3	+XX
46.000	.2	2	+X
48.000	.1	1	+X
50.000	.2	2	+X
52.000	0.	0	+
54.000	0.	0	+
56.000	0.	0	+
58.000	0.	0	+
60.000	.1	1	+X
62.000	.1	1	+X
TOTAL	100.0	1000	(INTERVAL WIDTH= 2.0000)

Percent of vehicles having VMT on trips with avgerage speeds >:							
	20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	55 mph
No VMT over...	6.3	10.6	17.1	26.2	37.3	49.9	75.8
Over 10 % VMT	8	85.2	75.4	62.5	52.5	31.8	10
Over 50% VMT	74.8	56.9	40.3	26.6	21.2	7.5	1
Over 80% VMT	41.6	24.4	13	6.9	3.1	1.2	0.1
Over 90% VMT	22.3	11.1	4.8	2.5	1.3	0.5	0

For example, going down the 30 mph column to 13...means that 13% of vehicles had over 80% of VMT on trips with average speed greater than 30 mph

May 8, 1991

MINUTE MEMORANDUM

SUBJECT: Answer to EPA's question 2

FROM: Jim Gruver 366-0193

TO: Jim Shrouds

We have no idea what NEDS is and can not comment.

The information in Table 2 of Paul Loring's note was provided by Harry Caldwell and was taken from an HPMS Base Year Analysis using HPMS data representing 1987. In Table 2 the Urban other freeways and expressways speed was incorrectly recorded as 46.2 mph and should have been 44.2 mph.

Updated Table 2 values for 1989 data year (reported in 1990) are provided below:

FEMA MODELED AVERAGE SPEEDS BY FUNCTIONAL CLASS (1989)

Roadway Functional Class	All autos, vans and pickups	All trucks
Rural - interstate	57.3	43.6
- other principal arterial	45.4	36.0
- minor arterial	39.9	33.3
- major collector	35.1	29.8
- minor collector	30.5	24.4
Urban - interstate	46.3	39.0
- other freeways and expwys	43.3	36.5
- other principal arterials	18.9	16.0
- minor arterials	19.6	16.7
- collectors	19.6	16.4

SOURCE: Federal Highway Administration, Highway Performance Monitoring System, Impact Analysis for 1989 base year

NOTE: Differences in average system speeds over time may in part be due to using different data to calculate the speeds.
Revised speeds can be obtained on an annual basis.

National Purchase Diary Data

faxed Dave Kortum 11/27

<ONEWAY OPTIONS=MARGW VAR=104 HEAD=20MPH>

Oneway Tabulations MR=

20

104.PCT20C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	90_100
N= 1969	124	34	52	75	93	117	158	206	287	379	436
MARGW	6.3	1.7	2.7	3.8	4.7	6.0	8.0	10.5	14.7	19.3	22.3

<ONEWAY OPTIONS=MARGW VAR=104 HEAD=25MPH>

Oneway Tabulations MR=

25

104.PCT25C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	90_100
N= 1969	208	83	108	130	159	154	189	224	225	261	218
MARGW	10.6	4.2	5.5	6.6	8.1	7.9	9.6	11.4	11.5	13.3	11.1

<ONEWAY OPTIONS=MARGW VAR=104 HEAD=30MPH>

Oneway Tabulations MR=

30

104.PCT30C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	90_100
N= 1969	336	146	179	161	165	182	181	180	174	161	95
MARGW	17.1	7.5	9.1	8.2	8.4	9.3	9.2	9.2	8.9	8.2	4.8

<ONEWAY OPTIONS=MARGW VAR=104 HEAD=35MPH>

Oneway Tabulations MR=

35

104.PCT35C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	90_100
N= 1969	515	221	231	165	162	146	145	131	110	86	49
MARGW	26.2	11.3	11.8	8.4	8.3	7.5	7.4	6.7	5.6	4.4	2.5

<ONEWAY OPTIONS=MARGW VAR=104 HEAD=40MPH>

Oneway Tabulations MR=

40

104.PCT40C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	90_100
N= 1969	731	299	223	169	122	120	84	92	58	36	26
MARGW	37.3	15.2	11.4	8.6	6.2	6.1	4.3	4.7	3.0	1.8	1.3

<ONEWAY OPTIONS=MARGW VAR=104 HEAD=45MPH>

Oneway Tabulations MR=

104.PCT45C	ZERO	1_10	11_20	21_30	31_40	41_50	51_60	61_70	71_80	81_90	90_100
N= 1969	977	384	196	124	87	70	46	46	29	14	8
MARGW	49.9	19.3	10.0	6.3	4.4	3.6	2.3	2.3	1.5	.7	.4

<DELETE DSATA1 VAR=ALL

E. H. PECHAN & ASSOCIATES, INC.
5537 Hempstead Way
Springfield, VA 22151
(703) 642-1120

December 29, 1988

Ms. Robin Miles-McLean
PM-221
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

SUBJECT: Motor Vehicle Emission Calculations

Dear Robin:

To follow up on the question raised during yesterday's conference call about assigning vehicle speeds to roadway types, I called DOT-FHWA and spoke with Mr. Harry Caldwell. His group uses the Highway Performance Monitoring System model, which contains a module that estimates effective speeds for seven vehicle types by roadway functional class. NEDS assignments of roadway types to vehicle speeds is shown in Table 1. This can be compared with the FHWA modeled roadway speeds by functional class in Table 2. Obviously, the FHWA values are quite different from NEDS values for many roadway types (see, for example, urban-other principal arterials) and would lead to a much different emission estimate if applied. We should probably find out more about the FHWA values before using them, but I wanted to let you know that data on vehicle speeds by roadway class are available.

Sincerely,

Jim Wilson

Jim Wilson

JW/kf

cc: Phil Lorang ✓

Table 1

NEDS Assignment of Roadway Types to Vehicle Speeds

Roadway Type	Assigned Vehicle Speed (mph)	Percentage of Total National VMT
Rural - interstate	50 mph	8.7
- other principal arterial		8.2
- minor arterial		7.7
Urban - interstate		12.2
- other freeways and expwys		5.5
- other principal arterial		15.7
Rural - major collector	45 mph	9.2
- minor collector		2.4
- local		4.9
Urban - minor arterial		11.4
Urban - collector	19.6 mph	5.0
- local		9.0