APPENDIX A

SCOPE OF WORK
WORK ASSIGNMENT NO. 5
CONTRACT 68-03-3073

WORK ASSIGNMENT NO. 5
VEHICLE EMISSIONS FROM ALTERNATE DIESEL FUELS

Scope of Work

Objective: The area of transportation fuels is currently a very dynamic area. There are some problems with the long term outlook for conventional petroleum supplies and for this reason alternate sources of transportation fuels are actively being sought. However, most research into this area is being done in the area of processes and not in end-use emissions.

It is therefore one objective of this work to operate a light duty vehicle on three alternate source fuels and analyze its emissions for a variety of pollutants. The vehicle to be used will be the same Volkswagen previously tested on which a complete baseline exists.

The second and most important objective of this work is to analyze statistically the fuels data obtained. The data derived from the first part of this task will be combined with that derived previously from the use of different alternate source fuels in the same vehicle (the VW). The combined data will then be statistically analyzed to detect trends in emissions as a function of fuel properties. The data will be compared to data taken from vehicles operated on petroleum based fuels. This comparison will be made to see if the changes observed in the emissions from the vehicle operated with alternate source fuels are significantly different from the changes one would expect based on the knowledge derived from this previous work on petroleum fuels.

Task I - Obtain Representative Fuels

The contractor shall obtain test quantities of up to three suitable fuels in accordance with the Project Officers technical direction. It is expected that EPA shall do much of the initial work to locate suitable fuels, but the contractor should be prepared to follow-up the acquisition efforts with regards to shipping and receiving the candidate fuels. Also, the contractor should be prepared to expend effort toward contacting potential sources of alternate fuels upon the direction of the Project Officer.

APPENDIX B

TEST VEHICLE BASELINE CHECK

CFTP - VEHICLE EMISSIONS RESULTS -VW CHECKOUT
PROJECT 05-6619-005

TEST NO. 329X01 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/ 3/82
BAG CART NO. 1 / CVS NO. 17
DYNO NO. 2

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-329-F
ODOMETER 4535. KM(2818. MILES)

BAROMETER 746.25 MM HG(29.38 IN HG)
RELATIVE HUMIDITY 54. PCT
DRY BULB TEMP. 22.8 DEG C(73.0 DEG F)
ABS. HUMIDITY 9.5 GM/KG

NOX HUMIDITY CORRECTION FACTOR .96

BAG RESULTS

BAG NUMBER / DESCRIPTION	1 COLD TRANSIENT	2 STABILIZED	3 HOT TRANSIENT	4 STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	914.4 (36.0)	914.4 (36.0)	914.4 (36.0)	914.4 (36.0)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)	889.0 (35.0)	889.0 (35.0)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	40.6 (105.0)	45.0 (113.0)	38.3 (101.0)	37.8 (100.0)
BLOWER REVOLUTIONS	4989.	8574.	4987.	8574.
TOT FLOW STD. CU. METRES(SCF)	147.0 (5192.)	250.1 (8833.)	147.8 (5218.)	254.4 (8984.)
THC SAMPLE METER/RANGE/PPM	31.4/11/ 31.	11.4/11/ 11.	26.3/11/ 26.	11.7/11/ 12.
THC BCKGRD METER/RANGE/PPM	3.0/ 1/ 3.	2.9/ 1/ 3.	2.9/ 1/ 3.	2.8/ 1/ 3.
CO SAMPLE METER/RANGE/PPM	49.4/13/ 47.	20.3/13/ 18.	43.6/13/ 41.	20.9/13/ 19.
CO BCKGRD METER/RANGE/PPM	.9/13/ 1.	1.2/13/ 1.	.4/13/ 0.	.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	59.4/11/ .4888	63.1/12/ .2567	82.9/12/ .3611	61.4/12/ .2483
CO2 BCKGRD METER/RANGE/PCT	7.3/11/ .0437	11.8/12/ .0400	11.9/12/ .0404	11.5/12/ .0389
NOX SAMPLE METER/RANGE/PPM	15.1/ 2/ 15.1	10.2/ 2/ 10.2	14.4/ 2/ 14.4	10.1/ 2/ 10.1
NOX BCKGRD METER/RANGE/PPM	.4/ 2/ .4	.4/ 2/ .4	.4/ 2/ .4	.3/ 2/ .3
DILUTION FACTOR	26.33	50.35	35.54	52.00
THC CONCENTRATION PPM	29.	9.	23.	9.
CO CONCENTRATION PPM	45.	17.	39.	18.
CO2 CONCENTRATION PCT	.4467	.2174	.3219	.2101
NOX CONCENTRATION PPM	14.7	9.8	14.0	9.8
FILTER WT. MG (EFFICIENCY, %)	3.700 (99.)	1.997 (96.)	2.786 (98.)	1.911 (97.)
THC MASS GRAMS	2.44	1.24	2.02	1.33
CO MASS GRAMS	7.62	4.96	6.78	5.36
CO2 MASS GRAMS	1202.6	995.8	871.1	978.9
NOX MASS GRAMS	3.98	4.51	3.81	4.59
PARTICULATE MASS GRAMS	2.53	1.33	1.89	1.32
THC GRAMS/KM	.42	.20	.35	.21
CO GRAMS/KM	1.32	.80	1.17	.85
CO2 GRAMS/KM	208.6	160.0	150.1	155.8
NOX GRAMS/KM	.69	.72	.66	.73
FUEL CONSUMPTION BY CB L/100KM	8.06	6.15	5.82	6.00
RUN TIME SECONDS	505.	867.	504.	867.
MEASURED DISTANCE KM	5.77	6.22	5.80	6.28
SCF, DRY	.978	.980	.979	.980
DFC, WET (DRY)		.973(.957)	.977(.961)	
TOT VOL (SCM) / SAM BLR (SCM)		397.2/ 78.15	402.2/ 78.12	
KM (MEASURED)		11.99	12.09	
FUEL CONSUMPTION L/100KM		7.07	5.91	

COMPOSITE RESULTS

TEST NUMBER		329X01
BAROMETER	MM HG	746.3
HUMIDITY	G/KG	9.5
TEMPERATURE	DEG C	22.8

		3-BAG	(4-BAG)
CARBON DIOXIDE	G/KM	167.3	(166.1)
FUEL CONSUMPTION	L/100KM	6.45	(6.41)
HYDROCARBONS (THC)	G/KM	.29	(.29)
CARBON MONOXIDE	G/KM	1.01	(1.02)
OXIDES OF NITROGEN	G/KM	.70	(.70)
PARTICULATES	G/KM	.291	(.290)

C505 - VEHICLE EMISSIONS RESULTS -VW CHECKOUT
PROJECT 05-6619-005

TEST NO. 329X02 RUN 2
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/ 4/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-329-F
ODOMETER 4561. KM(2834. MILES)

BAROMETER 752.60 MM HG(29.63 IN HG)
RELATIVE HUMIDITY 82. PCT
DRY BULB TEMP. 23.3 DEG C(74.0 DEG F)
ABS. HUMIDITY 15.0 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.16

BAG RESULTS

TEST CYCLE	C505
BLOWER DIF P MM. H2O(IN. H2O)	914.4 (36.0)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	39.4 (103.0)
BLOWER REVOLUTIONS	4994.
TOT FLOW STD. CU. METRES(SCF)	150.0 (5295.)
THC SAMPLE METER/RANGE/PPM	25.9/11/ 26.
THC BCKGRD METER/RANGE/PPM	4.1/ 1/ 4.
CO SAMPLE METER/RANGE/PPM	46.9/13/ 44.
CO BCKGRD METER/RANGE/PPM	5.9/13/ 5.
CO2 SAMPLE METER/RANGE/PCT	90.9/12/ .4082
CO2 BCKGRD METER/RANGE/PCT	12.8/12/ .0436
NOX SAMPLE METER/RANGE/PPM	15.9/ 2/ 15.9
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ .7
DILUTION FACTOR	31.49
THC CONCENTRATION PPM	22.
CO CONCENTRATION PPM	38.
CO2 CONCENTRATION PCT	.3660
NOX CONCENTRATION PPM	15.2
FILTER WT. MG (EFFICIENCY, %)	2.906 (98.)
THC MASS GRAMS	1.92
CO MASS GRAMS	6.55
CO2 MASS GRAMS	1004.9
NOX MASS GRAMS	5.08
PARTICULATE MASS GRAMS	1.92
RUN TIME SECONDS	505.
DFC, WET (DRY)	.968 (.943)
SCF, WET (DRY)	1.000 (.969)
VOL (SCM)	150.0
SAM BLR (SCM)	29.94
KM (MEASURED)	5.75
TEST NUMBER,	329X02
BAROMETER, MM HG	752.6
HUMIDITY, G/KG	15.0
TEMPERATURE, DEG C	23.3
CARBON DIOXIDE, G/KM	174.8
FUEL CONSUMPTION, L/100KM	6.75
HYDROCARBONS, (THC) G/KM	.33
CARBON MONOXIDE, G/KM	1.14
OXIDES OF NITROGEN, G/KM	.88
PARTICULATES, G/KM	.334

APPENDIX C

GASEOUS AND PARTICULATE EMISSION RESULTS

FTP - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 527F01 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/ 9/82
BAG CART NO. 1 / CVS NO. 17
DYNO NO. 2

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-527-F
ODOMETER 4625. KM(2874. MILES)

BAROMETER 745.74 MM HG(29.36 IN HG)
RELATIVE HUMIDITY 59. PCT
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)
ABS. HUMIDITY 11.6 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.03

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	914.4 (36.0)	914.4 (36.0)	914.4 (36.0)	914.4 (36.0)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)	889.0 (35.0)	889.0 (35.0)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	34.4 (94.0)	35.0 (95.0)	36.1 (97.0)	37.2 (99.0)
BLOWER REVOLUTIONS	4992.	8572.	4990.	8576.
TOT FLOW STD. CU. METRES(SCF)	149.6 (5282.)	256.5 (9058.)	148.9 (5258.)	255.3 (9013.)
THC SAMPLE METER/RANGE/PPM	36.1/11/ 36.	14.1/11/ 14.	31.9/11/ 32.	13.4/11/ 13.
THC BCKGRD METER/RANGE/PPM	6.0/ 1/ 6.	5.8/ 1/ 6.	5.8/ 1/ 6.	5.4/ 1/ 5.
CO SAMPLE METER/RANGE/PPM	51.5/13/ 49.	22.7/13/ 21.	45.8/13/ 43.	21.5/13/ 20.
CO BCKGRD METER/RANGE/PPM	2.5/13/ 2.	2.3/13/ 2.	1.8/13/ 2.	2.3/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	91.3/12/ .4106	62.3/12/ .2527	82.8/12/ .3606	61.1/12/ .2469
CO2 BCKGRD METER/RANGE/PCT	12.9/12/ .0439	13.0/12/ .0443	13.0/12/ .0443	12.9/12/ .0439
NOX SAMPLE METER/RANGE/PPM	14.0/ 2/ 14.0	9.0/ 2/ 9.0	13.1/ 2/ 13.1	9.0/ 2/ 9.0
NOX BCKGRD METER/RANGE/PPM	1.3/ 2/ 1.3	.9/ 2/ .9	.7/ 2/ .7	.7/ 2/ .7
DILUTION FACTOR	31.10	50.87	35.41	52.09
THC CONCENTRATION PPM	30.	8.	26.	8.
CO CONCENTRATION PPM	45.	18.	40.	17.
CO2 CONCENTRATION PCT	.3681	.2093	.3175	.2038
NOX CONCENTRATION PPM	12.7	8.1	12.4	8.3
FILTER WT. MG (EFFICIENCY, %)	2.611 (98.)	1.578 (99.)	1.988 (99.)	1.470 (97.)
THC MASS GRAMS	2.64	1.26	2.28	1.21
CO MASS GRAMS	7.88	5.44	6.98	5.09
CO2 MASS GRAMS	1008.2	983.0	865.8	952.3
NOX MASS GRAMS	3.75	4.10	3.64	4.18
PARTICULATE MASS GRAMS	1.81	1.06	1.35	.98
THC GRAMS/KM	.46	.20	.39	.19
CO GRAMS/KM	1.36	.87	1.21	.82
CO2 GRAMS/KM	174.6	156.6	149.8	152.5
NOX GRAMS/KM	.65	.65	.63	.67
FUEL CONSUMPTION BY CB L/100KM	7.06	6.28	6.06	6.12
RUN TIME SECONDS	505.	868.	505.	868.
MEASURED DISTANCE KM	5.77	6.28	5.78	6.24
SCF, DRY	.977	.978	.977	.978
DFC, WET (DRY)		.976(.957)		.977(.959)
TOT VOL (SCM) / SAM BLR (SCM)		406.1/ 78.17		404.2/ 78.14
KM (MEASURED)		12.05		12.03
FUEL CONSUMPTION L/100KM		6.66		6.09

COMPOSITE RESULTS

TEST NUMBER		527F01
BAROMETER	MM HG	745.7
HUMIDITY	G/KG	11.6
TEMPERATURE	DEG C	24.4

		3-BAG	(4-BAG)
CARBON DIOXIDE	G/KM	158.5	(157.2)
FUEL CONSUMPTION	L/100KM	6.38	(6.33)
HYDROCARBONS (THC)	G/KM	.31	(.30)
CARBON MONOXIDE	G/KM	1.06	(1.05)
OXIDES OF NITROGEN	G/KM	.65	(.65)
PARTICULATES	G/KM	.216	(.213)

HFET - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 527H02 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/ 9/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-527-F
ODOMETER 4649. KM(2889. MILES)

BAROMETER 745.49 MM HG(29.35 IN HG)
RELATIVE HUMIDITY 56. PCT
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)
ABS. HUMIDITY 11.3 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.02

BAG RESULTS

TEST CYCLE	HFET
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	38.3 (101.0)
BLOWER REVOLUTIONS	7560.
TOT FLOW STD. CU. METRES(SCF)	223.6 (7895.)
THC SAMPLE METER/RANGE/PPM	34.0/11/ 34.
THC BCKGRD METER/RANGE/PPM	5.2/ 1/ 5.
CO SAMPLE METER/RANGE/PPM	83.0/13/ 83.
CO BCKGRD METER/RANGE/PPM	1.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	66.7/11/ .5724
CO2 BCKGRD METER/RANGE/PCT	7.4/11/ .0444
NOX SAMPLE METER/RANGE/PPM	23.3/ 2/ 23.3
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ .7
DILUTION FACTOR	22.32
THC CONCENTRATION PPM	29.
CO CONCENTRATION PPM	79.
CO2 CONCENTRATION PCT	.5300
NOX CONCENTRATION PPM	22.6
FILTER WT. MG (EFFICIENCY, %)	5.691 (99.)
THC MASS GRAMS	3.78
CO MASS GRAMS	20.50
CO2 MASS GRAMS	2169.8
NOX MASS GRAMS	9.88
PARTICULATE MASS GRAMS	4.07
RUN TIME SECONDS	765.
DFC, WET (DRY)	.955 (.938)
SCF, WET (DRY)	1.000 (.976)
VOL (SCM)	223.6
SAM BLR (SCM)	42.73
KM (MEASURED)	16.39
TEST NUMBER,	527H02
BAROMETER, MM HG	745.5
HUMIDITY, G/KG	11.3
TEMPERATURE, DEG C	25.0
CARBON DIOXIDE, G/KM	132.4
FUEL CONSUMPTION, L/100KM	5.35
HYDROCARBONS, (THC) G/KM	.23
CARBON MONOXIDE, G/KM	1.25
OXIDES OF NITROGEN, G/KM	.60
PARTICULATES, G/KM	.248

IDLE - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 527103 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/ 9/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-527-F
ODOMETER 4667. KM(2900. MILES)

BAROMETER 745.49 MM HG(29.35 IN HG)
RELATIVE HUMIDITY 53. PCT
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)
ABS. HUMIDITY 11.1 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.01

BAG RESULTS

TEST CYCLE	IDLE
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	37.8 (100.0)
BLOWER REVOLUTIONS	11864.
TOT FLOW STD. CU. METRES(SCF)	351.3 (12405.)
THC SAMPLE METER/RANGE/PPM	7.6/11/ 8.
THC BCKGRD METER/RANGE/PPM	5.1/ 1/ 5.
CO SAMPLE METER/RANGE/PPM	8.4/13/ 8.
CO BCKGRD METER/RANGE/PPM	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	50.8/13/ .1003
CO2 BCKGRD METER/RANGE/PCT	22.9/13/ .0423
NOX SAMPLE METER/RANGE/PPM	3.4/ 2/ 3.4
NOX BCKGRD METER/RANGE/PPM	.7/ 2/ .7
DILUTION FACTOR	127.94
THC CONCENTRATION PPM	3.
CO CONCENTRATION PPM	6.
CO2 CONCENTRATION PCT	.0583
NOX CONCENTRATION PPM	2.7
FILTER WT. MG (EFFICIENCY, %)	.175 (85.)
THC MASS GRAMS	.52
CO MASS GRAMS	2.65
CO2 MASS GRAMS	375.1
NOX MASS GRAMS	1.84
PARTICULATE MASS GRAMS	.14
RUN TIME SECONDS	1201.
DFC, WET (DRY)	.992 (.975)
SCF, WET (DRY)	1.000 (.982)
VOL (SCM)	351.3
SAM BLR (SCM)	66.81
KM (MEASURED)	

TEST NUMBER,		527103
BAROMETER,	MM HG	745.5
HUMIDITY,	G/KG	11.1
TEMPERATURE,	DEG C	25.6
CARBON DIOXIDE,	G/KM	
FUEL CONSUMPTION,	L/100KM	
HYDROCARBONS, (THC)	G/KM	
CARBON MONOXIDE,	G/KM	
OXIDES OF NITROGEN,	G/KM	
PARTICULATES,	G/KM	

50 KM - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 527504 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/ 9/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-527-F
ODOMETER 4667. KM(2900. MILES)

BAROMETER 744.73 MM HG(29.32 IN HG)
RELATIVE HUMIDITY 52. PCT
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)
ABS. HUMIDITY 10.6 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.00

BAG RESULTS

TEST CYCLE	50 KM
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	36.7 (98.0)
BLOWER REVOLUTIONS	5939.
TOT FLOW STD. CU. METRES(SCF)	175.9 (6210.)
THC SAMPLE METER/RANGE/PPM	16.1/11/ 16.
THC BCKGRD METER/RANGE/PPM	5.0/ 1/ 5.
CO SAMPLE METER/RANGE/PPM	25.7/13/ 24.
CO BCKGRD METER/RANGE/PPM	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	79.8/12/ .3438
CO2 BCKGRD METER/RANGE/PCT	12.9/12/ .0439
NOX SAMPLE METER/RANGE/PPM	13.6/ 2/ 13.6
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ .6
DILUTION FACTOR	37.48
THC CONCENTRATION PPM	11.
CO CONCENTRATION PPM	22.
CO2 CONCENTRATION PCT	.3010
NOX CONCENTRATION PPM	13.0
FILTER WT. MG (EFFICIENCY, %)	1.714 (97.)
THC MASS GRAMS	1.16
CO MASS GRAMS	4.51
CO2 MASS GRAMS	969.2
NOX MASS GRAMS	4.37
PARTICULATE MASS GRAMS	1.16
RUN TIME SECONDS	601.
DFC, WET (DRY)	.973 (.957)
SCF, WET (DRY)	1.000 (.980)
VOL (SCM)	175.9
SAM BLR (SCM)	33.27
KM (MEASURED)	8.33
TEST NUMBER,	527504
BAROMETER, MM HG	744.7
HUMIDITY, G/KG	10.6
TEMPERATURE, DEG C	25.0
CARBON DIOXIDE, G/KM	116.3
FUEL CONSUMPTION, L/100KM	4.66
HYDROCARBONS, (THC) G/KM	.14
CARBON MONOXIDE, G/KM	.54
OXIDES OF NITROGEN, G/KM	.52
PARTICULATES, G/KM	.139

85 KM - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 527805 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/ 9/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-527-F
ODOMETER 4677. KM(2906. MILES)

BAROMETER 741.93 MM HG(29.21 IN HG)
RELATIVE HUMIDITY 50. PCT
DRY BULB TEMP. 25.6 DEG C(78.0 DEG F)
ABS. HUMIDITY 10.4 GM/KG

NOX HUMIDITY CORRECTION FACTOR .99

BAG RESULTS

TEST CYCLE	85 KM
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	41.7 (107.0)
BLOWER REVOLUTIONS	5933.
TOT FLOW STD. CU. METRES(SCF)	172.9 (6104.)
THC SAMPLE METER/RANGE/PPM	38.0/11/ 38.
THC BCKGRD METER/RANGE/PPM	4.9/ 1/ 5.
CO SAMPLE METER/RANGE/PPM	99.3/13/ 101.
CO BCKGRD METER/RANGE/PPM	.6/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	70.9/11/ .6234
CO2 BCKGRD METER/RANGE/PCT	7.3/11/ .0437
NOX SAMPLE METER/RANGE/PPM	26.6/ 2/ 26.6
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ .6
DILUTION FACTOR	20.45
THC CONCENTRATION PPM	33.
CO CONCENTRATION PPM	98.
CO2 CONCENTRATION PCT	.5818
NOX CONCENTRATION PPM	26.0
FILTER WT. MG (EFFICIENCY, %)	4.313 (99.)
THC MASS GRAMS	3.36
CO MASS GRAMS	19.71
CO2 MASS GRAMS	1841.5
NOX MASS GRAMS	8.53
PARTICULATE MASS GRAMS	3.80
RUN TIME SECONDS	600.
DFC, WET (DRY)	.951 (.936)
SCF, WET (DRY)	1.000 (.978)
VOL (SCM)	172.9
SAM BLR (SCM)	33.00
KM (MEASURED)	14.24

TEST NUMBER,		527805
BAROMETER,	MM HG	741.9
HUMIDITY,	G/KG	10.4
TEMPERATURE,	DEG C	25.6
CARBON DIOXIDE,	G/KM	129.3
FUEL CONSUMPTION,	L/100KM	5.24
HYDROCARBONS, (THC)	G/KM	.24
CARBON MONOXIDE,	G/KM	1.38
OXIDES OF NITROGEN,	G/KM	.60
PARTICULATES,	G/KM	.267

FTP - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 527F06 RUN 2
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/10/82
BAG CART NO. 1 / CVS NO. 17
DYNO NO. 2

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-527-F
ODOMETER 4688. KM(2913. MILES)

BAROMETER 746.25 MM HG(29.38 IN HG)
RELATIVE HUMIDITY 60. PCT
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)
ABS. HUMIDITY 12.1 GM/KG

NOX HUMIDITY CORRECTION FACTOR 1.05

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	914.4 (36.0)	914.4 (36.0)	914.4 (36.0)	914.4 (36.0)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)	889.0 (35.0)	889.0 (35.0)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	38.3 (101.0)	39.4 (103.0)	41.7 (107.0)	40.0 (104.0)
BLOWER REVOLUTIONS	4991.	8576.	4993.	8579.
TOT FLOW STD. CU. METRES(SCF)	148.2 (5232.)	253.9 (8966.)	147.0 (5192.)	253.7 (8957.)
THC SAMPLE METER/RANGE/PPM	21.7/12/ 43.	7.4/12/ 15.	15.8/12/ 32.	6.2/12/ 12.
THC BCKGRD METER/RANGE/PPM	6.0/ 1/ 6.	5.8/ 1/ 6.	5.8/ 1/ 6.	5.4/ 1/ 5.
CO SAMPLE METER/RANGE/PPM	55.5/13/ 53.	22.7/13/ 21.	45.4/13/ 43.	21.0/13/ 19.
CO BCKGRD METER/RANGE/PPM	1.5/13/ 1.	1.8/13/ 2.	1.0/13/ 1.	1.4/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	91.6/12/ .4125	62.3/12/ .2527	83.3/12/ .3634	61.2/12/ .2474
CO2 BCKGRD METER/RANGE/PCT	13.2/12/ .0450	13.0/12/ .0443	13.1/12/ .0446	13.2/12/ .0450
NOX SAMPLE METER/RANGE/PPM	12.8/ 2/ 12.8	8.4/ 2/ 8.4	12.3/ 2/ 12.3	8.4/ 2/ 8.4
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ .5	.5/ 2/ .5	.5/ 2/ .5	.5/ 2/ .5
DILUTION FACTOR	30.88	50.85	35.15	52.03
THC CONCENTRATION PPM	38.	9.	26.	7.
CO CONCENTRATION PPM	50.	19.	41.	17.
CO2 CONCENTRATION PCT	.3689	.2093	.3201	.2032
NOX CONCENTRATION PPM	12.3	7.9	11.8	7.9
FILTER WT. MG (EFFICIENCY, %)	2.983 (99.)	1.632 (98.)	2.059 (98.)	1.469 (97.)
THC MASS GRAMS	3.25	1.34	2.22	1.04
CO MASS GRAMS	8.64	5.51	6.94	5.15
CO2 MASS GRAMS	1000.8	973.1	861.6	943.8
NOX MASS GRAMS	3.65	4.02	3.48	4.02
PARTICULATE MASS GRAMS	1.99	1.08	1.37	.98
THC GRAMS/KM	.56	.21	.38	.17
CO GRAMS/KM	1.50	.88	1.20	.82
CO2 GRAMS/KM	173.3	154.5	149.2	150.4
NOX GRAMS/KM	.63	.64	.60	.64
FUEL CONSUMPTION BY CB L/100KM	7.03	6.20	6.03	6.03
RUN TIME SECONDS	505.	868.	505.	868.
MEASURED DISTANCE KM	5.78	6.30	5.78	6.27
SCF, DRY	.977	.978	.977	.978
DFC, WET (DRY)	.978	.976(.957)	.978	.977(.959)
TOT VOL (SCM) / SAM BLR (SCM)		402.1/ 78.05		400.7/ 78.05
KM (MEASURED)		12.07		12.05
FUEL CONSUMPTION L/100KM		6.60		6.03

COMPOSITE RESULTS

TEST NUMBER		527F06
BAROMETER	MM HG	746.3
HUMIDITY	G/KG	12.1
TEMPERATURE	DEG C	25.0

		3-BAG	(4-BAG)
CARBON DIOXIDE	G/KM	156.9	(155.7)
FUEL CONSUMPTION	L/100KM	6.32	(6.27)
HYDROCARBONS (THC)	G/KM	.33	(.32)
CARBON MONOXIDE	G/KM	1.09	(1.08)
OXIDES OF NITROGEN	G/KM	.63	(.63)
PARTICULATES	G/KM	.225	(.220)

HFET - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 527H07 RUN 2
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/10/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-527-F
ODOMETER 4720. KM(2933. MILES)

BAROMETER 745.49 MM HG(29.35 IN HG)
RELATIVE HUMIDITY 55. PCT

DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)
ABS. HUMIDITY 10.4 GM/KG

NOX HUMIDITY CORRECTION FACTOR .99

BAG RESULTS

TEST CYCLE	HFET
BLOWER DIF P MM. H2O(IN. H2O)	914.4 (36.0)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	40.0 (104.0)
BLOWER REVOLUTIONS	7564.
TOT FLOW STD. CU. METRES(SCF)	222.9 (7871.)
THC SAMPLE METER/RANGE/PPM	38.0/12/ 76.
THC BCKGRD METER/RANGE/PPM	5.4/ 1/ 5.
CO SAMPLE METER/RANGE/PPM	94.7/13/ 96.
CO BCKGRD METER/RANGE/PPM	1.1/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	67.4/11/ .5808
CO2 BCKGRD METER/RANGE/PCT	7.4/11/ .0444
NOX SAMPLE METER/RANGE/PPM	21.5/ 2/ 21.5
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ .5
DILUTION FACTOR	21.80
THC CONCENTRATION PPM	71.
CO CONCENTRATION PPM	92.
CO2 CONCENTRATION PCT	.5384
NOX CONCENTRATION PPM	21.0
FILTER WT. MG (EFFICIENCY, %)	5.707 (99.)
THC MASS GRAMS	9.20
CO MASS GRAMS	23.93
CO2 MASS GRAMS	2197.4
NOX MASS GRAMS	8.87
PARTICULATE MASS GRAMS	4.05
RUN TIME SECONDS	766.
DFC, WET (DRY)	.954 (.937)
SCF, WET (DRY)	1.000 (.976)
VOL (SCM)	222.9
SAM BLR (SCM)	42.77
KM (MEASURED)	16.62
TEST NUMBER,	527H07
BAROMETER, MM HG	745.5
HUMIDITY, G/KG	10.4
TEMPERATURE, DEG C	23.9
CARBON DIOXIDE, G/KM	132.2
FUEL CONSUMPTION, L/100KM	5.40
HYDROCARBONS, (THC) G/KM	.55
CARBON MONOXIDE, G/KM	1.44
OXIDES OF NITROGEN, G/KM	.53
PARTICULATES, G/KM	.243

FTP - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 526F01 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/12/82
BAG CART NO. 1 / CVS NO. 17
DYNO NO. 2

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-526-F
ODOMETER 4801. KM(2983. MILES)

BAROMETER 747.78 MM HG(29.44 IN HG)
RELATIVE HUMIDITY 25. PCT
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)
ABS. HUMIDITY 4.6 GM/KG

NOX HUMIDITY CORRECTION FACTOR .83

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	939.8 (37.0)	927.1 (36.5)	927.1 (36.5)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	914.4 (36.0)	889.0 (35.0)	889.0 (35.0)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	35.0 (95.0)	36.1 (97.0)	36.1 (97.0)	36.7 (98.0)
BLOWER REVOLUTIONS	4982.	8566.	4988.	8570.
TOT FLOW STD. CU. METRES(SCF)	148.9 (5258.)	256.2 (9045.)	149.2 (5267.)	255.9 (9037.)
THC SAMPLE METER/RANGE/PPM	16.7/12/ 33.	9.7/12/ 19.	13.7/12/ 27.	7.5/12/ 15.
THC BCKGRD METER/RANGE/PPM	3.0/ 1/ 3.	3.0/ 1/ 3.	3.0/ 1/ 3.	2.8/ 2/ 6.
CO SAMPLE METER/RANGE/PPM	48.8/13/ 46.	23.8/13/ 22.	46.6/13/ 44.	26.0/13/ 24.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.2/13/ 1.	1.4/13/ 1.	1.4/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	94.7/12/ .4318	63.8/12/ .2601	84.9/12/ .3726	62.9/12/ .2557
CO2 BCKGRD METER/RANGE/PCT	12.3/12/ .0418	12.3/12/ .0418	11.9/12/ .0404	12.3/12/ .0418
NOX SAMPLE METER/RANGE/PPM	18.5/ 2/ 18.5	12.0/ 2/ 12.0	17.7/ 2/ 17.7	11.8/ 2/ 11.8
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ .6	.7/ 2/ .7	.5/ 2/ .5	.6/ 2/ .6
DILUTION FACTOR	30.67	51.04	35.52	51.96
THC CONCENTRATION PPM	31.	16.	24.	10.
CO CONCENTRATION PPM	44.	20.	42.	22.
CO2 CONCENTRATION PCT	.3914	.2191	.3334	.2147
NOX CONCENTRATION PPM	17.9	11.3	17.2	11.2
FILTER WT. MG (EFFICIENCY, %)	4.005 (99.)	2.278 (97.)	2.693 (99.)	1.687 (96.)
THC MASS GRAMS	2.62	2.43	2.10	1.40
CO MASS GRAMS	7.66	6.08	7.27	6.63
CO2 MASS GRAMS	1067.0	1027.8	910.4	1005.9
NOX MASS GRAMS	4.25	4.62	4.09	4.57
PARTICULATE MASS GRAMS	2.78	1.59	1.87	1.17
THC GRAMS/KM	.45	.38	.36	.22
CO GRAMS/KM	1.32	.96	1.25	1.04
CO2 GRAMS/KM	183.4	161.7	157.0	157.1
NOX GRAMS/KM	.73	.73	.71	.71
FUEL CONSUMPTION BY CB L/100KM	6.83	6.00	5.85	5.82
RUN TIME SECONDS	504.	867.	505.	867.
MEASURED DISTANCE KM	5.82	6.36	5.80	6.40
SCF, DRY	.988	.990	.989	.990
DFC, WET (DRY)	.989 .976(.968)		.989 .977(.970)	
TOT VOL (SCM) / SAM BLR (SCM)	405.1/ 78.27		405.1/ 78.30	
KM (MEASURED)	12.17		12.20	
FUEL CONSUMPTION L/100KM	6.40		5.83	

COMPOSITE RESULTS

TEST NUMBER		526F01
BAROMETER	MM HG	747.8
HUMIDITY	G/KG	4.6
TEMPERATURE	DEG C	23.9

		3-BAG	(4-BAG)
CARBON DIOXIDE	G/KM	164.9	(163.5)
FUEL CONSUMPTION	L/100KM	6.13	(6.08)
HYDROCARBONS (THC)	G/KM	.39	(.34)
CARBON MONOXIDE	G/KM	1.11	(1.13)
OXIDES OF NITROGEN	G/KM	.72	(.72)
PARTICULATES	G/KM	.316	(.296)

HFET - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 526H02 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/12/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-526-F
ODOMETER 4826. KM(2999. MILES)

BAROMETER 747.78 MM HG(29.44 IN HG)
RELATIVE HUMIDITY 24. PCT
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)
ABS. HUMIDITY 4.8 GM/KG

NOX HUMIDITY CORRECTION FACTOR .84

BAG RESULTS

TEST CYCLE	HFET
BLOWER DIF P MM. H2O(IN. H2O)	965.2 (38.0)
BLOWER INLET P MM. H2O(IN. H2O)	939.8 (37.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	36.7 (98.0)
BLOWER REVOLUTIONS	7565.
TOT FLOW STD. CU. METRES(SCF)	223.8 (7902.)
THC SAMPLE METER/RANGE/PPM	26.0/12/ 52.
THC BCKGRD METER/RANGE/PPM	3.0/ 1/ 3.
CO SAMPLE METER/RANGE/PPM	81.3/13/ 81.
CO BCKGRD METER/RANGE/PPM	.2/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	70.2/11/ .6148
CO2 BCKGRD METER/RANGE/PCT	6.8/11/ .0406
NOX SAMPLE METER/RANGE/PPM	36.2/ 2/ 36.2
NOX BCKGRD METER/RANGE/PPM	1.9/ 2/ 1.9
DILUTION FACTOR	21.48
THC CONCENTRATION PPM	49.
CO CONCENTRATION PPM	79.
CO2 CONCENTRATION PCT	.5761
NOX CONCENTRATION PPM	34.4
FILTER WT. MG (EFFICIENCY, %)	7.071 (99.)
THC MASS GRAMS	6.33
CO MASS GRAMS	20.55
CO2 MASS GRAMS	2360.2
NOX MASS GRAMS	12.30
PARTICULATE MASS GRAMS	5.19
RUN TIME SECONDS	766.
DFC, WET (DRY)	.953 (.946)
SCF, WET (DRY)	1.000 (.987)
VOL (SCM)	223.8
SAM BLR (SCM)	42.94
KM (MEASURED)	16.55
TEST NUMBER,	526H02
BAROMETER, MM HG	747.8
HUMIDITY, G/KG	4.8
TEMPERATURE, DEG C	25.0
CARBON DIOXIDE, G/KM	142.6
FUEL CONSUMPTION, L/100KM	5.32
HYDROCARBONS, (THC) G/KM	.38
CARBON MONOXIDE, G/KM	1.24
OXIDES OF NITROGEN, G/KM	.74
PARTICULATES, G/KM	.314

IDLE - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 526103 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/12/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-526-F
ODOMETER 4844. KM(3010. MILES)

BAROMETER 748.03 MM HG(29.45 IN HG)
RELATIVE HUMIDITY 26. PCT
DRY BULB TEMP. 24.4 DEG C(76.0 DEG F)
ABS. HUMIDITY 5.0 GM/KG

NOX HUMIDITY CORRECTION FACTOR .84

BAG RESULTS

TEST CYCLE	IDLE
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	36.1 (97.0)
BLOWER REVOLUTIONS	11864.
TOT FLOW STD. CU. METRES(SCF)	354.1 (12502.)
THC SAMPLE METER/RANGE/PPM	20.7/11/ 21.
THC BCKGRD METER/RANGE/PPM	3.2/ 1/ 3.
CO SAMPLE METER/RANGE/PPM	22.6/13/ 21.
CO BCKGRD METER/RANGE/PPM	.5/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	47.1/13/ .0924
CO2 BCKGRD METER/RANGE/PCT	20.6/13/ .0378
NOX SAMPLE METER/RANGE/PPM	4.8/ 2/ 4.8
NOX BCKGRD METER/RANGE/PPM	1.7/ 2/ 1.7
DILUTION FACTOR	139.69
THC CONCENTRATION PPM	18.
CO CONCENTRATION PPM	20.
CO2 CONCENTRATION PCT	.0549
NOX CONCENTRATION PPM	3.1
FILTER WT. MG (EFFICIENCY, %)	.445 (83.)
THC MASS GRAMS	3.58
CO MASS GRAMS	8.23
CO2 MASS GRAMS	355.9
NOX MASS GRAMS	1.77
PARTICULATE MASS GRAMS	.37
RUN TIME SECONDS	1200.
DFC, WET (DRY)	.993 (.985)
SCF, WET (DRY)	1.000 (.991)
VOL (SCM)	354.1
SAM BLR (SCM)	67.29
KM (MEASURED)	5.00
TEST NUMBER,	526103
BAROMETER, MM HG	748.0
HUMIDITY, G/KG	5.0
TEMPERATURE, DEG C	24.4
CARBON DIOXIDE, G/KM	71.2
FUEL CONSUMPTION, L/100KM	2.78
HYDROCARBONS, (THC) G/KM	.72
CARBON MONOXIDE, G/KM	1.65
OXIDES OF NITROGEN, G/KM	.35
PARTICULATES, G/KM	.074

50 KPH- VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 526504 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/12/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-526-F
ODOMETER 4844. KM(3010. MILES)

BAROMETER 748.28 MM HG(29.46 IN HG)
RELATIVE HUMIDITY 27. PCT
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)
ABS. HUMIDITY 5.3 GM/KG

NOX HUMIDITY CORRECTION FACTOR .85

BAG RESULTS

TEST CYCLE	50 KPH
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	36.7 (98.0)
BLOWER REVOLUTIONS	5934.
TOT FLOW STD. CU. METRES(SCF)	176.8 (6242.)
THC SAMPLE METER/RANGE/PPM	16.9/12/ 34.
THC BCKGRD METER/RANGE/PPM	3.0/ 1/ 3.
CO SAMPLE METER/RANGE/PPM	35.1/13/ 32.
CO BCKGRD METER/RANGE/PPM	.1/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	80.1/12/ .3454
CO2 BCKGRD METER/RANGE/PCT	11.8/12/ .0400
NOX SAMPLE METER/RANGE/PPM	16.9/ 2/ 16.9
NOX BCKGRD METER/RANGE/PPM	1.4/ 2/ 1.4
DILUTION FACTOR	38.31
THC CONCENTRATION PPM	31.
CO CONCENTRATION PPM	32.
CO2 CONCENTRATION PCT	.3065
NOX CONCENTRATION PPM	15.5
FILTER WT. MG (EFFICIENCY, %)	2.178 (96.)
THC MASS GRAMS	3.14
CO MASS GRAMS	6.56
CO2 MASS GRAMS	991.8
NOX MASS GRAMS	4.46
PARTICULATE MASS GRAMS	1.50
RUN TIME SECONDS	600.
DFC, WET (DRY)	.974 (.965)
SCF, WET (DRY)	1.000 (.988)
VOL (SCM)	176.8
SAM BLR (SCM)	33.92
KM (MEASURED)	8.35
TEST NUMBER,	526504
BAROMETER, MM HG	748.3
HUMIDITY, G/KG	5.3
TEMPERATURE, DEG C	25.0
CARBON DIOXIDE, G/KM	118.7
FUEL CONSUMPTION, L/100KM	4.42
HYDROCARBONS, (THC) G/KM	.38
CARBON MONOXIDE, G/KM	.79
OXIDES OF NITROGEN, G/KM	.53
PARTICULATES, G/KM	.179

85 KPH- VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 526805 RUN 1
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/12/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-526-F
ODOMETER 4854. KM(3016. MILES)

BAROMETER 748.54 MM HG(29.47 IN HG)
RELATIVE HUMIDITY 24. PCT
DRY BULB TEMP. 25.0 DEG C(77.0 DEG F)
ABS. HUMIDITY 4.7 GM/KG

NOX HUMIDITY CORRECTION FACTOR .84

BAG RESULTS

TEST CYCLE	85 KPH
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	39.4 (103.0)
BLOWER REVOLUTIONS	5933.
TOT FLOW STD. CU. METRES(SCF)	175.5 (6197.)
THC SAMPLE METER/RANGE/PPM	26.2/12/ 52.
THC BCKGRD METER/RANGE/PPM	3.0/ 1/ 3.
CO SAMPLE METER/RANGE/PPM	81.1/13/ 80.
CO BCKGRD METER/RANGE/PPM	.5/13/ 0.
CO2 SAMPLE METER/RANGE/PCT	74.8/11/ .6729
CO2 BCKGRD METER/RANGE/PCT	6.9/11/ .0412
NOX SAMPLE METER/RANGE/PPM	38.4/ 2/ 38.4
NOX BCKGRD METER/RANGE/PPM	1.4/ 2/ 1.4
DILUTION FACTOR	19.66
THC CONCENTRATION PPM	50.
CO CONCENTRATION PPM	78.
CO2 CONCENTRATION PCT	.6338
NOX CONCENTRATION PPM	37.1
FILTER WT. MG (EFFICIENCY, %)	5.845 (99.)
THC MASS GRAMS	5.00
CO MASS GRAMS	16.00
CO2 MASS GRAMS	2036.3
NOX MASS GRAMS	10.40
PARTICULATE MASS GRAMS	4.41
RUN TIME SECONDS	600.
DFC, WET (DRY)	.949 (.942)
SCF, WET (DRY)	1.000 (.986)
VOL (SCM)	175.5
SAM BLR (SCM)	33.81
KM (MEASURED)	14.24
TEST NUMBER,	526805
BAROMETER, MM HG	748.5
HUMIDITY, G/KG	4.7
TEMPERATURE, DEG C	25.0
CARBON DIOXIDE, G/KM	143.0
FUEL CONSUMPTION, L/100KM	5.33
HYDROCARBONS, (THC) G/KM	.35
CARBON MONOXIDE, G/KM	1.12
OXIDES OF NITROGEN, G/KM	.73
PARTICULATES, G/KM	.309

FTP - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 526F06 RUN 2
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/15/82
BAG CART NO. 1 / CVS NO. 17
DYNO NO. 2

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-526-F
ODOMETER 4881. KM(3033. MILES)

BAROMETER 753.87 MM HG(29.68 IN HG)
RELATIVE HUMIDITY 16. PCT
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)
ABS. HUMIDITY 2.9 GM/KG

NOX HUMIDITY CORRECTION FACTOR .80

BAG RESULTS

BAG NUMBER	1	2	3	4
DESCRIPTION	COLD TRANSIENT	STABILIZED	HOT TRANSIENT	STABILIZED
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)	939.8 (37.0)	927.1 (36.5)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	914.4 (36.0)	927.1 (36.5)	914.4 (36.0)	914.4 (36.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	42.8 (109.0)	36.7 (98.0)	36.1 (97.0)	36.1 (97.0)
BLOWER REVOLUTIONS	4989.	8576.	4991.	8576.
TOT FLOW STD. CU. METRES(SCF)	148.3 (5237.)	258.2 (9118.)	150.7 (5322.)	259.0 (9146.)
THC SAMPLE METER/RANGE/PPM	20.1/12/ 40.	7.9/12/ 16.	14.0/12/ 28.	7.3/12/ 15.
THC BCKGRD METER/RANGE/PPM	4.0/ 1/ 4.	6.0/ 1/ 6.	6.0/ 1/ 6.	6.0/ 1/ 6.
CO SAMPLE METER/RANGE/PPM	48.8/13/ 46.	23.8/13/ 22.	46.6/13/ 44.	26.0/13/ 24.
CO BCKGRD METER/RANGE/PPM	1.2/13/ 1.	1.2/13/ 1.	1.4/13/ 1.	1.4/13/ 1.
CO2 SAMPLE METER/RANGE/PCT	94.7/12/ .4318	63.8/12/ .2601	84.9/12/ .3726	62.9/12/ .2557
CO2 BCKGRD METER/RANGE/PCT	12.3/12/ .0418	12.3/12/ .0418	11.9/12/ .0404	12.3/12/ .0418
NOX SAMPLE METER/RANGE/PPM	18.5/ 2/ 18.5	12.0/ 2/ 12.0	17.7/ 2/ 17.7	11.8/ 2/ 11.8
NOX BCKGRD METER/RANGE/PPM	.6/ 2/ .6	.7/ 2/ .7	.5/ 2/ .5	.6/ 2/ .6
DILUTION FACTOR	30.62	51.11	35.51	51.97
THC CONCENTRATION PPM	36.	10.	22.	9.
CO CONCENTRATION PPM	44.	20.	42.	22.
CO2 CONCENTRATION PCT	.3914	.2191	.3334	.2147
NOX CONCENTRATION PPM	17.9	11.3	17.2	11.2
FILTER WT. MG (EFFICIENCY, %)	3.597 (99.)	1.741 (97.)	1.906 (97.)	2.867 (98.)
THC MASS GRAMS	3.10	1.48	1.92	1.31
CO MASS GRAMS	7.65	6.15	7.37	6.73
CO2 MASS GRAMS	1062.6	1036.0	920.0	1018.1
NOX MASS GRAMS	4.04	4.45	3.95	4.42
PARTICULATE MASS GRAMS	2.39	1.21	1.30	1.99
THC GRAMS/KM	.54	.24	.33	.21
CO GRAMS/KM	1.33	.98	1.27	1.07
CO2 GRAMS/KM	184.7	165.8	159.1	161.8
NOX GRAMS/KM	.70	.71	.68	.70
FUEL CONSUMPTION BY CB L/100KM	6.88	6.14	5.92	5.99
RUN TIME SECONDS	505.	867.	505.	868.
MEASURED DISTANCE KM	5.75	6.25	5.78	6.29
SCF, DRY	.991	.992	.992	.992	.993
DFC, WET (DRY)	.976(.971)		.977(.973)	
TOT VOL (SCM) / SAM BLR (SCM)	406.5/ 80.25		409.7/ 80.19	
KM (MEASURED)	12.00		12.08	
FUEL CONSUMPTION L/100KM	6.50		5.96	

COMPOSITE RESULTS

TEST NUMBER		526F06
BAROMETER	MM HG	753.9
HUMIDITY	G/KG	2.9
TEMPERATURE	DEG C	23.9

		3-BAG	(4-BAG)
CARBON DIOXIDE	G/KM	167.8	(166.7)
FUEL CONSUMPTION	L/100KM	6.23	(6.19)
HYDROCARBONS (THC)	G/KM	.32	(.32)
CARBON MONOXIDE	G/KM	1.13	(1.16)
OXIDES OF NITROGEN	G/KM	.70	(.70)
PARTICULATES	G/KM	.248	(.284)

HFET - VEHICLE EMISSIONS RESULTS -
PROJECT 05-6619-005

TEST NO. 526H07 RUN 2
VEHICLE MODEL 80 VW RABBIT
ENGINE 1.5 L(90. CID) L-4
TRANSMISSION M4

VEHICLE NO.1
DATE 11/15/82
BAG CART NO. 1
DYNO NO. 2
CVS NO. 17

TEST WEIGHT 1021. KG(2250. LBS)
ACTUAL ROAD LOAD 5.4 KW(7.3 HP)
DIESEL EM-526-F
ODOMETER 4907. KM(3049. MILES)

BAROMETER 752.60 MM HG(29.63 IN HG)
RELATIVE HUMIDITY 19. PCT
DRY BULB TEMP. 23.9 DEG C(75.0 DEG F)
ABS. HUMIDITY 3.5 GM/KG

NOX HUMIDITY CORRECTION FACTOR .81

BAG RESULTS

TEST CYCLE	HFET
BLOWER DIF P MM. H2O(IN. H2O)	927.1 (36.5)
BLOWER INLET P MM. H2O(IN. H2O)	889.0 (35.0)
BLOWER INLET TEMP. DEG. C(DEG. F)	37.2 (99.0)
BLOWER REVOLUTIONS	7565.
TOT FLOW STD. CU. METRES(SCF)	227.0 (8014.)
THC SAMPLE METER/RANGE/PPM	28.2/12/ 56.
THC BCKGRD METER/RANGE/PPM	7.0/ 1/ 7.
CO SAMPLE METER/RANGE/PPM	85.0/13/ 85.
CO BCKGRD METER/RANGE/PPM	1.8/13/ 2.
CO2 SAMPLE METER/RANGE/PCT	69.8/11/ .6099
CO2 BCKGRD METER/RANGE/PCT	7.0/11/ .0419
NOX SAMPLE METER/RANGE/PPM	34.7/ 2/ 34.7
NOX BCKGRD METER/RANGE/PPM	.5/ 2/ .5
DILUTION FACTOR	21.62
THC CONCENTRATION PPM	50.
CO CONCENTRATION PPM	82.
CO2 CONCENTRATION PCT	.5699
NOX CONCENTRATION PPM	34.2
FILTER WT. MG (EFFICIENCY, %)	7.761 (99.)
THC MASS GRAMS	6.48
CO MASS GRAMS	21.61
CO2 MASS GRAMS	2368.3
NOX MASS GRAMS	11.99
PARTICULATE MASS GRAMS	5.65
RUN TIME SECONDS	765.
DFC, WET (DRY)	.954 (.948)
SCF, WET (DRY)	1.000 (.988)
VOL (SCM)	227.0
SAM BLR (SCM)	43.48
KM (MEASURED)	16.54
TEST NUMBER,	526H07
BAROMETER, MM HG	752.6
HUMIDITY, G/KG	3.5
TEMPERATURE, DEG C	23.9
CARBON DIOXIDE, G/KM	143.2
FUEL CONSUMPTION, L/100KM	5.35
HYDROCARBONS, (THC) G/KM	.39
CARBON MONOXIDE, G/KM	1.31
OXIDES OF NITROGEN, G/KM	.73
PARTICULATES, G/KM	.342

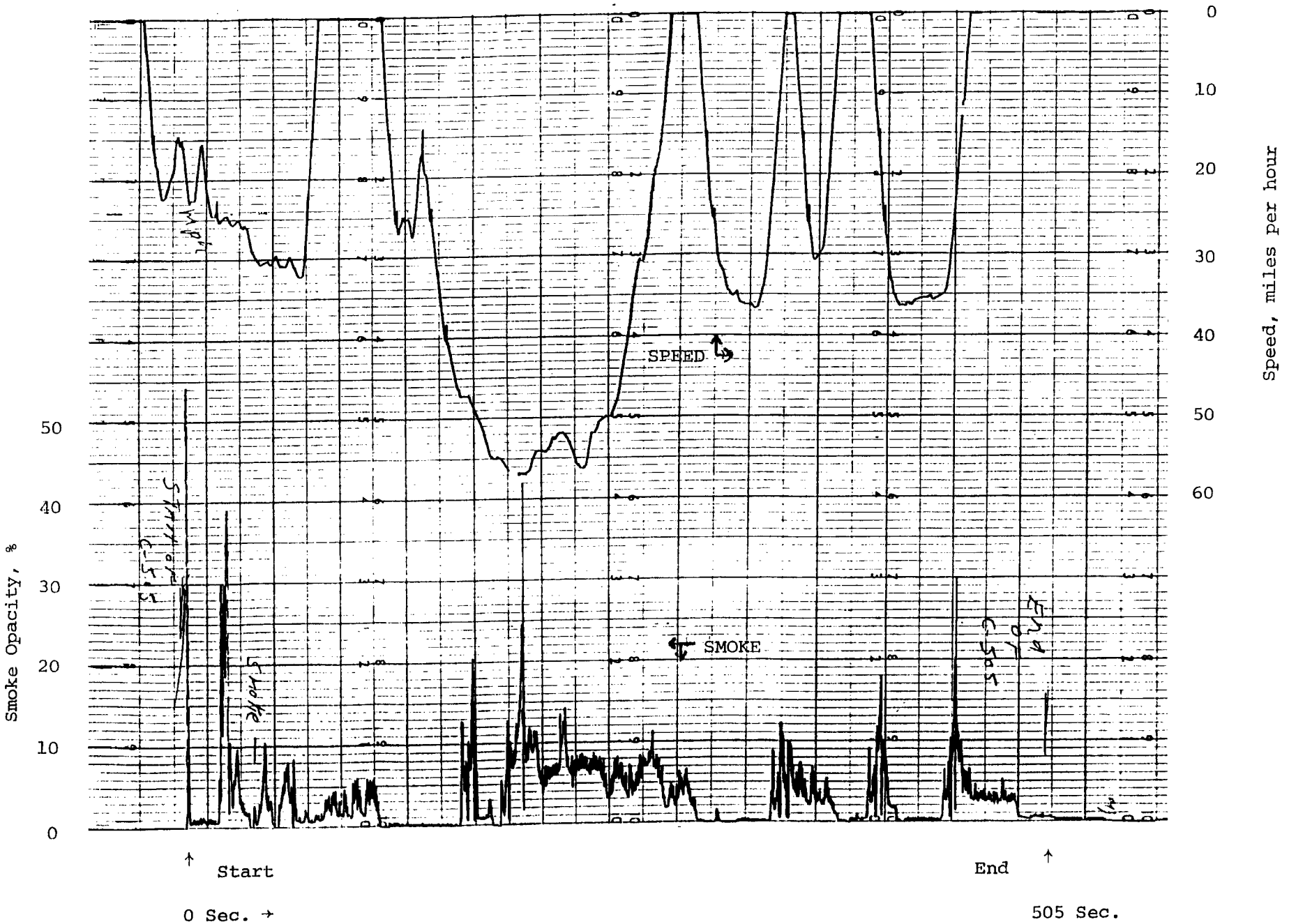


Figure C-1. Smoke opacity and vehicle speed vs. time for the first 505 seconds of a cold-start FTP, VW Rabbit Diesel, EM-527-F, SASOL, 11/11/82.

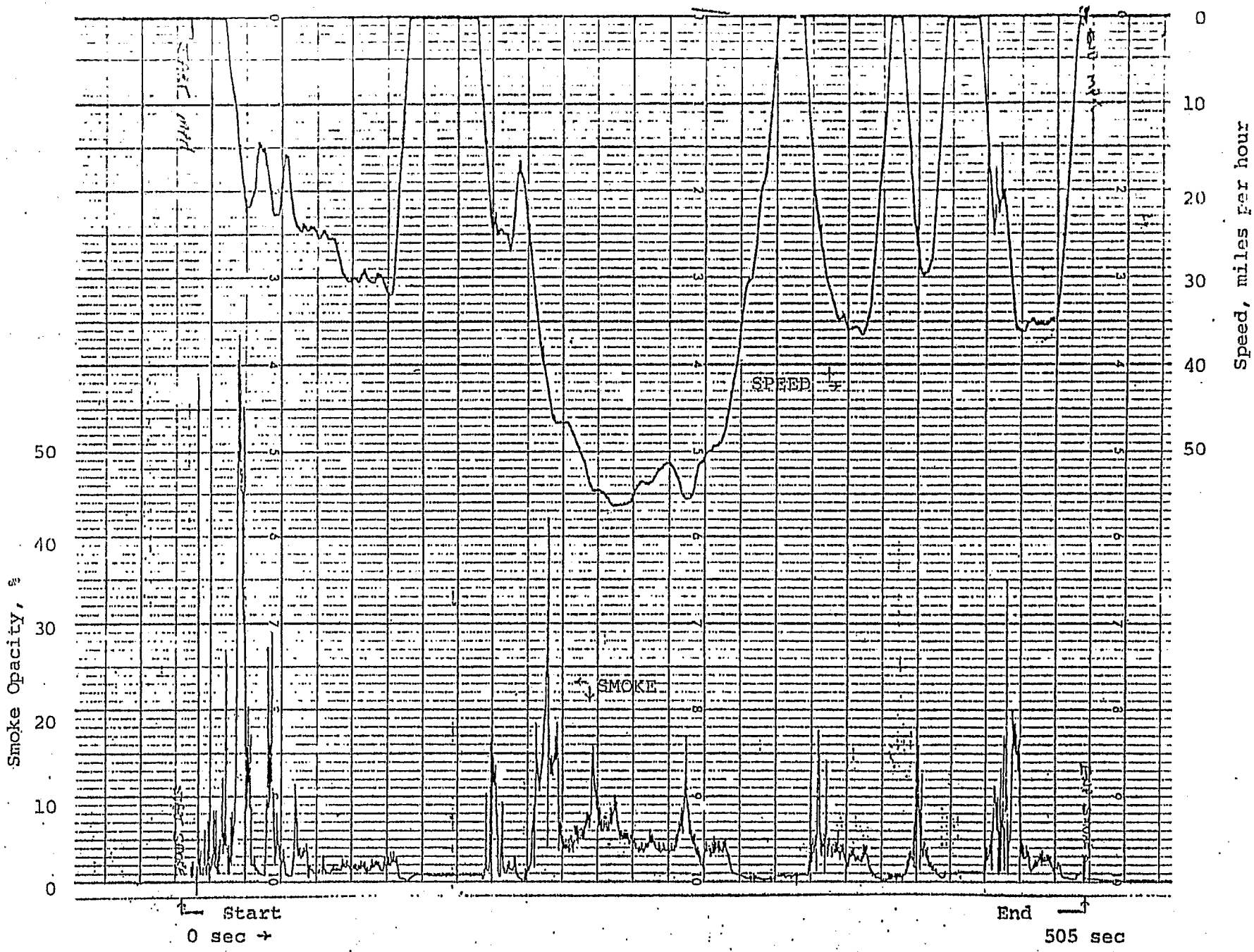


Figure C-2. Smoke opacity and vehicle speed vs time for the first 505 seconds of a cold-start FTP, VW Rabbit Diesel, EM-478-F, 25% SRC-II, 7/21/81
The trace is similar to what was observed using EM-526, 25% H-Coal.

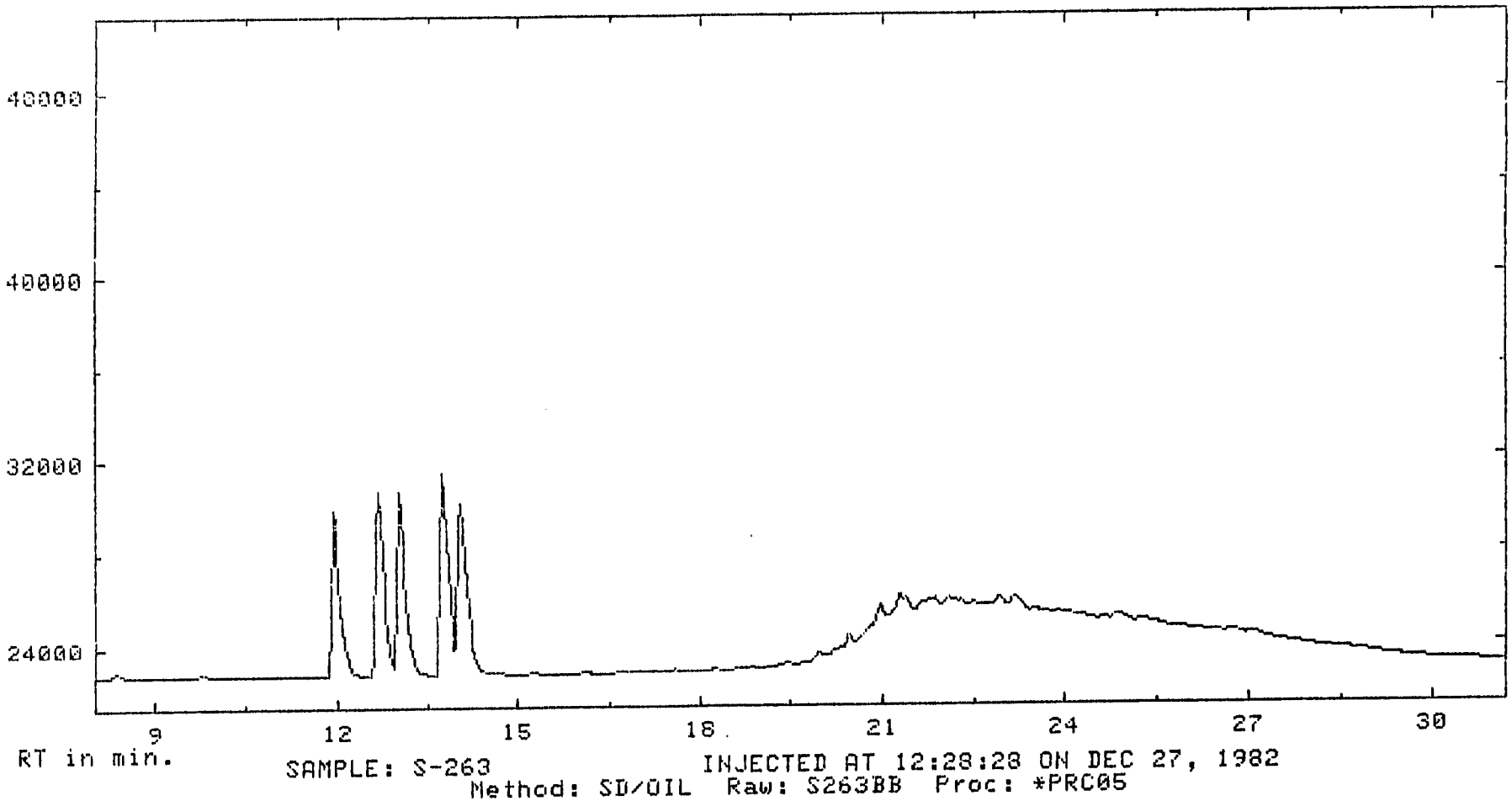


Figure C-3. Chromatogram of organic solubles from particulate matter, vehicle operated on EM-527-F fuel during FTP.

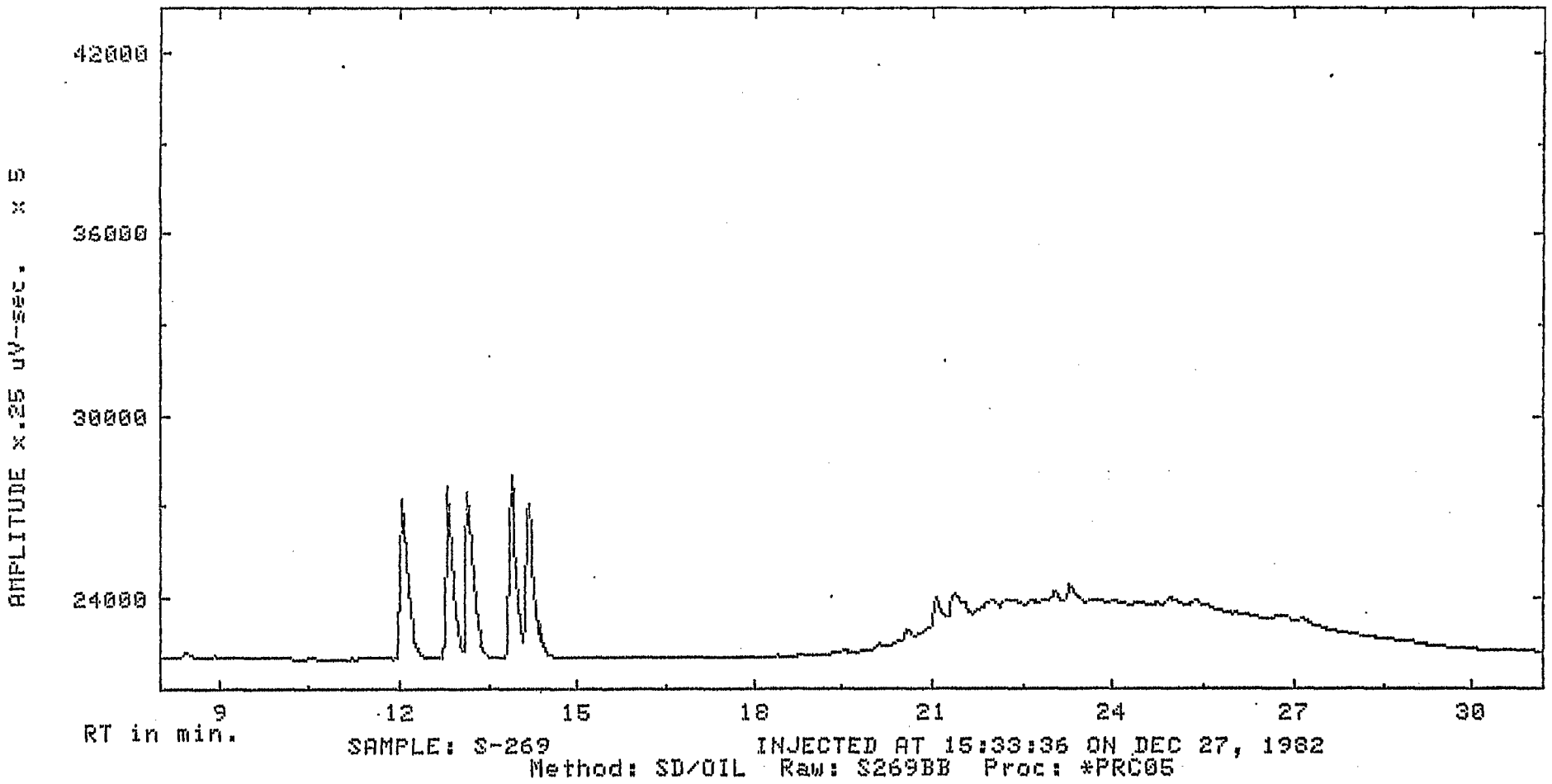


Figure C-4. Chromatogram of organic solubles from particulate matter, vehicle operated on EM-527-F fuel during HFET.

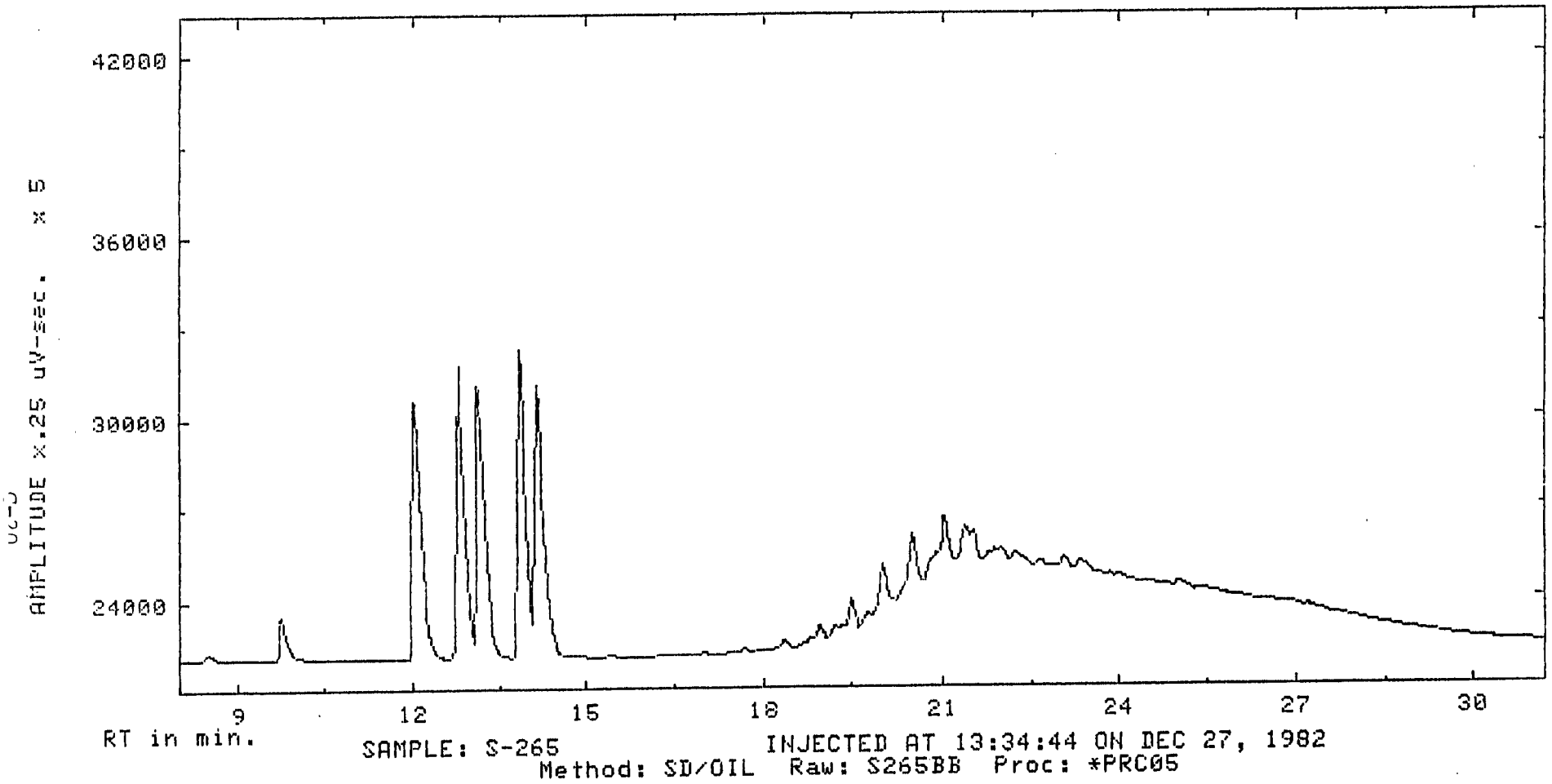


Figure C-5. Chromatogram of organic solubles from particulate matter, vehicle operated on EM-526-F fuel during FTP.

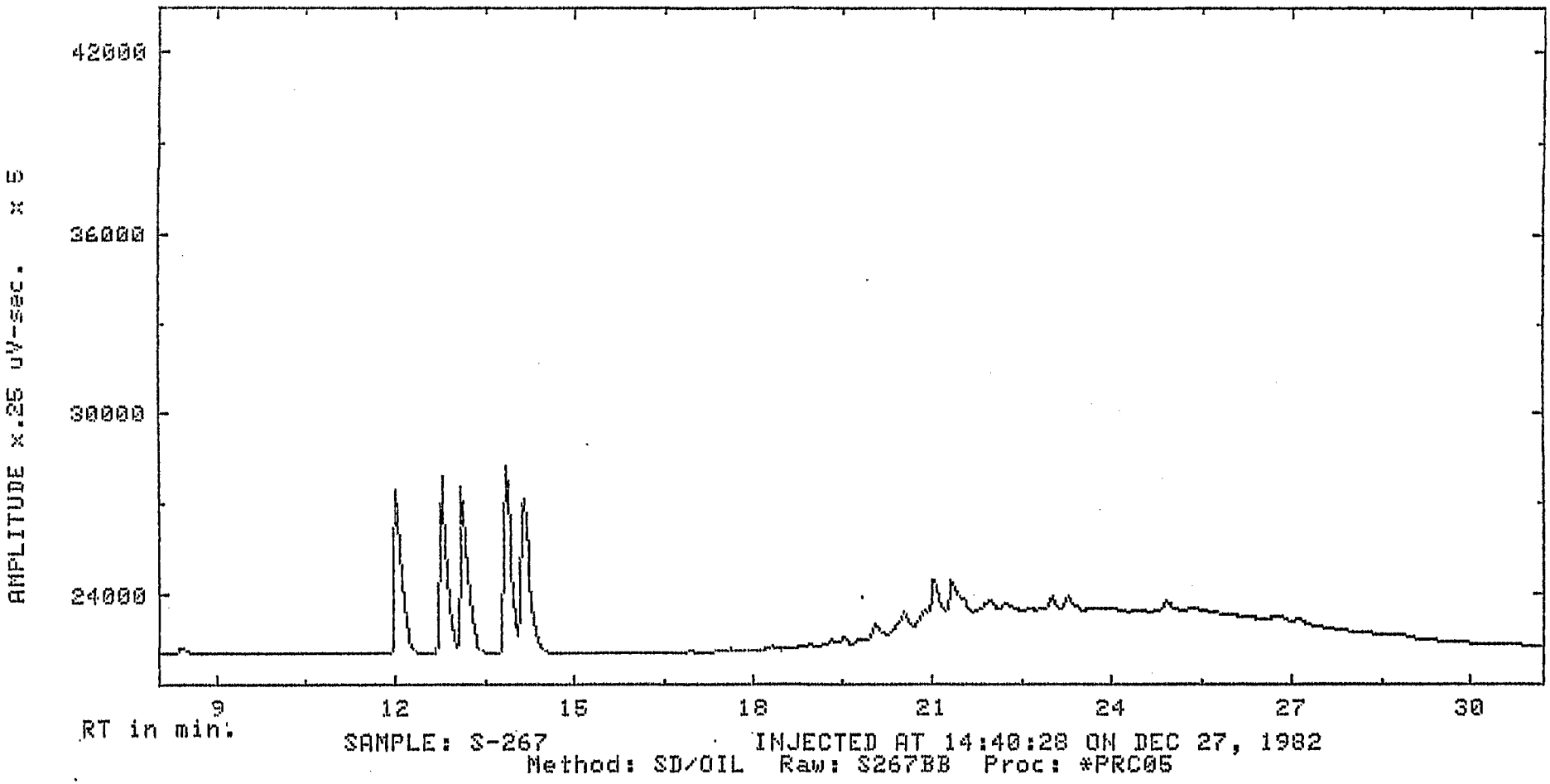


Figure C-6. Chromatogram of organic solubles from particulate matter, vehicle operated on EM-526-F fuel during HFET.

APPENDIX D

STATISTICAL ANALYSIS RESULTS

SOUTHWEST RESEARCH INSTITUTE

INTER-DEPARTMENTAL MEMORANDUM

October 4, 1982

TO: Bruce Bykowski

FROM: R.L. Mason

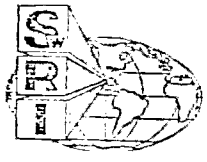
SUBJECT: Response to 05-6619-005 Task Order

The analysis approach proposed for meeting the objectives of the current task order is discussed in the following paragraphs. Attempts have been made to strengthen the statistical arguments while minimizing the number of assumptions and maximizing the application of the conclusions.

Experiments involving the study of the relationships between exhaust emissions and fuel properties are known to depend on several factors. These include, as a minimum, the vehicle on which the tests are run, the type of fuel, the test cycle, and the measurement techniques. Further, it is well known that the quantity of a given exhaust emission depends on a variety of fuel properties and that this type of an association precludes simple one-to-one relationships between a given emission and a specific fuel property.

The above facts have an important effect in any effort aimed at combining various studies on emissions. First, these studies most probably will have varying experimental conditions resulting in experiments utilizing different vehicles, fuels, test cycles and measurement techniques. Second, each experiment may yield differing prediction equations relating emissions to fuel properties. These equations will be based on different sample sizes as well as experimental conditions. Third, the experimental results will have wide variation as a result of the many sources of variation. This will result in differing levels of fit with some prediction equations yielding large correlation coefficients while others yield moderate-to-low correlations.

Any analysis plan devised for combining the data from many studies on petroleum-based fuels will be, at best, descriptive in nature as a result of the previous arguments. Nevertheless, it is possible to obtain some helpful information by the usage of both graphical displays of the data as well as some simple statistical techniques. The proposed method involves reviewing each study concerned with predicting emission trends from petroleum-based fuels and determining which indicate similar relationships.



Due to the difficulties involved in displaying and comparing multiple-variable equations, the primary effort in this task will be devoted to studying one-to-one relationships between exhaust emissions and fuel properties. However, if enough data are available, some effort may be given to expanding the analysis plan to consider multi-variable relationships.

Since each experiment may be using different data ranges for the fuel properties (e.g., due to differing fuel types or test vehicles), the data from each study as well as from the alternate-source fuel study must be normalized to a common point. This will yield more meaningful comparisons. Hence, the data from each study will be normalized to a predetermined fuel property level (e.g., 30% aromatics).

Three procedures will be used to analyze the normalized data. These include the following:

1. Graphical Comparison

The normalized data from each study will be plotted on a graph of the emission of interest versus a specific fuel property. In this manner a region of interest will be established within which will lie the data from all petroleum-based studies. The normalized data from the alternate-source fuel will be plotted on the same graph to determine if the data fall inside or outside the region of interest.

2. Curve-Fitting Comparison

The normalized emissions data from each study will be fitted with a least squares regression line using a specified fuel property as the predictor variable. Similarly an equation will be used to fit the alternate-fuel data. These lines will be plotted on a graph similar to the one given as an example in Figure 1. The lines from the petroleum-fuel data will form a region representing the dispersion for such studies. The effects of using alternate-source fuels can be determined by observing where the alternate-source fuel line falls relative to the petroleum-based fuel band.

3. Average Comparison

Although the prediction equations obtained in step 2 will be based on varying experimental conditions and sample sizes, and will have differing degrees of fit (i.e., correlation coefficients), an attempt will be made to fit all the petroleum-based fuel data using a single regression line. This combined equation then could be used as a comparison for the alternate-source fuel fit. One means of accomplishing this analysis is to form an "average" line whose intercept and slope are the average of the intercepts and slopes, respectively, of the individual lines. Another approach might be to fit all the petroleum-data to a single line; however, this method

would give undue emphasis to studies with better fits and more data. The resulting "average" fit could be used with the fuel property data from the alternate-source study to obtain predicted emission values that could be compared to the observed emission data from the alternate-source study.

This comparison would be accomplished using a goodness-of-fit statistic such as

$$X^2 = \sum_{i=1}^{n} \frac{(\text{Observed} - \text{Predicted})^2}{\text{Predicted}}$$

While X^2 is not a chi-square statistic (as would occur in a single experiment with random observations) it is similar to it and the chi-square table can be used to provide guidelines for determining whether the observed and predicted values differ.

A brief example of a typical plot of the data resulting from the above study is shown in Figure 1.

It shows that the alternate-source study's effect of aromatics is greater than the average of all petroleum-based studies reviewed. The alternate-source study's fuel aromatic contents could be inserted into the linear equation for the average of studies A, B, C, D to yield particulate emissions as if the alternate fuels were petroleum-based fuels. The predicted particulate values could be compared to actual observed particulate emissions. Where appropriate, additional comparisons would be made between the alternate-source study and individual studies. For example, if study "A" represented results from a petroleum-based study which incorporated the same vehicle type and driving cycle as the alternate-source study, then the results would indicate that the alternate-source fuels exhibit less of a particulate emission increase as compared with the petroleum-based fuels.

The previous discussions describe the statistical approach for combining the data from the various studies and the expected output from the analysis. In summary, descriptive statistical techniques based on plotting the data and fitting curves to the data will be utilized in order to compare the effects of petroleum-based fuels on exhaust emissions to those of alternate-source fuels on emissions.

The proposed methodology has some severe limitations which restrict the application of more advanced statistical concepts. These include the usage of experiments performed at differing times under differing test conditions and with differing objectives. Due to these facets, it is expected that only some general trend information will be available at the conclusion of this project.

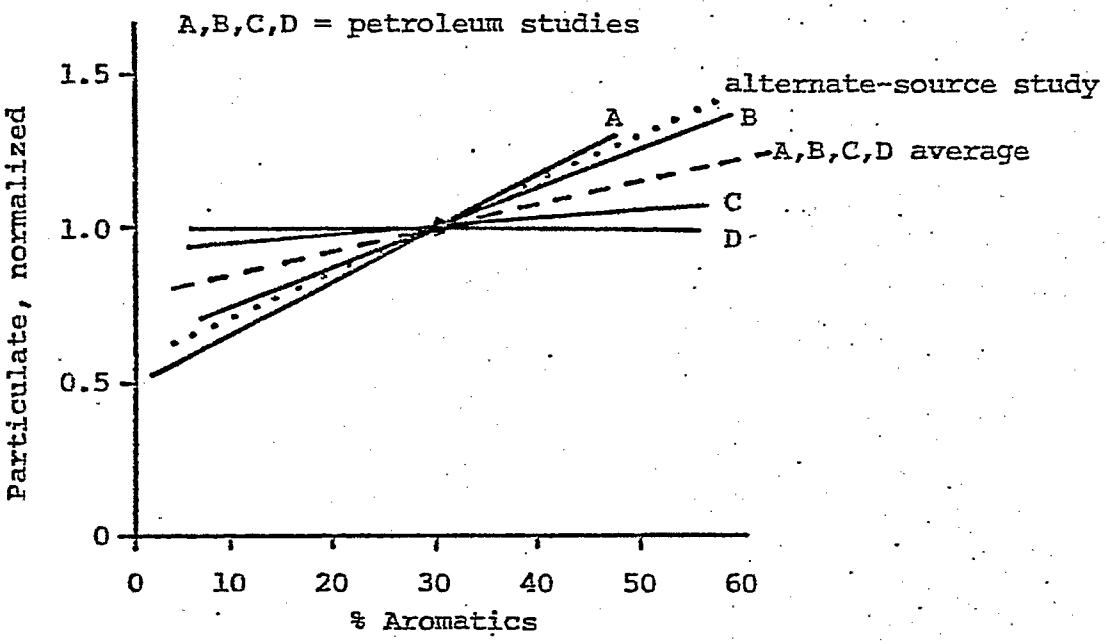


Figure 1. Particulate index vs. percent aromatics

STUDY INFO	ID	FUEL CODE	CETANE NO.	DENSITY G/ML	N PPM	ARO. VOL %	OLE. VOL %	10%PT DEG C	90%PT DEG C	HC G/KM	CO G/KM	NOX G/KM	PART. G/KM	FUEL L/100KM	BAP UG/KM	ALDE. MG/KM	PHEN. MG/KM	SOLUBLE MG/KM
A1	1.	395.	62.	0.793	1.	5.8	1.5	211.	224.	0.09	0.52	0.75	0.171	9.46	0.59	0.31	1.69	27.0
A1	1.	401.	55.	0.800	1.	2.7	1.9	206.	239.	0.11	0.50	0.85	0.151	9.55	0.42	4.89	0.00	23.7
A1	1.	404.	62.	0.794	479.	6.1	1.5	211.	224.	0.08	0.47	0.76	0.162	9.50	0.25	0.30	4.33	21.7
A1	1.	405.	61.	0.795	930.	6.6	1.5	210.	224.	0.08	0.46	0.89	0.162	9.59	0.35	15.2	29.4	17.0
A1	1.	430.	63.	0.796	493.	8.8	1.8	210.	228.	0.09	0.52	0.84	0.180	9.76	0.96	0.00	128.	22.9
A1	1.	434.	44.	0.825	5.	31.5	2.9	206.	234.	0.12	0.59	0.88	0.212	9.52	0.37	2.80	0.66	27.6
A1	1.	438.	64.	0.793	1.	6.8	6.6	210.	224.	0.09	0.48	0.85	0.155	9.84	0.21	0.00	0.17	28.4
A1	1.	448.	56.	0.783	1.	4.9	1.8	189.	223.	0.11	0.48	0.82	0.142	9.51	0.51	8.18	0.21	26.7
A1	1.	460.	46.	0.815	1.	32.1	1.0	209.	224.	0.13	0.60	0.92	0.219	9.56	0.73	0.00	1.30	30.2
A1	1.	461.	68.	0.791	1.	5.1	1.0	216.	251.	0.08	0.47	0.86	0.159	9.63	0.43	8.83	0.55	26.2
A1	1.	463.	60.	0.826	718.	30.8	1.2	206.	234.	0.13	0.66	1.04	0.287	9.62	0.43	0.00	0.18	34.7
B1	2.	238.	53.	0.845	50.	29.8	1.6	213.	313.	0.12	0.57	0.78	0.329	8.48	0.39	16.9	----	36.7
B1	2.	239	47.	0.844	50.	21.6	0.8	216.	303.	0.19	0.64	0.79	0.314	8.60	0.46	15.9	----	30.6
B1	2.	240.	47.	0.806	60.	13.0	3.4	181.	238.	0.09	0.57	0.73	0.235	8.51	0.32	16.0	----	28.3
B1	2.	241.	41.	0.861	240.	34.6	1.0	216.	301.	0.20	0.71	0.88	0.380	9.38	0.62	23.9	----	28.7
B1	2.	242.	50.	0.831	80.	12.4	0.8	213.	310.	0.12	0.68	0.85	0.292	9.38	0.23	16.9	----	26.1
B2	3.	238.	53.	0.845	50.	29.8	1.6	213.	313.	0.18	0.49	0.59	0.225	5.71	1.13	28.7	----	24.4
B2	3.	239.	47.	0.844	50.	21.6	0.8	216.	303.	0.20	0.51	0.65	0.218	5.60	1.33	12.6	----	28.8
B2	3.	240.	47.	0.806	60.	13.0	3.4	181.	238.	0.17	0.55	0.57	0.177	5.71	1.18	18.0	----	26.6
B2	3.	241.	41.	0.861	240.	34.6	1.0	216.	301.	0.71	0.81	0.58	0.375	6.17	3.64	52.5	----	58.4
B2	3.	242.	50.	0.831	80.	12.4	0.8	213.	310.	0.20	0.52	0.63	0.194	5.89	1.05	13.4	----	26.4
C1	4.	1.	47.	0.806	----	13.0	3.4	181.	238.	0.21	0.80	1.12	0.231	7.99	0.96	22.6	----	71.6
C1	4.	2.	47.	0.832	----	27.0	1.8	204.	280.	0.19	0.78	1.14	0.308	8.34	----	24.2	----	----
C1	4.	3.	49.	0.844	----	21.6	0.8	216.	303.	0.29	0.88	1.64	0.247	8.87	----	37.4	----	----
C1	4.	4.	49.	0.843	----	26.5	0.9	214.	306.	0.30	0.90	1.43	0.316	8.89	0.98	34.7	----	74.0
D1	5.	20.	50.	0.850	----	35.1	0.0	223.	316.	0.15	0.68	0.85	0.172	8.06	----	31.1	----	----
D1	5.	2.	47.	0.847	----	28.8	1.4	217.	309.	0.21	0.84	0.83	0.187	7.71	----	29.6	----	----
D1	5.	1.	48.	0.835	----	22.8	1.1	205.	297.	0.26	0.88	0.81	0.178	7.79	----	23.0	----	----
F1	6.	1.	48.4	0.829	----	23.7	0.96	197.	290.	0.31	0.71	0.46	----	4.97	----	----	----	----
F1	6.	4.	50.0	0.809	----	19.2	0.70	151.	303.	0.37	0.74	0.46	----	5.16	----	----	----	----
F1	6.	5.	43.5	0.840	----	36.9	0.72	139.	308.	1.74	1.50	0.38	----	5.05	----	----	----	----
F1	6.	6.	----	0.800	----	19.2	0.72	136.	279.	----	0.87	0.40	----	5.29	----	----	----	----
F2	7.	1.	48.4	0.829	----	23.7	0.96	197.	290.	0.55	1.23	0.96	----	12.32	----	----	----	----
F2	7.	5.	43.5	0.840	----	36.9	0.72	139.	308.	0.30	1.17	1.12	----	12.99	----	----	----	----
F2	7.	6.	----	0.800	----	19.2	0.72	136.	279.	0.29	1.08	0.96	----	12.38	----	----	----	----
G1	8.	7812.	61.0	0.784	----	0.0	----	209.	247.	----	----	----	----	----	----	----	----	----
G1	8.	7938.	45.7	0.810	----	13.0	----	206.	226.	----	----	----	----	----	----	----	----	----
G1	8.	7941.	47.7	0.820	----	13.0	----	213.	309.	0.1	0.4	1.0	0.11	10.7	----	----	----	19.3
G1	8.	8017.	44.9	0.811	----	17.0	----	188.	244.	----	----	----	----	----	----	----	----	----
G1	8.	7939.	41.2	0.823	----	20.0	----	203.	249.	0.1	0.4	1.1	0.14	11.2	----	----	----	31.7
G1	8.	7942.	41.1	0.819	----	20.0	----	201.	227.	0.1	0.4	0.9	0.11	9.8	----	----	----	25.5
G1	8.	7926.	44.2	0.852	----	32.0	----	214.	306.	0.1	0.5	1.0	0.12	10.2	----	----	----	39.8
G1	8.	7943.	39.8	0.835	----	32.0	----	199.	312.	0.2	0.6	0.9	0.11	10.2	----	----	----	19.3
G1	8.	7940.	37.0	0.830	----	34.0	----	199.	251.	0.1	0.5	0.9	0.11	9.8	----	----	----	31.7
G2	9.	7812.	61.0	0.784	----	0.0	----	209.	247.	0.7	1.2	0.9	0.10	----	----	----	----	39.8
G2	9.	7938.	45.7	0.810	----	13.0	----	206.	226.	0.1	0.5	0.7	0.14	11.2	----	----	----	41.0
G2	9.	7941.	47.7	0.820	----	13.0	----	213.	309.	0.1	0.6	0.8	0.15	11.8	----	----	----	44.7
G2	9.	8017.	44.9	0.811	----	17.0	----	188.	244.	0.2	0.7	0.9	0.12	----	----	----	----	31.1
G2	9.	7939.	41.2	0.823	----	20.0	----	203.	249.	0.1	0.6	0.8	0.13	11.	----	----	----	32.9
G2	9.	7942.	41.4	0.819	----	20.0	----	201.	227.	0.1	0.6	0.8	0.14	13.1	----	----	----	57.2
G2	9.	7926.	44.2	0.852	----	32.0	----	214.	306.	0.2	0.9	0.9	0.19	11.8	----	----	----	40.4
G2	9.	7943.	39.8	0.835	----	32.0	----	199.	312.	0.2	0.6	0.8	0.14	11.2	----	----	----	29.8
G2	9.	7940.	37.0	0.830	----	34.0	----	199.	251.	0.2	0.7	0.8	0.16	11.2	----	----	----	34.2
H1	10.	2.	27.	0.707	----	7.0	4.0	54.	130.		----				----	----	----	61.4
H1	10.	3.	45.	0.707	----	7.0	4.0	54.	130.		----				----	----	----	30.3
H1	10.	6.	28.	0.678	----	3.0	3.0	63.	92.		----				----	----	----	48.9
H1	10.	7.	47.	0.678	----	3.0	3.0	63.	92.		----				----	----	----	24.8
H1	10.	9.	28.	0.723	----	6.0	1.0	79.	122.		----				----	----	----	45.5
H1	10.	11.	49.	0.817	----	17.0	4.0	201.	255.		----				----	----	----	20.1
H1	10.	13.	39.	0.789	----	13.0	2.0	165.	186.		----				----	----	----	39.7

STUDY INFO	ID	FUEL CODE	CETANE NO.	DENSITY G/ML	N PPM	ARO. VOL %	OLE. VOL %	10%PT DEG C	90%PT DEG C	HC G/KM	CO G/KM	NOX G/KM	PART. G/KM	FUEL L/100KM	BAP UG/KM	ALDE. MG/KM	PHEN. MG/KM	SOLUBLE MG/KM
H1	10.	15.	41.	0.786	----	14.0	1.0	125.	235.		----				----	----	----	
H1	10.	16.	42.	0.826	----	28.0	2.0	133.	308.		----				----	----	----	
H1	10.	17.	40.	0.879	----	46.0	1.0	267.	320.		----				----	----	----	
H1	10.	18.	46.	0.816	----	19.0	2.0	143.	309.		----				----	----	----	
H1	10.	19.	52.	0.834	----	23.0	4.0	219.	314.		----				----	----	----	
H1	10.	20.	47.	0.845	----	35.0	3.0	198.	296.		----				----	----	----	
H1	10.	21.	50.	0.851	----	35.0	2.0	222.	314.		----				----	----	----	
H1	10.	22.	43.	0.845	----	34.0	3.0	203.	297.		----				----	----	----	
H1	10.	23.	47.	0.851	----	35.0	5.0	221.	314.		----				----	----	----	
H1	10.	24.	43.	0.848	----	33.0	3.0	213.	307.		----				----	----	----	
H1	10.	25.	47.	0.840	----	28.0	3.0	214.	311.		----				----	----	----	
H1	10.	26.	47.	0.813	----	17.0	3.0	190.	247.		----				----	----	----	
H1	10.	27.	54.	0.754	----	7.0	.0	101.	233.		----				----	----	----	
H1	10.	28.	45.	0.843	----	28.0	4.0	222.	303.		----				----	----	----	
H1	10.	30.	31.	0.759	----	13.0	1.0	85.	208.		----				----	----	----	
H1	10.	31.	54.	0.776	----	11.0	1.0	117.	246.		----				----	----	----	
H1	10.	32.	44.	0.864	----	40.0	3.0	233.	311.		----				----	----	----	
H1	10.	33.	50.	0.832	----	24.0	3.0	204.	309.		----				----	----	----	
H1	10.	34.	47.	0.759	----	13.0	1.0	85.	208.		----				----	----	----	
H1	10.	35.	47.	0.789	----	13.0	2.0	165.	186.		----				----	----	----	
H1	10.	36.	47.	0.737	----	14.0	1.0	79.	145.		----				----	----	----	
H1	10.	40.	36.	0.780	----	2.0	2.0	215.	233.		----				----	----	----	
H1	10.	43.	52.	0.849	----	19.0	----	221.	358.		----				----	----	----	
H1	10.	46.	80.	0.840	----	0.1	----	190.	320.		----				----	----	----	
I1	11.	1.	51.0	0.809	----	19.9	----	197.	256.	----	----	----	0.298	----	----	----	----	62.2
I1	11.	2.	48.0	0.851	----	32.7	----	209.	317.	----	----	----	0.435	----	----	----	----	93.2
I1	11.	3.	52.2	0.864	----	20.8	----	262.	364.	----	----	----	0.635	----	----	----	----	311.
I1	11.	4.	45.3	0.883	----	33.7	----	271.	363.	----	----	----	0.827	----	----	----	----	360.
I1	11.	5.	47.7	0.871	----	32.1	----	254.	349.	----	----	----	0.634	----	----	----	----	193.
I1	11.	6.	40.5	0.899	----	47.0	----	261.	364.	----	----	----	0.914	----	----	----	----	342.
I1	11.	7.	48.2	0.843	----	9.7	----	258.	354.	----	----	----	0.392	----	----	----	----	130.
I1	11.	8.	32.6	0.918	----	57.7	----	254.	367.	----	----	----	0.988	----	----	----	----	447.
I1	11.	9.	40.0	0.775	----	12.4	----	112.	224.	----	----	----	0.292	----	----	----	----	53.4
I1	11.	10.	28.0	0.872	----	57.7	----	177.	346.	----	----	----	0.914	----	----	----	----	255.
I1	11.	11.	29.0	0.782	----	1.7	----	211.	246.	----	----	----	0.193	----	----	----	----	35.4
I1	11.	12.	71.1	0.829	----	0.3	----	309.	365.	----	----	----	0.348	----	----	----	----	140.
I1	11.	13.	46.0	0.795	----	0.0	----	221.	342.	----	----	----	0.261	----	----	----	----	116.
I1	11.	14.	52.6	0.808	----	0.0	----	231.	357.	----	----	----	0.305	----	----	----	----	117.
I1	11.	15.	32.0	0.872	----	45.1	----	191.	328.	----	----	----	0.566	----	----	----	----	150.
I2	12.	1.	51.0	0.809	----	19.9	----	197.	256.	----	----	----	0.242	----	----	----	----	31.1
I2	12.	2.	48.0	0.851	----	32.7	----	209.	317.	----	----	----	0.311	----	----	----	----	61.5
I2	12.	4.	45.3	0.883	----	33.7	----	271.	363.	----	----	----	0.423	----	----	----	----	154.
I2	12.	7.	48.2	0.843	----	9.7	----	258.	354.	----	----	----	0.242	----	----	----	----	64.6
I2	12.	11.	29.0	0.782	----	1.7	----	211.	246.	----	----	----	0.155	----	----	----	----	29.2
I2	12.	13.	46.0	0.795	----	0.0	----	221.	342.	----	----	----	0.174	----	----	----	----	41.6
I2	12.	1.	51.0	0.809	----	19.9	----	197.	256.	----	----	----	0.143	----	----	----	----	60.9
I2	12.	2.	48.0	0.851	----	32.7	----	209.	317.	----	----	----	0.180	----	----	----	----	62.8
I2	12.	8.	32.6	0.918	----	57.7	----	254.	367.	----	----	----	0.329	----	----	----	----	204.
I2	12.	11.	29.0	0.782	----	1.7	----	211.	246.	----	----	----	0.081	----	----	----	----	44.7
I2	12.	12.	71.1	0.829	----	0.3	----	309.	365.	----	----	----	0.118	----	----	----	----	71.5
I2	12.	15.	32.0	0.872	----	45.1	----	191.	328.	----	----	----	0.224	----	----	----	----	122.
I2	12.	1.	51.0	0.809	----	19.9	----	197.	256.	----	----	----	0.267	----	----	----	----	46.0
I2	12.	2.	48.0	0.851	----	32.7	----	209.	317.	----	----	----	0.323	----	----	----	----	50.3
I2	12.	4.	45.3	0.883	----	33.7	----	271.	363.	----	----	----	0.329	----	----	----	----	64.6
I2	12.	11.	29.0	0.782	----	1.7	----	211.	246.	----	----	----	0.174	----	----	----	----	36.7
I2	12.	12.	71.1	0.829	----	0.3	----	309.	365.	----	----	----	0.174	----	----	----	----	39.2
J1	13.	329.	50.1	0.837	48.	21.3	1.7	219.	219.	0.31	1.03	0.82	0.255	8.52	2.0	12.0	8.0	140.
J1	13.	469.	48.0	0.849	----	39.1	0.9	307.	315.	0.35	1.18	0.87	0.280	8.59	1.1	10.9	15.7	156.
J2	14.	329.	50.1	0.837	48.	21.3	1.7	219.	219.	0.24	0.84	1.27	0.162	10.36	1.1	9.3	26.7	60.2
J2	14.	469.	48.0	0.849	----	39.1	0.9	307.	315.	0.30	0.98	1.26	0.205	10.23	3.4	5.2	8.8	88.5

STUDY INFO	ID	FUEL CODE	CETANE NO.	DENSITY G/ML	N PPM	ARO. VOL %	OLE. VOL %	10%PT DEG C	90%PT DEG C	HC G/KM	CO G/KM	NOX G/KM	PART. G/KM	FUEL L/100KM	BAP UG/KM	ALDE. MG/KM	PHEN. MG/KM	SOLUBLE MG/KM
J3	15.	329.	50.1	0.837	48.	21.3	1.7	219.	219.	0.12	0.65	0.64	0.236	10.69	0.3	1.1	8.5	28.2
J3	15.	469.	48.0	0.849	----	39.1	0.9	307.	315.	0.13	0.69	0.65	0.273	10.64	0.5	0.5	9.7	37.1
K1	16.	329.	50.	0.837	48.	21.3	1.7	219.	302.	0.31	0.96	0.66	0.249	6.37	14.9	14.	12.	44.8
K1	16.	453.	49.	0.835	5.	28.5	2.1	236.	295.	0.31	1.06	0.67	0.274	6.63	34.0	9.	11.	48.6
K1	16.	473.	45.	0.808	1.	22.0	2.0	189.	228.	0.38	1.20	0.70	0.250	6.62	31.6	13.	0.5	30.4
K1	16.	474.	42.	0.870	1600.	34.9	1.4	234.	330.	0.39	1.21	0.83	0.321	6.23	44.1	8.	14.	56.6
K1	16.	476.	35.	0.806	1000.	16.2	0.0	53.	303.	0.68	1.38	0.65	0.208	6.64	30.2	12.	2.	52.4
K1	16.	478.	38.	0.867	2000.	39.9	1.2	209.	303.	0.60	1.31	0.76	0.394	6.45	10.0	2.	12.	101.
K1	16.	482.	44.	0.856	267.	36.4	0.0	207.	316.	0.33	1.14	0.73	0.281	6.11	24.3	3.	24.	36.7
K1	16.	485.	45.	0.833	142.	25.5	0.5	157.	302.	0.34	1.16	0.76	0.299	6.59	8.7	----	----	----
K1	16.	527.	50.	0.804	1.	24.0	0.0	200.	392.	0.32	1.08	0.64	0.221	6.35	19.6	2.	0.0	43.3
K1	16.	526.	42.	0.861	980.	37.2	1.2	212.	316.	0.36	1.12	0.71	0.282	6.18	19.0	0.0	0.0	47.8

STUDY INFO	ID	FUEL CODE	DENSITY G/ML	HC NORM	NOX NORM	PART. NORM	FUEL NORM
A1	1.	395.	.793	.5960	.7123	.5498	.9895
A1	1.	401.	.800	.7285	.8072	.4855	.9990
A1	1.	404.	.794	.5298	.7217	.5209	.9937
A1	1.	405.	.795	.5298	.8452	.5209	1.0031
A1	1.	430.	.796	.5960	.7977	.5788	1.0209
A1	1.	434.	.825	.7947	.8357	.6817	.9958
A1	1.	438.	.793	.5960	.8072	.4984	1.0293
A1	1.	448.	.783	.7285	.7787	.4566	.9948
A1	1.	460.	.815	.8609	.8737	.7042	1.0000
A1	1.	461.	.791	.5298	.8167	.5113	1.0073
A1	1.	463.	.826	.8609	.9877	.9228	1.0063
B1	2.	238.	.845	.7101	1.2601	.9620	.9438
B1	2.	2390.	.844	1.1243	1.2763	.9181	.9572
B1	2.	240.	.806	.5325	1.1793	.6871	.9471
B1	2.	241.	.861	1.1834	1.4216	1.1111	1.0440
B1	2.	242.	.831	.7101	1.3732	.8538	1.0440
B2	3.	238.	.845	.4639	.9704	.8123	.9706
B2	3.	239.	.844	.5155	1.0691	.7870	.9519
B2	3.	240.	.806	.4381	.9375	.6390	.9706
B2	3.	241.	.861	1.8299	.9539	1.3538	1.0488
B2	3.	242.	.831	.5155	1.0362	.7004	1.0012
C1	4.	1.	.806	.7292	.7292	.7700	.8919
C1	4.	2.	.832	.6597	.7422	1.0267	.9310
C1	4.	3.	.844	1.0069	1.0677	.8233	.9902
C1	4.	4.	.843	1.0417	.9310	1.0533	.9924
D1	5.	20.	.850	.8876	1.0071	.9609	1.0181
D1	5.	2.	.847	1.2426	.9834	1.0447	.9739
D1	5.	1.	.835	1.5385	.9597	.9944	.9840
F1	6.	1.	.829	.1800	1.1192	----	1.0106
F1	6.	4.	.809	.2149	1.1192	----	1.0492
F1	6.	5.	.840	1.0105	.9246	----	1.0268
F1	6.	6.	.800	-----	.9732	----	1.0756
F2	7.	1.	.829	1.2673	.8735	----	.9567
F2	7.	5.	.840	.6912	1.0191	----	1.0088
F2	7.	6.	.800	.6682	.8735	----	.9614
G1	8.	7812.	.784	----	----	----	----
G1	8.	7938.	.810	----	----	----	----
G1	8.	7941.	.820	.7692	1.0384	.9402	1.0568
G1	8.	8017.	.811	----	----	----	----
G1	8.	7939.	.823	.7692	1.1423	1.1966	1.1062
G1	8.	7942.	.819	.7692	.9346	.9402	.9679
G1	8.	7926.	.852	.7692	1.0384	1.0256	1.0074
G1	8.	7943.	.835	1.5385	.9346	.9402	1.0074
G1	8.	7940.	.830	.7692	.9346	.9402	.9679
G2	9.	7812.	.784	21.2121	1.1002	.5682	----
G2	9.	7938.	.810	3.0303	.8557	.7955	.9695
G2	9.	7941.	.820	3.0303	.9780	.8523	1.0215
G2	9.	8017.	.811	6.0606	1.1002	.6818	----
G2	9.	7939.	.823	3.0303	.9780	.7386	.9695
G2	9.	7942.	.819	3.0303	.9780	.7955	1.1340
G2	9.	7926.	.852	6.0606	1.1002	1.0795	1.0215
G2	9.	7943.	.835	6.0606	.9780	.7955	.9695
G2	9.	7940.	.830	6.0606	.9780	.9091	.9695

STUDY INFO	ID	FUEL CODE	DENSITY G/ML	HC NORM	NOX NORM	PART. NORM	FUEL NORM
H1	10.	2.	.707	4.7196	1.4413	.5592	.9782
H1	10.	3.	.707	2.1729	1.0401	.9174	.9852
H1	10.	6.	.678	4.5561	.9609	.5894	.9961
H1	10.	7.	.678	1.9626	.9014	.8365	.9571
H1	10.	9.	.723	1.1682	1.1194	.9129	.9439
H1	10.	11.	.817	.1636	.8370	1.1048	.9727
H1	10.	13.	.789	.1636	.7033	1.0172	.9127
H1	10.	15.	.786	4.0421	.9212	.6250	.9883
H1	10.	16.	.826	1.0981	1.2729	.9371	.9922
H1	10.	17.	.879	.8879	1.3422	1.1502	1.0078
H1	10.	18.	.816	2.8037	1.0253	1.1093	1.0023
H1	10.	19.	.834	1.1682	1.0599	.9378	1.1403
H1	10.	20.	.845	2.5935	1.1441	.8826	.9758
H1	10.	21.	.851	1.7290	1.0599	.9892	.9260
H1	10.	22.	.845	1.1916	1.0203	.7481	.9712
H1	10.	23.	.851	.3738	1.1095	.9091	.9673
H1	10.	24.	.848	.4206	.9559	.8698	.9478
H1	10.	25.	.840	.2804	1.0599	.8501	.9906
H1	10.	26.	.813	.1168	.9856	.8932	.9049
H1	10.	27.	.754	.2804	.8470	.8600	.8527
H1	10.	28.	.843	.3505	.9312	1.1955	1.0585
H1	10.	30.	.759	32.5234	1.4859	.6499	1.1052
H1	10.	31.	.776	.7944	1.2729	.9537	.9556
H1	10.	32.	.864	.3037	.8321	1.0874	.9860
H1	10.	33.	.832	.3972	1.0550	1.0149	.9587
H1	10.	34.	.759	.5140	1.0797	1.1124	.9657
H1	10.	35.	.789	.3972	1.0451	1.1486	.9704
H1	10.	36.	.737	.8178	1.0896	1.0058	.9509
H1	10.	40.	.780	.1168	.5002	.7617	.9790
H1	10.	43.	.849	.6776	.6835	1.1683	1.1582
H1	10.	46.	.840	.2336	.8123	.8683	1.0663
11	11.	1.	.809	----	----	.5293	----
11	11.	2.	.851	----	----	.7726	----
11	11.	3.	.864	----	----	1.1279	----
11	11.	4.	.803	----	----	1.4689	----
11	11.	5.	.871	----	----	1.1261	----
11	11.	6.	.899	----	----	1.6234	----
11	11.	7.	.843	----	----	.6963	----
11	11.	8.	.918	----	----	1.7549	----
11	11.	9.	.775	----	----	.5187	----
11	11.	10.	.872	----	----	1.6234	----
11	11.	11.	.782	----	----	.3428	----
11	11.	12.	.829	----	----	.6181	----
11	11.	13.	.795	----	----	.4636	----
11	11.	14.	.808	----	----	.5417	----
11	11.	15.	.872	----	----	1.0053	----

STUDY INFO	ID	FUEL CODE	DENSITY G/ML	HC NORM	NOX NORM	PART. NORM	FUEL NORM
I2	12.	1.	.809	----	----	.9490	----
I2	12.	2.	.851	----	----	1.2196	----
I2	12.	4.	.883	----	----	1.6588	----
I2	12.	7.	.843	----	----	.9490	----
I2	12.	11.	.782	----	----	.6078	----
I2	12.	13.	.795	----	----	.6824	----
I2	12.	1.	.809	----	----	.5608	----
I2	12.	2.	.851	----	----	.7059	----
I2	12.	8.	.918	----	----	1.2902	----
I2	12.	11.	.782	----	----	.3176	----
I2	12.	12.	.829	----	----	.4627	----
I2	12.	15.	.872	----	----	.8784	----
I2	12.	1.	.809	----	----	1.0471	----
I2	12.	2.	.851	----	----	1.2667	----
I2	12.	4.	.883	----	----	1.2902	----
I2	12.	11.	.782	----	----	.6824	----
I2	12.	12.	.829	----	----	.6824	----
J1	13.	329.	.837	.8782	.9393	.9043	.9912
J1	13.	469.	.849	.9915	.9966	.9929	.9993
J2	14.	329.	.837	.7869	1.0087	.7751	1.0138
J2	14.	469.	.849	.9836	1.0008	.9809	1.0011
J3	15.	329.	.837	.9160	.9831	.8551	1.0051
J3	15.	469.	.849	.9924	.9985	.9891	1.0004
K1	16.	329.	.837	.7789	.9016	.8328	1.0020
K1	16.	453.	.835	.7789	.9153	.9164	1.0429
K1	16.	473.	.808	.9548	.9563	.8361	1.0414
K1	16.	474.	.870	.9799	1.1339	1.0736	.9800
K1	16.	476.	.806	1.7085	.8880	.6957	1.0445
K1	16.	478.	.867	1.5075	1.0383	1.3177	1.0146
K1	16.	482.	.856	.8291	.9973	.9398	.9611
K1	16.	485.	.833	.8543	1.0383	1.0000	1.0367
K1	16.	527.	.804	.8040	.8743	.7391	.9989
K1	16.	526.	.861	.9045	.9699	.9431	.9722

STUDY INFO	ID	FUEL CODE	CETANE NO.	HC NORM	CO NORM	SOLUBLE NORM
A1	1.	395.	62.0	.7258	.9028	.9708
A1	1.	401.	55.0	.8871	.8681	.8522
A1	1.	404.	62.0	.6452	.8160	.7803
A1	1.	405.	61.0	.6452	.7986	.6113
A1	1.	430.	63.0	.7258	.9028	.8234
A1	1.	434.	44.0	.9677	1.0243	.9924
A1	1.	438.	64.0	.7258	.8333	1.0212
A1	1.	448.	56.0	.8871	.8333	.9601
A1	1.	460.	46.0	1.0484	1.0417	1.0859
A1	1.	461.	68.0	.6452	.8160	.9421
A1	1.	463.	60.0	1.0484	1.1458	1.2477
B1	2.	238.	53.0	.8108	.8920	1.2313
B1	2.	2390.	47.0	1.2838	1.0016	1.0266
B1	2.	240.	47.0	.6081	.8920	.9494
B1	2.	241.	41.0	1.3514	1.1111	.9629
B1	2.	242.	50.0	.8108	1.0642	.8756
B2	3.	238.	53.0	.5660	.8277	.7049
B2	3.	239.	47.0	.6289	.8615	.8320
B2	3.	240.	47.0	.5346	.9291	.7685
B2	3.	241.	41.0	2.2327	1.3682	1.6872
B2	3.	242.	50.0	.6289	.8784	.7627
C1	4.	1.	47.0	1.0500	1.0127	1.0000
C1	4.	2.	47.0	.9500	.9873	----
C1	4.	3.	49.0	1.4500	1.1139	----
C1	4.	4.	49.0	1.5000	1.1392	1.0335
D1	5.	20.	50.0	.6250	.7727	----
D1	5.	2.	47.0	.8750	.9545	----
D1	5.	1.	48.0	1.0833	1.0000	----
F1	6.	1.	48.4	.3543	.6947	----
F1	6.	4.	50.0	.4229	.7241	----
F1	6.	5.	43.5	1.9886	1.4677	----
F1	6.	6.	----	----	.8513	----
F2	7.	1.	48.4	1.1482	1.0140	----
F2	7.	5.	43.5	.6263	.9646	----
F2	7.	6.	----	.6054	.8904	----
G1	8.	7812.	61.0	----	----	----
G1	8.	7938.	45.7	----	----	----
G1	8.	7941.	47.7	.9901	.9569	.7399
G1	8.	8017.	44.9	----	----	----
G1	8.	7939.	41.2	.9901	.9569	1.2152
G1	8.	7942.	41.1	.9901	.9569	.9775
G1	8.	7926.	44.2	.9901	1.1962	1.5257
G1	8.	7943.	39.8	1.9802	1.4354	.7399
G1	8.	7940.	37.0	.9901	1.1962	1.2152
G2	9.	7812.	61.0	2.6923	1.5748	1.0092
G2	9.	7938.	45.7	.3846	.6562	1.0396
G2	9.	7941.	47.7	.3846	.7874	1.1334
G2	9.	8017.	44.9	.7692	.9186	.7886
G2	9.	7939.	41.2	.3846	.7874	.8342
G2	9.	7942.	41.4	.3846	.7874	1.4503
G2	9.	7926.	44.2	.7692	1.1811	1.0244
G2	9.	7943.	39.8	.7692	.7874	.7556
G2	9.	7940.	37.0	.7692	.9186	.8672

STUDY INFO	ID	FUEL CODE	CETANE NO.	HC NORM	CO NORM	SOLUBLE NORM
H1	10.	2.	27.0	2.6200	----	1.6474
H1	10.	3.	45.0	1.2062	----	.8130
H1	10.	6.	28.0	2.5292	----	1.3120
H1	10.	7.	47.0	1.0895	----	.6654
H1	10.	9.	28.0	.6485	----	1.2208
H1	10.	11.	49.0	.0908	----	.5393
H1	10.	13.	39.0	.0908	----	1.0652
H1	10.	15.	41.0	2.2438	----	1.2664
H1	10.	16.	42.0	.6096	----	1.1672
H1	10.	17.	40.0	.4929	----	.9498
H1	10.	18.	46.0	1.5564	----	.9767
H1	10.	19.	52.0	.6485	----	.5661
H1	10.	20.	47.0	1.4397	----	.6922
H1	10.	21.	50.0	.9598	----	1.2235
H1	10.	22.	43.0	.6615	----	1.3013
H1	10.	23.	47.0	.2075	----	1.1135
H1	10.	24.	43.0	.2335	----	1.2396
H1	10.	25.	47.0	.1556	----	.8666
H1	10.	26.	47.0	.0649	----	.7459
H1	10.	27.	54.0	.1556	----	1.0706
H1	10.	28.	45.0	.1946	----	----
H1	10.	30.	31.0	18.0545	----	1.2772
H1	10.	31.	54.0	.4410	----	.5849
H1	10.	32.	44.0	.1686	----	.9015
H1	10.	33.	50.0	.2205	----	.8318
H1	10.	34.	47.0	.2853	----	.9257
H1	10.	35.	47.0	.2205	----	.7513
H1	10.	36.	47.0	.4540	----	1.3255
H1	10.	40.	36.0	.0649	----	----
H1	10.	43.	52.0	.3761	----	.9606
H1	10.	46.	80.0	.1297	----	1.4060
I1	11.	1.	51.0	----	----	.3428
I1	11.	2.	48.0	----	----	.5136
I1	11.	3.	52.2	----	----	1.7138
I1	11.	4.	45.3	----	----	1.9838
I1	11.	5.	47.7	----	----	1.0635
I1	11.	6.	40.5	----	----	1.8846
I1	11.	7.	48.2	----	----	.7164
I1	11.	8.	32.6	----	----	2.4632
I1	11.	9.	40.0	----	----	.2943
I1	11.	10.	28.0	----	----	1.4052
I1	11.	11.	29.0	----	----	.1951
I1	11.	12.	71.1	----	----	.7715
I1	11.	13.	46.0	----	----	.6392
I1	11.	14.	52.6	----	----	.6447
I1	11.	15.	32.0	----	----	.8266

STUDY INFO	ID	FUEL CODE	CETANE NO.	HC NORM	CO NORM	SOLUBLE NORM
I2	12.	1.	51.0	----	----	.4534
I2	12.	2.	48.0	----	----	.8966
I2	12.	4.	45.3	----	----	2.2452
I2	12.	7.	48.2	----	----	.9418
I2	12.	11.	29.0	----	----	.4257
I2	12.	13.	46.0	----	----	.6065
I2	12.	1.	51.0	----	----	.8879
I2	12.	2.	48.0	----	----	.9156
I2	12.	8.	32.6	----	----	2.9742
I2	12.	11.	29.0	----	----	.6517
I2	12.	12.	71.1	----	----	1.0424
I2	12.	15.	32.0	----	----	1.7787
I2	12.	1.	51.0	----	----	.6707
I2	12.	2.	48.0	----	----	.7333
I2	12.	4.	45.3	----	----	.9418
I2	12.	11.	29.0	----	----	.5351
I2	12.	12.	71.1	----	----	.5715
J1	13.	329.	50.1	.8401	.8233	.8556
J1	13.	469.	48.0	.9485	.9432	.9534
J2	14.	329.	50.1	.7295	.8023	.5903
J2	14.	469.	48.0	.9119	.9360	.8679
J3	15.	329.	50.1	.8889	.9168	.6822
J3	15.	469.	48.0	.9630	.9732	.8975
K1	16.	329.	50.0	.9309	.8767	.9902
K1	16.	453.	49.0	.9309	.9680	1.0742
K1	16.	473.	45.0	1.1411	1.0959	.6719
K1	16.	474.	42.0	1.1712	1.1050	1.2510
K1	16.	476.	35.0	2.0420	1.2603	1.1582
K1	16.	478.	38.0	1.8018	1.1963	2.2323
K1	16.	482.	44.0	.9910	1.0411	.8112
K1	16.	485.	45.0	1.0210	1.0594	----
K1	16.	527.	50.0	.9610	.9863	.9570
K1	16.	526.	42.0	1.0811	1.0228	1.0565

STUDY INFO	ID	FUEL CODE	N PPM	CO NORM	BAP NORM	SOLUBLE NORM
A1	1.	395.	1.	.9981	1.2292	1.0092
A1	1.	401.	1.	.9597	.8750	.8859
A1	1.	404.	479.	.9021	.5208	.8111
A1	1.	405.	930.	.8829	.7292	.6354
A1	1.	430.	493.	.9981	2.0000	.8560
A1	1.	434.	5.	1.1324	.7708	1.0317
A1	1.	438.	1.	.9213	.4375	1.0616
A1	1.	448.	1.	.9213	1.0625	.9980
A1	1.	460.	1.	1.1516	1.5208	1.1288
A1	1.	461.	1.	.9021	.8958	.9793
A1	1.	463.	718.	1.2668	.8958	1.2971
B1	2.	238.	50.	.9120	1.0183	1.2104
B1	2.	2390.	50.	1.0240	1.2010	1.0092
B1	2.	240.	60.	.9120	.8355	.9333
B1	2.	241.	240.	1.1360	1.6188	.9465
B1	2.	242.	80.	1.0880	.6005	.8608
B2	3.	238.	50.	.8909	.7772	.8092
B2	3.	239.	50.	.9273	.9147	.9551
B2	3.	240.	60.	1.0000	.8116	.8821
B2	3.	241.	240.	1.4727	2.5034	1.9367
B2	3.	242.	80.	.9455	.7221	.8755
C1	4.	1.	----	----	----	----
C1	4.	2.	----	----	----	----
C1	4.	3.	----	----	----	----
C1	4.	4.	----	----	----	----
D1	5.	20.	----	----	----	----
D1	5.	2.	----	----	----	----
D1	5.	1.	----	----	----	----
F1	6.	1.	----	----	----	----
F1	6.	4.	----	----	----	----
F1	6.	5.	----	----	----	----
F1	6.	6.	----	----	----	----
F2	7.	1.	----	----	----	----
F2	7.	5.	----	----	----	----
F2	7.	6.	----	----	----	----
G1	8.	7812.	----	----	----	----
G1	8.	7938.	----	----	----	----
G1	8.	7941.	----	----	----	----
G1	8.	8017.	----	----	----	----
G1	8.	7939.	----	----	----	----
G1	8.	7942.	----	----	----	----
G1	8.	7926.	----	----	----	----
G1	8.	7943.	----	----	----	----
G1	8.	7940.	----	----	----	----
G2	9.	7812.	----	----	----	----
G2	9.	7938.	----	----	----	----
G2	9.	7941.	----	----	----	----
G2	9.	8017.	----	----	----	----
G2	9.	7939.	----	----	----	----
G2	9.	7942.	----	----	----	----
G2	9.	7926.	----	----	----	----
G2	9.	7943.	----	----	----	----
G2	9.	7940.	----	----	----	----

STUDY INFO	ID	FUEL CODE	N PPM	CO NORM	BAP NORM	SOLUBLE NORM
H1	10.	2.	----	----	----	----
H1	10.	3.	----	----	----	----
H1	10.	6.	----	----	----	----
H1	10.	7.	----	----	----	----
H1	10.	9.	----	----	----	----
H1	10.	11.	----	----	----	----
H1	10.	13.	----	----	----	----
H1	10.	15.	----	----	----	----
H1	10.	16.	----	----	----	----
H1	10.	17.	----	----	----	----
H1	10.	18.	----	----	----	----
H1	10.	19.	----	----	----	----
H1	10.	20.	----	----	----	----
H1	10.	21.	----	----	----	----
H1	10.	22.	----	----	----	----
H1	10.	23.	----	----	----	----
H1	10.	24.	----	----	----	----
H1	10.	25.	----	----	----	----
H1	10.	26.	----	----	----	----
H1	10.	27.	----	----	----	----
H1	10.	28.	----	----	----	----
H1	10.	30.	----	----	----	----
H1	10.	31.	----	----	----	----
H1	10.	32.	----	----	----	----
H1	10.	33.	----	----	----	----
H1	10.	34.	----	----	----	----
H1	10.	35.	----	----	----	----
H1	10.	36.	----	----	----	----
H1	10.	40.	----	----	----	----
H1	10.	43.	----	----	----	----
H1	10.	46.	----	----	----	----
I1	11.	1.	----	----	----	----
I1	11.	2.	----	----	----	----
I1	11.	3.	----	----	----	----
I1	11.	4.	----	----	----	----
I1	11.	5.	----	----	----	----
I1	11.	6.	----	----	----	----
I1	11.	7.	----	----	----	----
I1	11.	8.	----	----	----	----
I1	11.	9.	----	----	----	----
I1	11.	10.	----	----	----	----
I1	11.	11.	----	----	----	----
I1	11.	12.	----	----	----	----
I1	11.	13.	----	----	----	----
I1	11.	14.	----	----	----	----
I1	11.	15.	----	----	----	----

STUDY INFO	ID	FUEL CODE	N PPM	CO NORM	BAP NORM	SOLUBLE NORM
I2	12.	1.	----	----	----	----
I2	12.	2.	----	----	----	----
I2	12.	4.	----	----	----	----
I2	12.	7.	----	----	----	----
I2	12.	11.	----	----	----	----
I2	12.	13.	----	----	----	----
I2	12.	1.	----	----	----	----
I2	12.	2.	----	----	----	----
I2	12.	8.	----	----	----	----
I2	12.	11.	----	----	----	----
I2	12.	12.	----	----	----	----
I2	12.	15.	----	----	----	----
I2	12.	1.	----	----	----	----
I2	12.	2.	----	----	----	----
I2	12.	4.	----	----	----	----
I2	12.	11.	----	----	----	----
I2	12.	12.	----	----	----	----
J1	13.	329.	48.	----	----	----
J1	13.	469.	----	----	----	----
J2	14.	329.	48.	----	----	----
J2	14.	469.	----	----	----	----
J3	15.	329.	48.	----	----	----
J3	15.	469.	----	----	----	----
K1	16.	329.	48.	.8680	.6452	1.1507
K1	16.	453.	5.	.9584	1.4722	1.2483
K1	16.	473.	1.	1.0850	1.3683	.7808
K1	16.	474.	1600.	1.0940	1.9095	1.4537
K1	16.	476.	1000.	1.2477	1.3076	1.3459
K1	16.	478.	2000.	1.1844	.4330	2.5941
K1	16.	482.	267.	1.0307	1.0522	.9426
K1	16.	485.	142.	1.0488	.3767	----
K1	16.	527.	1.	.9765	.8487	1.1121
K1	16.	526.	980.	1.0127	.8227	1.2277

STUDY INFO	ID.	FUEL CODE	ARO. VOL %	HC NORM	CO NORM	NOX NORM	PART. NORM	BAP NORM	ALDE. NORM
A1	1.	395.	5.8	.7317	.8553	.7996	.7277	1.1281	.3183
A1	1.	401.	2.7	.8943	.8224	.9062	.6426	.8031	5.0205
A1	1.	404.	6.1	.6504	.7730	.8102	.6894	.4780	.3080
A1	1.	405.	6.6	.6504	.7566	.9488	.6894	.6692	15.6057
A1	1.	430.	8.8	.7317	.8553	.8955	.7660	1.8356	0.0000
A1	1.	434.	31.5	.9756	.9704	.9382	.9021	.7075	2.8747
A1	1.	438.	6.8	.7317	.7895	.9062	.6596	.4015	0.0000
A1	1.	448.	4.9	.8943	.7895	.8742	.6043	.9751	8.3984
A1	1.	460.	32.1	1.0569	.9868	.9808	.9319	1.3958	0.0000
A1	1.	461.	5.1	.6504	.7730	.9168	.6766	.8222	9.0657
A1	1.	463.	30.8	1.0569	1.0855	1.1087	1.2213	.8222	0.0000
B1	2.	238.	29.8	.7143	.8837	.9443	.9481	.7753	.8538
B1	2.	2390.	21.6	1.1310	.9922	.9564	.9049	.9145	.8033
B1	2.	240.	13.0	.5357	.8837	.8838	.6772	.6362	.8083
B1	2.	241.	34.6	1.1905	1.1008	1.0654	1.0951	1.2326	1.2074
B1	2.	242.	12.4	.7143	1.0543	1.0291	.8415	.4573	.8538
B2	3.	238.	29.8	.4306	.7692	.9883	.7785	.4960	.7984
B2	3.	239.	21.6	.4785	.8006	1.0888	.7543	.5838	.3505
B2	3.	240.	13.0	.4067	.8634	.9548	.6125	.5180	.5007
B2	3.	241.	34.6	1.6986	1.2716	.9715	1.2976	1.5979	1.4604
B2	3.	242.	12.4	.4785	.8163	1.0553	.6713	.4609	.3728
C1	4.	1.	13.0	.7955	.9302	.7932	.7152	.9746	.6798
C1	4.	2.	27.0	.7197	.9070	.8074	.9536	----	.7279
C1	4.	3.	21.6	1.0985	1.0233	1.1615	.7647	----	1.1249
C1	4.	4.	26.5	1.1364	1.0465	1.0127	.9783	.9949	1.0437
D1	5.	20.	35.1	.7614	.8696	1.0192	.9609	----	1.0866
D1	5.	2.	28.8	1.0660	1.0742	.9952	1.0447	----	1.0342
D1	5.	1.	22.8	1.3198	1.1253	.9712	.9944	----	.8036
F1	6.	1.	23.7	.2834	.6079	1.1247	----	----	----
F1	6.	4.	19.2	.3382	.6336	1.1247	----	----	----
F1	6.	5.	36.9	1.5905	1.2842	.9291	----	----	----
F1	6.	6.	19.2	----	.7449	.9780	----	----	----
F2	7.	1.	23.7	1.4986	1.0513	.9169	----	----	----
F2	7.	5.	36.9	.8174	1.0000	1.0697	----	----	----
F2	7.	6.	19.2	.7902	.9231	.9169	----	----	----
G1	8.	7812.	0.0	----	----	----	----	----	----
G1	8.	7938.	13.0	----	----	----	----	----	----
G1	8.	7941.	13.0	.8000	.7921	1.0571	.9483	----	----
G1	8.	8017.	17.0	----	----	----	----	----	----
G1	8.	7939.	20.0	.8000	.7921	1.1628	1.2069	----	----
G1	8.	7942.	20.0	.8000	.7921	.9514	.9483	----	----
G1	8.	7926.	32.0	.8000	.9901	1.0571	1.0345	----	----
G1	8.	7943.	32.0	1.6000	1.1881	.9514	.9483	----	----
G1	8.	7940.	34.0	.8000	.9901	.9514	.9483	----	----
G2	9.	7812.	0.0	7.1429	1.8634	1.1002	.6329	----	----
G2	9.	7938.	13.0	1.0204	.7764	.8557	.8861	----	----
G2	9.	7941.	13.0	1.0204	.9317	.9780	.9494	----	----
G2	9.	8017.	17.0	2.0408	1.0870	1.1002	.7595	----	----
G2	9.	7939.	20.0	1.0204	.9317	.9780	.8228	----	----
G2	9.	7942.	20.0	1.0204	.9317	.9780	.8861	----	----
G2	9.	7926.	32.0	2.0408	1.3975	1.1002	1.2025	----	----
G2	9.	7943.	32.0	2.0408	.9317	.9780	.8861	----	----
G2	9.	7940.	34.0	2.0408	1.0870	.9780	1.0127	----	----

STUDY INFO	ID	FUEL CODE	ARO. VOL %	HC NORM	CO NORM	NOX NORM	PART. NORM	BAP NORM	ALDE. NORM
H1	10.	2.	7.0	3.0606	----	1.3566	.5700	----	----
H1	10.	3.	7.0	1.4091	----	.9790	.9351	----	----
H1	10.	6.	3.0	2.9545	----	.9044	.6008	----	----
H1	10.	7.	3.0	1.2727	----	.8485	.8527	----	----
H1	10.	9.	6.0	.7576	----	1.0536	.9305	----	----
H1	10.	11.	17.0	.1061	----	.7879	1.1262	----	----
H1	10.	13.	13.0	.1061	----	.6620	1.0368	----	----
H1	10.	15.	14.0	2.6212	----	.8671	.6370	----	----
H1	10.	16.	28.0	.7121	----	1.1981	.9552	----	----
H1	10.	17.	46.0	.5758	----	1.2634	1.1724	----	----
H1	10.	18.	19.0	1.8182	----	.9650	1.1308	----	----
H1	10.	19.	23.0	.7576	----	.9977	.9559	----	----
H1	10.	20.	35.0	1.6818	----	1.0769	.8997	----	----
H1	10.	21.	35.0	1.1212	----	.9977	1.0083	----	----
H1	10.	22.	34.0	.7727	----	.9604	.7626	----	----
H1	10.	23.	35.0	.2424	----	1.0443	.9267	----	----
H1	10.	24.	33.0	.2727	----	.8998	.8866	----	----
H1	10.	25.	28.0	.1818	----	.9977	.8666	----	----
H1	10.	26.	17.0	.0758	----	.9277	.9105	----	----
H1	10.	27.	7.0	.1818	----	.7972	.8766	----	----
H1	10.	28.	28.0	.2273	----	.8765	1.2186	----	----
H1	10.	30.	13.0	21.0909	----	1.3986	.6625	----	----
H1	10.	31.	11.0	.5152	----	1.1981	.9721	----	----
H1	10.	32.	40.0	.1970	----	.7832	1.1085	----	----
H1	10.	33.	24.0	.2576	----	.9930	1.0345	----	----
H1	10.	34.	13.0	.3333	----	1.0163	1.1339	----	----
H1	10.	35.	13.0	.2576	----	.9837	1.1709	----	----
H1	10.	36.	14.0	.5303	----	1.0256	1.0253	----	----
H1	10.	40.	2.0	.0758	----	.4709	.7765	----	----
H1	10.	43.	19.0	.4394	----	.6434	1.1909	----	----
H1	10.	46.	.1	.1515	----	.7646	.8851	----	----
11	11.	1.	19.9	----	----	----	.5008	----	----
11	11.	2.	32.7	----	----	----	.7311	----	----
11	11.	3.	20.8	----	----	----	1.0672	----	----
11	11.	4.	33.7	----	----	----	1.3899	----	----
11	11.	5.	32.1	----	----	----	1.0655	----	----
11	11.	6.	47.0	----	----	----	1.5361	----	----
11	11.	7.	9.7	----	----	----	.6588	----	----
11	11.	8.	57.7	----	----	----	1.6605	----	----
11	11.	9.	12.4	----	----	----	.4908	----	----
11	11.	10.	57.7	----	----	----	1.5361	----	----
11	11.	11.	1.7	----	----	----	.3244	----	----
11	11.	12.	.3	----	----	----	.5849	----	----
11	11.	13.	0.0	----	----	----	.4387	----	----
11	11.	14.	0.0	----	----	----	.5126	----	----
11	11.	15.	45.1	----	----	----	.9513	----	----

STUDY INFO	ID	FUEL CODE	ARO. VOL %	HC NORM	CO NORM	NOX NORM	PART. NORM	RAP NORM	ALDE. NORM
12	12.	1.	19.9	----	----	----	.9167	----	----
12	12.	2.	32.7	----	----	----	1.1780	----	----
12	12.	4.	33.7	----	----	----	1.6023	----	----
12	12.	7.	9.7	----	----	----	.9167	----	----
12	12.	11.	1.7	----	----	----	.5871	----	----
12	12.	13.	0.0	----	----	----	.6591	----	----
12	12.	1.	19.9	----	----	----	.5417	----	----
12	12.	2.	32.7	----	----	----	.6818	----	----
12	12.	8.	57.7	----	----	----	1.2462	----	----
12	12.	11.	1.7	----	----	----	.3068	----	----
12	12.	12.	.3	----	----	----	.4470	----	----
12	12.	15.	45.1	----	----	----	.8485	----	----
12	12.	1.	19.9	----	----	----	1.0114	----	----
12	12.	2.	32.7	----	----	----	1.2235	----	----
12	12.	4.	33.7	----	----	----	1.2462	----	----
12	12.	11.	1.7	----	----	----	.6591	----	----
12	12.	12.	.3	----	----	----	.6591	----	----
J1	13.	329.	21.3	.9394	.9338	.9716	.9551	1.2821	1.0469
J1	13.	469.	39.1	1.0606	1.0698	1.0308	1.0487	.7051	.9510
J2	14.	329.	21.3	.8922	.9241	1.0040	.8852	.4946	1.2747
J2	14.	469.	39.1	1.1152	1.0781	.9960	1.1202	1.5288	.7127
J3	15.	329.	21.3	.9600	.9701	.9922	.9291	.7538	1.3631
J3	15.	469.	39.1	1.0400	1.0299	1.0078	1.0748	1.2563	.6196
K1	16.	329.	21.3	.7750	.8255	.9192	.8737	.6346	2.1558
K1	16.	453.	28.5	.7750	.9114	.9331	.9614	1.4480	1.3859
K1	16.	473.	22.0	.9500	1.0318	.9749	.8772	1.3458	2.0018
K1	16.	474.	34.9	.9750	1.0404	1.1560	1.1263	1.8782	1.2319
K1	16.	476.	16.2	1.7000	1.1866	.9053	.7298	1.2862	1.8479
K1	16.	478.	39.9	1.5000	1.1264	1.0585	1.3825	.4259	.3080
K1	16.	482.	36.4	.8250	.9802	1.0167	.9860	1.0349	.4620
K1	16.	485.	25.5	.8500	.9974	1.0585	1.0491	.3705	----
K1	16.	527.	24.0	.8000	.9286	.8914	.7754	.8348	.3080
K1	16.	526.	37.2	.9000	.9630	.9889	.9895	.8092	0.0000

STUDY INFO	ID	FUEL CODE	OLE. VOL %	FUEL NORM
A1	1.	395.	1.50	.9862
A1	1.	401.	1.90	.9956
A1	1.	404.	1.50	.9904
A1	1.	405.	1.50	.9998
A1	1.	430.	1.80	1.0175
A1	1.	434.	2.90	.9925
A1	1.	438.	6.60	1.0259
A1	1.	448.	1.80	.9915
A1	1.	460.	1.00	.9967
A1	1.	461.	1.00	1.0040
A1	1.	463.	1.20	1.0029
B1	2.	238.	1.60	.9684
B1	2.	2390.	.80	.9821
B1	2.	240.	3.40	.9718
B1	2.	241.	1.00	1.0711
B1	2.	242.	.80	1.0711
B2	3.	238.	1.60	.9867
B2	3.	239.	.80	.9677
B2	3.	240.	3.40	.9867
B2	3.	241.	1.00	1.0662
B2	3.	242.	.80	1.0178
C1	4.	1.	3.40	.9483
C1	4.	2.	1.80	.9898
C1	4.	3.	.80	1.0527
C1	4.	4.	.90	1.0551
D1	5.	20.	0.00	1.0657
D1	5.	2.	1.40	1.0194
D1	5.	1.	1.10	1.0300
F1	6.	1.	.96	1.1976
F1	6.	4.	.70	1.2434
F1	6.	5.	.72	1.2169
F1	6.	6.	.72	1.2747
F2	7.	1.	.96	1.1473
F2	7.	5.	.72	1.2097
F2	7.	6.	.72	1.1529
G1	8.	7812.	----	----
G1	8.	7938.	----	----
G1	8.	7941.	----	----
G1	8.	8017.	----	----
G1	8.	7939.	----	----
G1	8.	7942.	----	----
G1	8.	7926.	----	----
G1	8.	7943.	----	----
G1	8.	7940.	----	----
G2	9.	7812.	----	----
G2	9.	7938.	----	----
G2	9.	7941.	----	----
G2	9.	8017.	----	----
G2	9.	7939.	----	----
G2	9.	7942.	----	----
G2	9.	7926.	----	----
G2	9.	7943.	----	----
G2	9.	7940.	----	----

STUDY INFO	ID	FUEL CODE	OLE. VOL %	FUEL NORM
H1	10.	2.	4.00	1.0065
H1	10.	3.	4.00	1.0137
H1	10.	6.	3.00	1.0249
H1	10.	7.	3.00	.9848
H1	10.	9.	1.00	.9712
H1	10.	11.	4.00	1.0009
H1	10.	13.	2.00	.9391
H1	10.	15.	1.00	1.0169
H1	10.	16.	2.00	1.0209
H1	10.	17.	1.00	1.0370
H1	10.	18.	2.00	1.0314
H1	10.	19.	4.00	1.1733
H1	10.	20.	3.00	1.0041
H1	10.	21.	2.00	.9528
H1	10.	22.	3.00	.9993
H1	10.	23.	5.00	.9953
H1	10.	24.	3.00	.9752
H1	10.	25.	3.00	1.0193
H1	10.	26.	3.00	.9311
H1	10.	27.	0.00	.8774
H1	10.	28.	4.00	1.0891
H1	10.	30.	1.00	1.1372
H1	10.	31.	1.00	.9832
H1	10.	32.	3.00	1.0145
H1	10.	33.	3.00	.9864
H1	10.	34.	1.00	.9937
H1	10.	35.	2.00	.9985
H1	10.	36.	1.00	.9784
H1	10.	40.	2.00	1.0073
H1	10.	43.	----	----
H1	10.	46.	----	----
I1	11.	1.	----	----
I1	11.	2.	----	----
I1	11.	3.	----	----
I1	11.	4.	----	----
I1	11.	5.	----	----
I1	11.	6.	----	----
I1	11.	7.	----	----
I1	11.	8.	----	----
I1	11.	9.	----	----
I1	11.	10.	----	----
I1	11.	11.	----	----
I1	11.	12.	----	----
I1	11.	13.	----	----
I1	11.	14.	----	----
I1	11.	15.	----	----

STUDY INFO ID		FUEL CODE	OLE. VOL %	FUEL NORM
I2	12.	1.	----	----
I2	12.	2.	----	----
I2	12.	4.	----	----
I2	12.	7.	----	----
I2	12.	11.	----	----
I2	12.	13.	----	----
I2	12.	1.	----	----
I2	12.	2.	----	----
I2	12.	8.	----	----
I2	12.	11.	----	----
I2	12.	12.	----	----
I2	12.	15.	----	----
I2	12.	1.	----	----
I2	12.	2.	----	----
I2	12.	4.	----	----
I2	12.	11.	----	----
I2	12.	12.	----	----
J1	13.	329.	1.70	1.0031
J1	13.	469.	.90	1.0113
J2	14.	329.	1.70	.9953
J2	14.	469.	.90	.9828
J3	15.	329.	1.70	.9982
J3	15.	469.	.90	.9936
K1	16.	329.	1.70	.9839
K1	16.	453.	2.10	1.0241
K1	16.	473.	2.00	1.0226
K1	16.	474.	1.40	.9623
K1	16.	476.	0.00	1.0256
K1	16.	478.	1.20	.9963
K1	16.	482.	0.00	.9438
K1	16.	485.	.50	1.0179
K1	16.	527.	0.00	.9808
K1	16.	526.	1.20	.9546

STUDY INFO	ID	FUEL CODE	10%PT DEG C	HC NORM	NOX NORM	PART. NORM
A1	1.	395.	211.	1.0588	.8782	.9096
A1	1.	401.	206.	1.2941	.9953	.8032
A1	1.	404.	211.	.9412	.8899	.8617
A1	1.	405.	210.	.9412	1.0422	.8617
A1	1.	430.	210.	1.0588	.9836	.9574
A1	1.	434.	206.	1.4118	1.0304	1.1277
A1	1.	438.	210.	1.0588	.9953	.8245
A1	1.	448.	189.	1.2941	.9602	.7553
A1	1.	460.	209.	1.5294	1.0773	1.1649
A1	1.	461.	216.	.9412	1.0070	.8457
A1	1.	463.	206.	1.5294	1.2178	1.5266
B1	2.	238.	213.	.7018	.9286	.9536
B1	2.	2390.	216.	1.1111	.9405	.9101
B1	2.	240.	181.	.5263	.8690	.6812
B1	2.	241.	216.	1.1696	1.0476	1.1014
B1	2.	242.	213.	.7018	1.0119	.8464
B2	3.	238.	213.	.5042	.9532	.8396
B2	3.	239.	216.	.5602	1.0501	.8134
B2	3.	240.	181.	.4762	.9208	.6604
B2	3.	241.	216.	1.9888	.9370	1.3993
B2	3.	242.	213.	.5602	1.0178	.7239
C1	4.	1.	181.	.7292	.7306	.7726
C1	4.	2.	204.	.6597	.7436	1.0301
C1	4.	3.	216.	1.0069	1.0698	.8261
C1	4.	4.	214.	1.0417	.9328	1.0569
D1	5.	20.	223.	.8427	1.0119	.9663
D1	5.	2.	217.	1.1798	.9881	1.0506
D1	5.	1.	205.	1.4607	.9643	1.0000
F1	6.	1.	197.	1.2917	.9350	----
F1	6.	4.	151.	1.5417	.9350	----
F1	6.	5.	139.	7.2500	.7724	----
F1	6.	6.	136.	----	.8130	----
F2	7.	1.	197.	.8488	1.0256	----
F2	7.	5.	139.	.4630	1.1966	----
F2	7.	6.	136.	.4475	1.0256	----
G1	8.	7812.	209.	----	----	----
G1	8.	7938.	206.	----	----	----
G1	8.	7941.	213.	1.2500	.9488	.9322
G1	8.	8017.	188.	----	----	----
G1	8.	7939.	203.	1.2500	1.0436	1.1864
G1	8.	7942.	201.	1.2500	.8539	.9322
G1	8.	7926.	214.	1.2500	.9488	1.0169
G1	8.	7943.	199.	2.5000	.8539	.9322
G1	8.	7940.	199.	1.2500	.8539	.9322
G2	9.	7812.	209.	2.6022	1.1029	.6250
G2	9.	7938.	206.	.3717	.8578	.8750
G2	9.	7941.	213.	.3717	.9804	.9375
G2	9.	8017.	188.	.7435	1.1029	.7500
G2	9.	7939.	203.	.3717	.9804	.8125
G2	9.	7942.	201.	.3717	.9804	.8750
G2	9.	7926.	214.	.7435	1.1029	1.1875
G2	9.	7943.	199.	.7435	.9804	.8750
G2	9.	7940.	199.	.7435	.9804	1.0000

STUDY INFO	ID	FUEL CODE	10%PT DEG C	HC NORM	NOX NORM	PART. NORM
H1	10.	2.	54.	9.6651	1.5008	.5616
H1	10.	3.	54.	4.4498	1.0830	.9214
H1	10.	6.	63.	9.3301	1.0005	.5920
H1	10.	7.	63.	4.0191	.9386	.8402
H1	10.	9.	79.	2.3923	1.1655	.9168
H1	10.	11.	201.	.3349	.8716	1.1096
H1	10.	13.	165.	.3349	.7323	1.0216
H1	10.	15.	125.	8.2775	.9593	.6277
H1	10.	16.	133.	2.2488	1.3254	.9411
H1	10.	17.	267.	1.8182	1.3976	1.1551
H1	10.	18.	143.	5.7416	1.0676	1.1141
H1	10.	19.	219.	2.3923	1.1037	.9419
H1	10.	20.	198.	5.3110	1.1913	.8865
H1	10.	21.	222.	3.5407	1.1037	.9935
H1	10.	22.	203.	2.4402	1.0624	.7514
H1	10.	23.	221.	.7656	1.1552	.9130
H1	10.	24.	213.	.8612	.9954	.8736
H1	10.	25.	214.	.5742	1.1037	.8538
H1	10.	26.	190.	.2392	1.0263	.8971
H1	10.	27.	101.	.5742	.8819	.8637
H1	10.	28.	222.	.7177	.9696	1.2007
H1	10.	30.	85.	66.6029	1.5472	.6527
H1	10.	31.	117.	1.6268	1.3254	.9578
H1	10.	32.	233.	.6220	.8664	1.0921
H1	10.	33.	204.	.8134	1.0985	1.0193
H1	10.	34.	85.	1.0526	1.1243	1.1172
H1	10.	35.	165.	.8134	1.0882	1.1536
H1	10.	36.	79.	1.6746	1.1346	1.0102
H1	10.	40.	215.	.2392	.5209	.7650
H1	10.	43.	221.	1.3876	.7117	1.1733
H1	10.	46.	190.	.4785	.8458	.8720
I1	11.	1.	197.	----	----	.5709
I1	11.	2.	209.	----	----	.8333
I1	11.	3.	262.	----	----	1.2165
I1	11.	4.	271.	----	----	1.5843
I1	11.	5.	254.	----	----	1.2146
I1	11.	6.	261.	----	----	1.7510
I1	11.	7.	258.	----	----	.7510
I1	11.	8.	254.	----	----	1.8927
I1	11.	9.	112.	----	----	.5594
I1	11.	10.	177.	----	----	1.7510
I1	11.	11.	211.	----	----	.3697
I1	11.	12.	309.	----	----	.6667
I1	11.	13.	221.	----	----	.5000
I1	11.	14.	231.	----	----	.5843
I1	11.	15.	191.	----	----	1.0843

STUDY INFO	ID	FUEL CODE	10%PT DEG C	HC NORM	NOX NORM	PART. NORM
I2	12.	1.	197.	----	----	1.0708
I2	12.	2.	209.	----	----	1.3761
I2	12.	4.	271.	----	----	1.8717
I2	12.	7.	258.	----	----	1.0708
I2	12.	11.	211.	----	----	.6858
I2	12.	13.	221.	----	----	.7699
I2	12.	1.	197.	----	----	.6327
I2	12.	2.	209.	----	----	.7965
I2	12.	8.	254.	----	----	1.4558
I2	12.	11.	211.	----	----	.3584
I2	12.	12.	309.	----	----	.5221
I2	12.	15.	191.	----	----	.9912
I2	12.	1.	197.	----	----	1.1814
I2	12.	2.	209.	----	----	1.4292
I2	12.	4.	271.	----	----	1.4558
I2	12.	11.	211.	----	----	.7699
I2	12.	12.	309.	----	----	.7699
J1	13.	329.	219.	1.0032	.9988	1.0039
J1	13.	469.	307.	1.1327	1.0597	1.1024
J2	14.	329.	219.	1.0000	.9992	.9939
J2	14.	469.	307.	1.2500	.9913	1.2577
J3	15.	329.	219.	1.0084	1.0016	1.0000
J3	15.	469.	307.	1.0924	1.0172	1.1568
K1	16.	329.	219.	.8708	.9154	.8527
K1	16.	453.	236.	.8708	.9293	.9384
K1	16.	473.	189.	1.0674	.9709	.8562
K1	16.	474.	234.	1.0955	1.1512	1.0993
K1	16.	476.	53.	1.9101	.9015	.7123
K1	16.	478.	209.	1.6854	1.0541	1.3493
K1	16.	482.	207.	.9270	1.0125	.9623
K1	16.	485.	157.	.9551	1.0541	1.0240
K1	16.	527.	200.	.8989	.8877	.7568
K1	16.	526.	212.	1.0112	.9847	.9658

STUDY INFO	ID	FUEL CODE	90%PT DEG C	HC NORM	PART. NORM
A1	1.	395.	224.	.8911	.8182
A1	1.	401.	239.	1.0891	.7225
A1	1.	404.	224.	.7921	.7751
A1	1.	405.	224.	.7921	.7751
A1	1.	430.	228.	.8911	.8612
A1	1.	434.	234.	1.1881	1.0144
A1	1.	438.	224.	.8911	.7416
A1	1.	448.	223.	1.0891	.6794
A1	1.	460.	224.	1.2871	1.0478
A1	1.	461.	251.	.7921	.7608
A1	1.	463.	234.	1.2871	1.3732
B1	2.	238.	313.	.8054	1.0313
B1	2.	2390.	303.	1.2752	.9843
B1	2.	240.	238.	.6040	.7367
B1	2.	241.	301.	1.3423	1.1912
B1	2.	242.	310.	.8054	.9154
B2	3.	238.	313.	.6000	.9184
B2	3.	239.	303.	.6667	.8898
B2	3.	240.	238.	.5667	.7224
B2	3.	241.	301.	2.3667	1.5306
B2	3.	242.	310.	.6667	.7918
C1	4.	1.	238.	.7778	.7938
C1	4.	2.	280.	.7037	1.0584
C1	4.	3.	303.	1.0741	.8488
C1	4.	4.	306.	1.1111	1.0859
D1	5.	20.	316.	.6024	.9503
D1	5.	2.	309.	.8434	1.0331
D1	5.	1.	297.	1.0442	.9834
F1	6.	1.	290.	.3949	----
F1	6.	4.	303.	.4713	----
F1	6.	5.	308.	2.2166	----
F1	6.	6.	279.	----	----
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G1	8.	7942.	227.	1.1236	.9565
G1	8.	7926.	306.	1.1236	1.0435
G1	8.	7943.	312.	2.2472	.9565
G1	8.	7940.	251.	1.1236	.9565
G2	9.	7812.	247.	3.5354	.6536
G2	9.	7938.	226.	.5051	.9150
G2	9.	7941.	309.	.5051	.9804
G2	9.	8017.	244.	1.0101	.7843
G2	9.	7939.	249.	.5051	.8497
G2	9.	7942.	227.	.5051	.9150
G2	9.	7926.	306.	1.0101	1.2418
G2	9.	7943.	312.	1.0101	.9150
G2	9.	7940.	251.	1.0101	1.0458

STUDY INFO	ID	FUEL CODE	90%PT DEG C	HC NORM	PART. NORM
H1	10.	2.	130.	3.1661	.5746
H1	10.	3.	130.	1.4577	.9427
H1	10.	6.	92.	3.0564	.6057
H1	10.	7.	92.	1.3166	.8596
H1	10.	9.	122.	.7837	.9380
H1	10.	11.	255.	.1097	1.1353
H1	10.	13.	186.	.1097	1.0452
H1	10.	15.	235.	2.7116	.6422
H1	10.	16.	308.	.7367	.9629
H1	10.	17.	320.	.5956	1.1819
H1	10.	18.	309.	1.8809	1.1399
H1	10.	19.	314.	.7837	.9637
H1	10.	20.	296.	1.7398	.9070
H1	10.	21.	314.	1.1599	1.0165
H1	10.	22.	297.	.7994	.7688
H1	10.	23.	314.	.2508	.9342
H1	10.	24.	307.	.2821	.8938
H1	10.	25.	311.	.1881	.8736
H1	10.	26.	247.	.0784	.9178
H1	10.	27.	233.	.1881	.8837
H1	10.	28.	303.	.2351	1.2285
H1	10.	30.	208.	21.8182	.6678
H1	10.	31.	246.	.5329	.9800
H1	10.	32.	311.	.2038	1.1174
H1	10.	33.	309.	.2665	1.0429
H1	10.	34.	208.	.3448	1.1430
H1	10.	35.	186.	.2665	1.1803
H1	10.	36.	145.	.5486	1.0335
H1	10.	40.	233.	.0784	.7827
H1	10.	43.	358.	.4545	1.2005
H1	10.	46.	320.	.1567	.8922
11	11.	1.	256.	----	.6835
11	11.	2.	317.	----	.9977
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11	11.	4.	363.	----	1.8968
11	11.	5.	349.	----	1.4541
11	11.	6.	364.	----	2.0963
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11	11.	8.	367.	----	2.2661
11	11.	9.	224.	----	.6697
11	11.	10.	346.	----	2.0963
11	11.	11.	246.	----	.4427
11	11.	12.	365.	----	.7982
11	11.	13.	342.	----	.5986
11	11.	14.	357.	----	.6995
11	11.	15.	328.	----	1.2982

STUDY INFO	STUDY ID	FUEL CODE	90%PT DEG C	HC NORM	PART. NORM
I2	12.	1.	256.	----	1.1000
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I2	12.	4.	363.	----	1.9227
I2	12.	7.	354.	----	1.1000
I2	12.	11.	246.	----	.7045
I2	12.	13.	342.	----	.7909
I2	12.	1.	256.	----	.6500
I2	12.	2.	317.	----	.8182
I2	12.	8.	367.	----	1.4955
I2	12.	11.	246.	----	.3682
I2	12.	12.	365.	----	.5364
I2	12.	15.	328.	----	1.0182
I2	12.	1.	256.	----	1.2136
I2	12.	2.	317.	----	1.4682
I2	12.	4.	363.	----	1.4955
I2	12.	11.	246.	----	.7909
I2	12.	12.	365.	----	.7909
J1	13.	329.	219.	.8986	.9239
J1	13.	469.	315.	1.0145	1.0145
J2	14.	329.	219.	.8219	.8141
J2	14.	469.	315.	1.0274	1.0302
J3	15.	329.	219.	.9449	.8773
J3	15.	469.	315.	1.0236	1.0149
K1	16.	329.	302.	.7654	.8957
K1	16.	453.	295.	.7654	.9856
K1	16.	473.	228.	.9383	.8993
K1	16.	474.	330.	.9630	1.1547
K1	16.	476.	303.	1.6790	.7482
K1	16.	478.	303.	1.4815	1.4173
K1	16.	482.	316.	.8148	1.0108
K1	16.	485.	302.	.8395	1.0755
K1	16.	527.	392.	.7901	.7950
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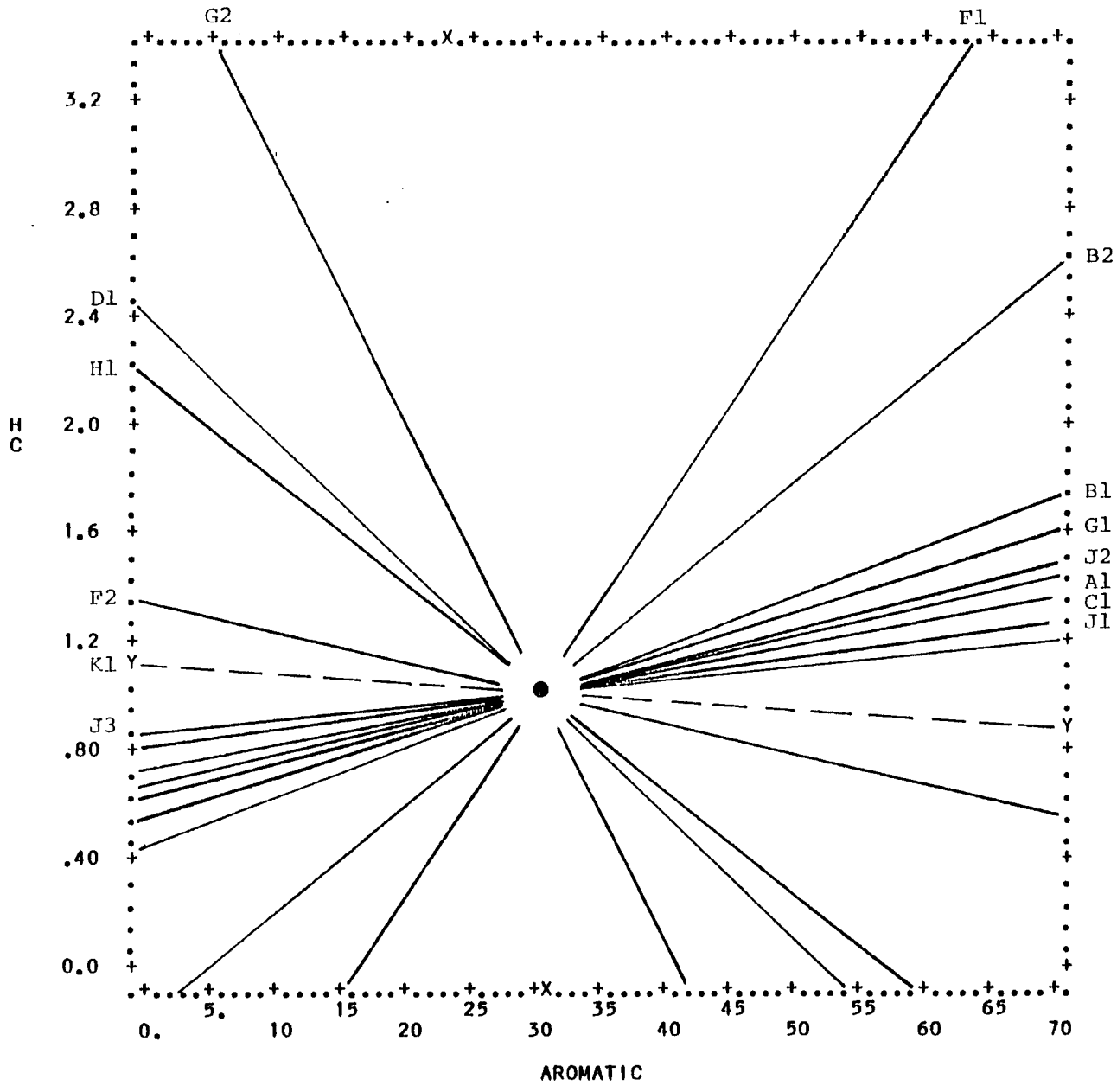
APPENDIX E

SCATTERGRAMS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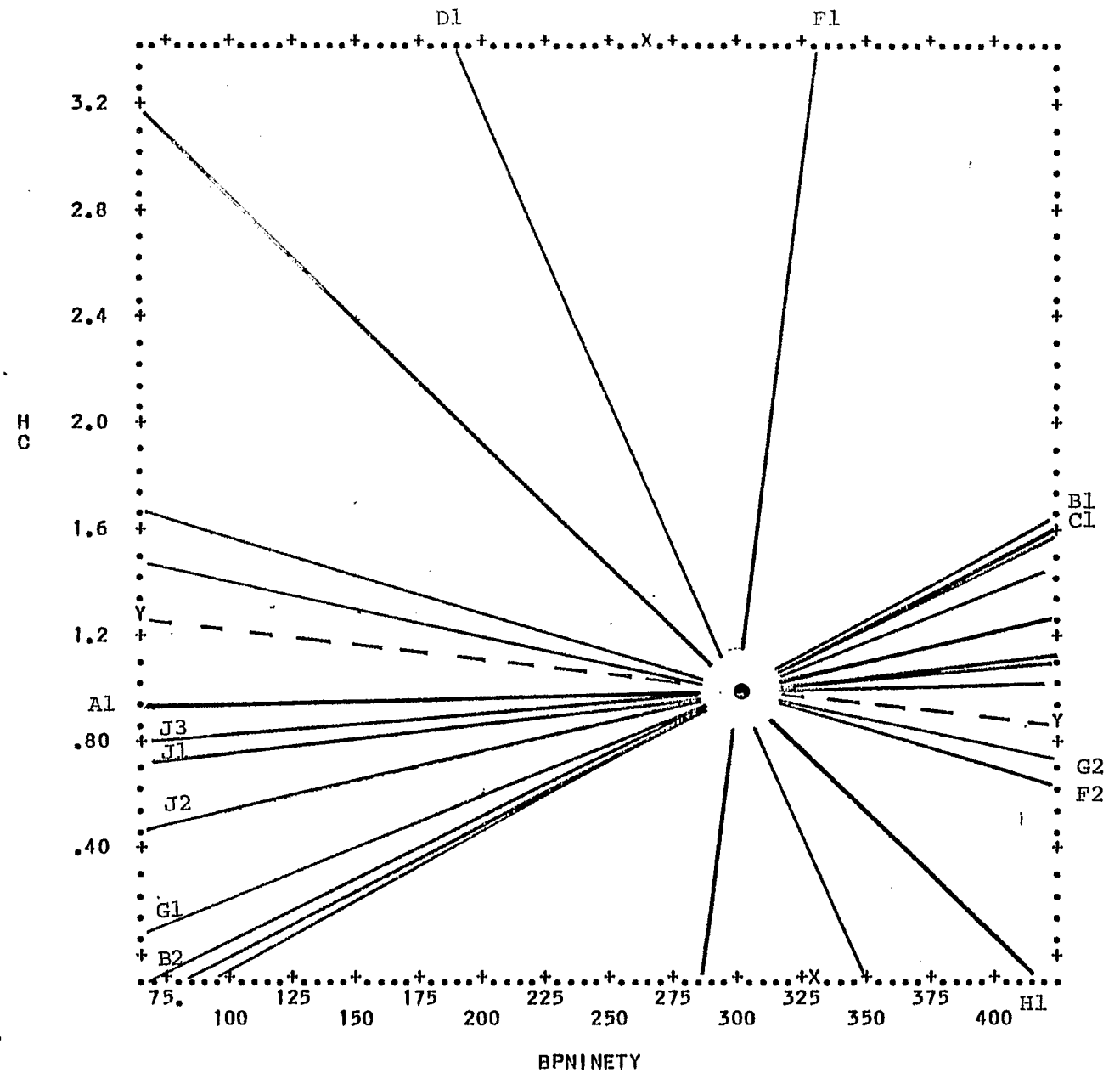
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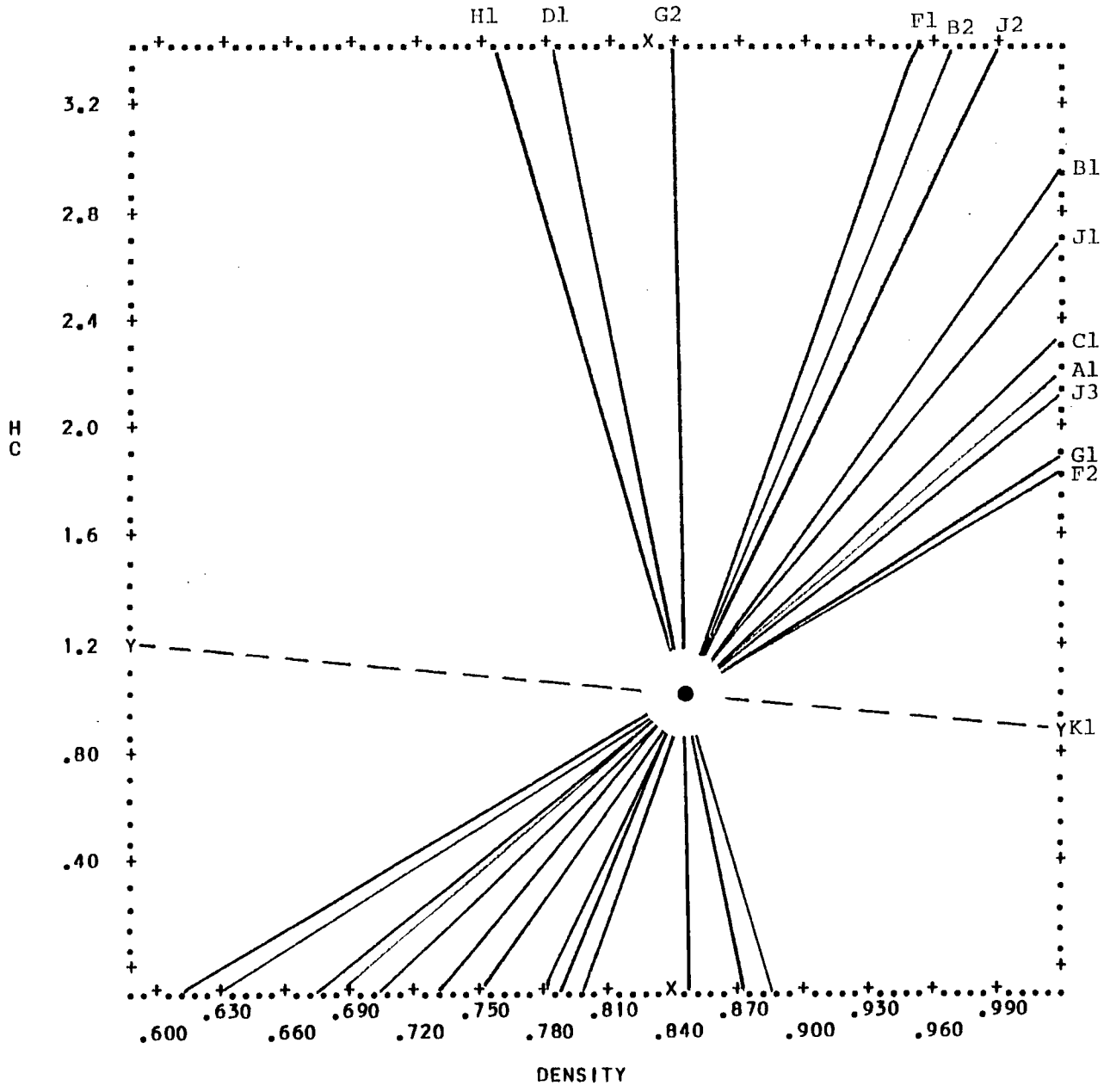
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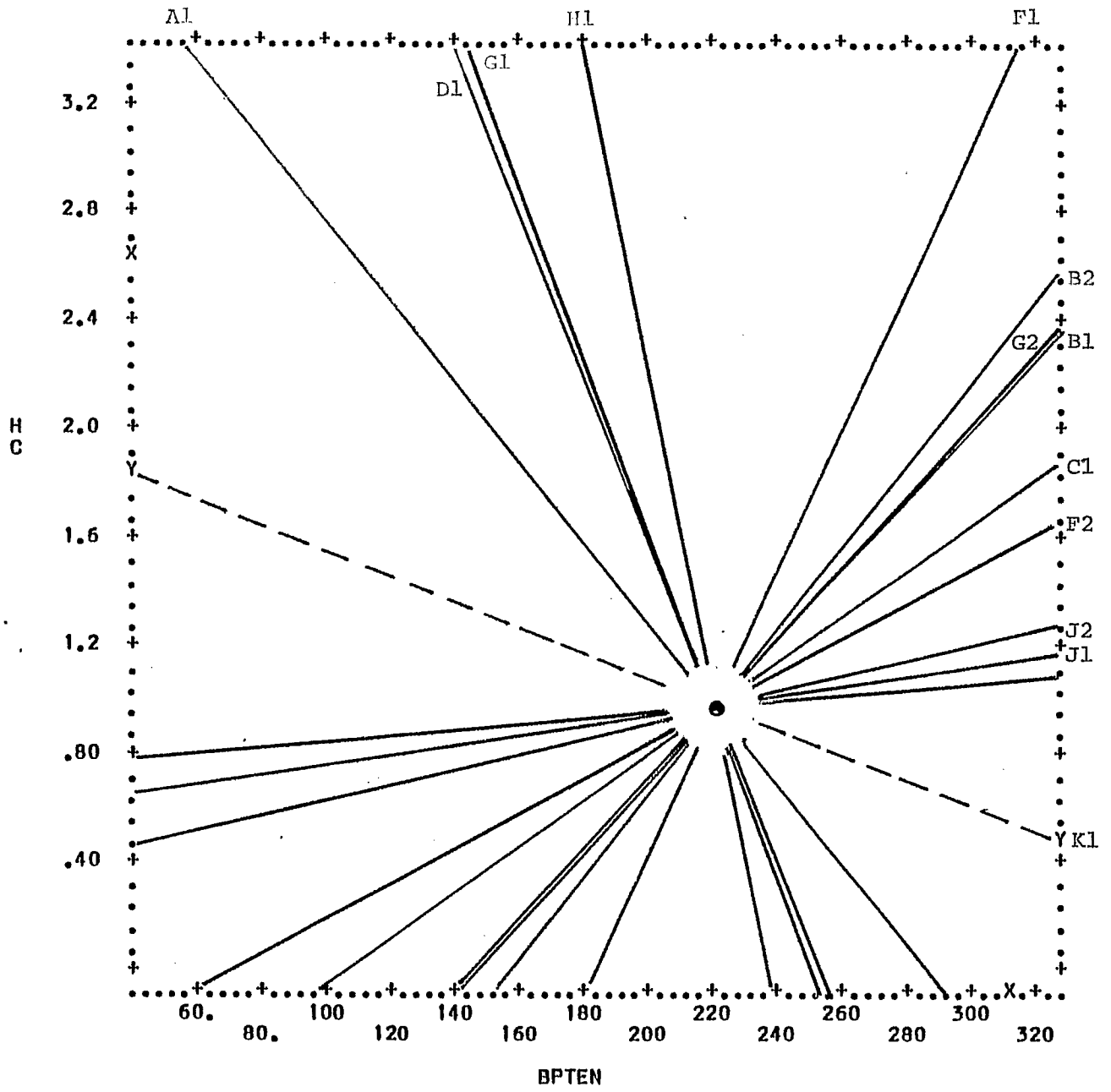
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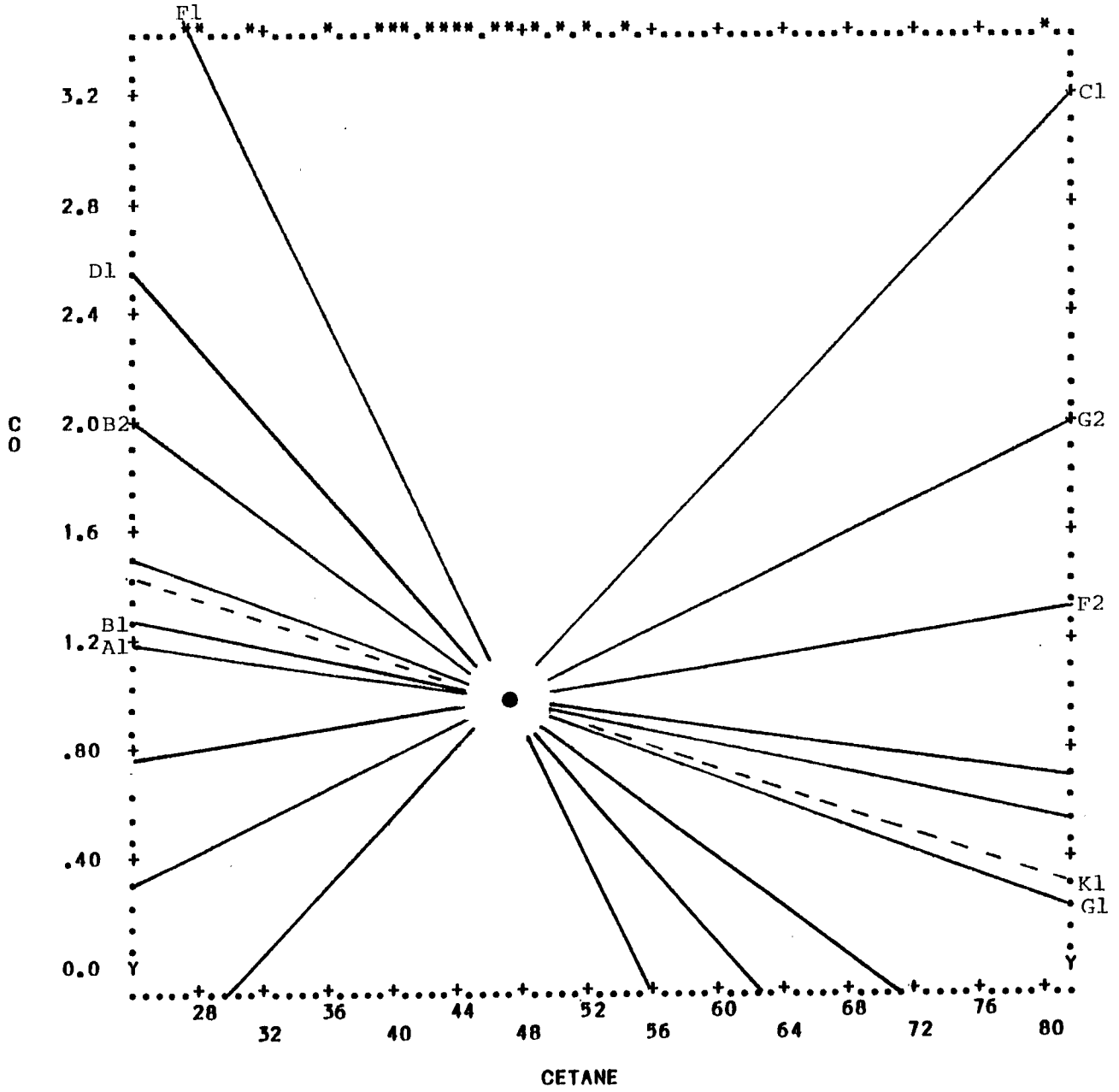
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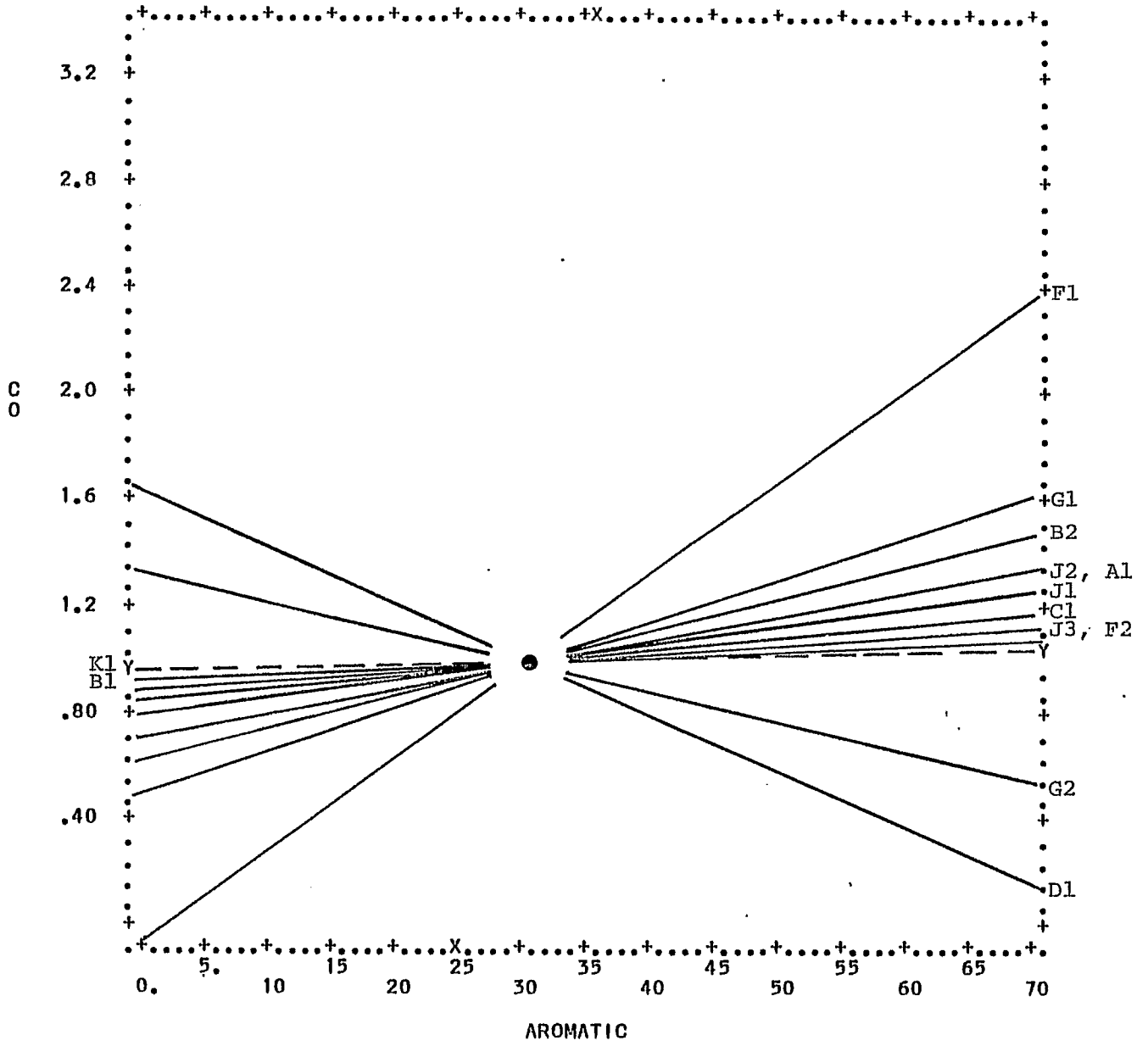
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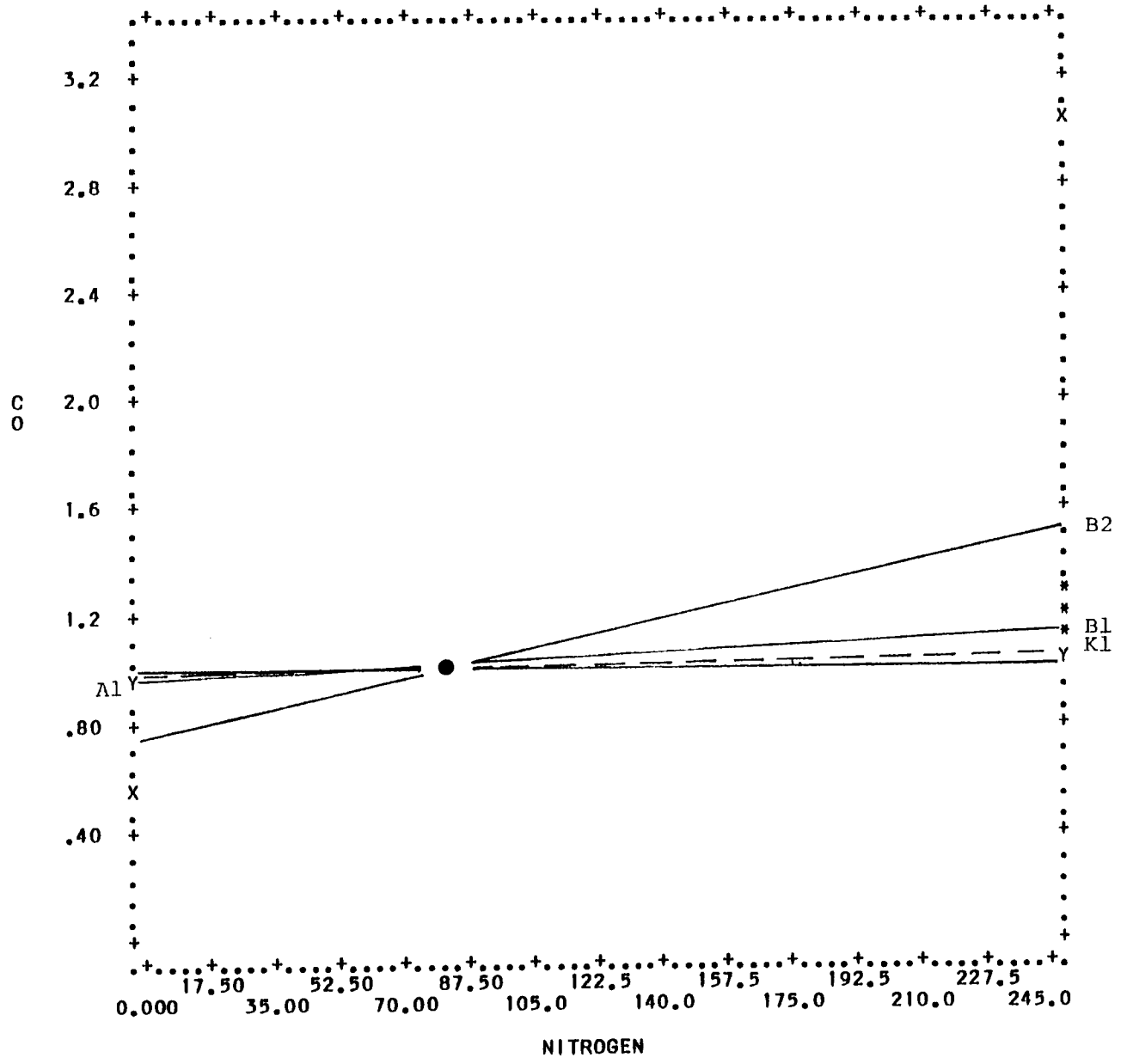
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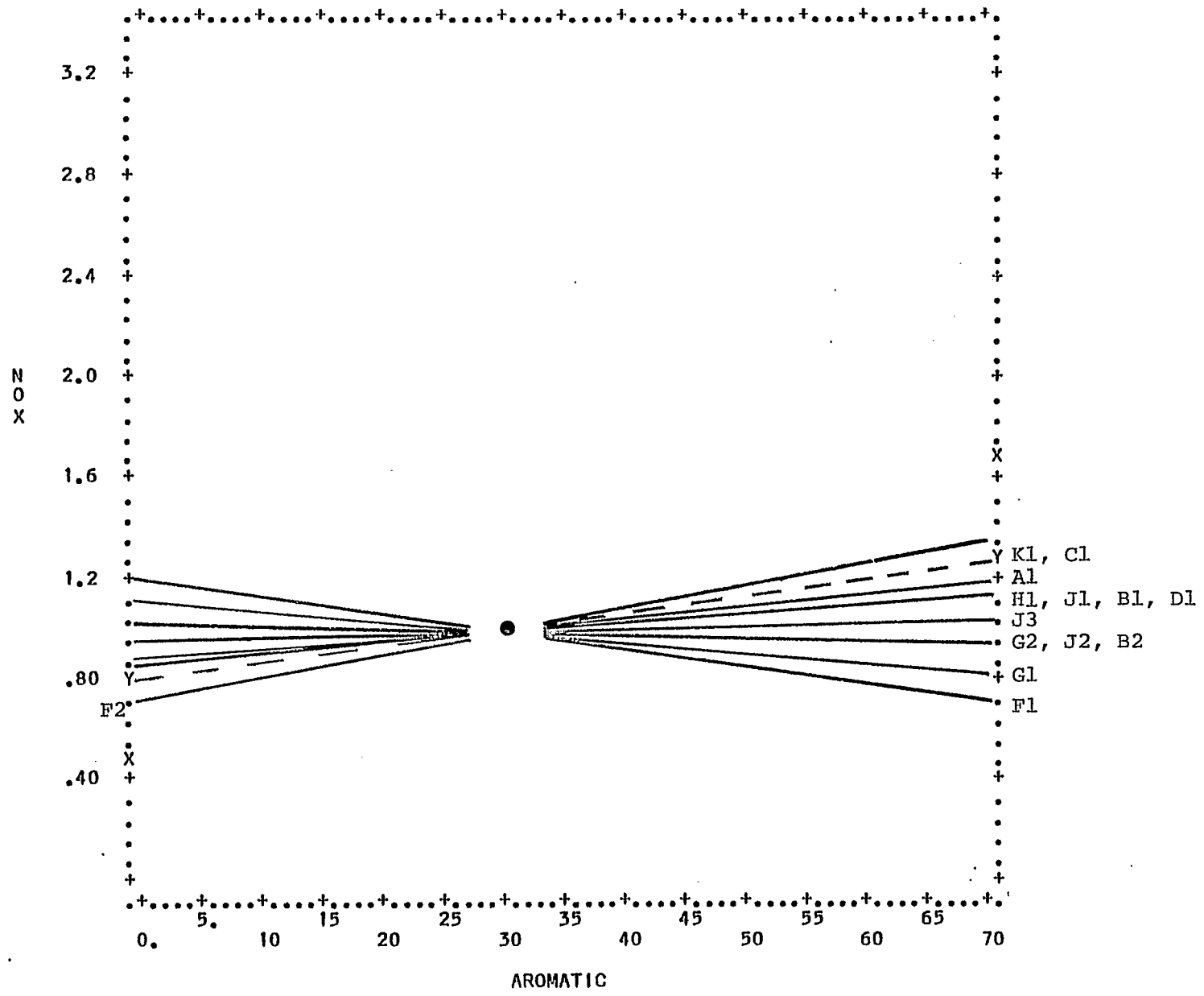
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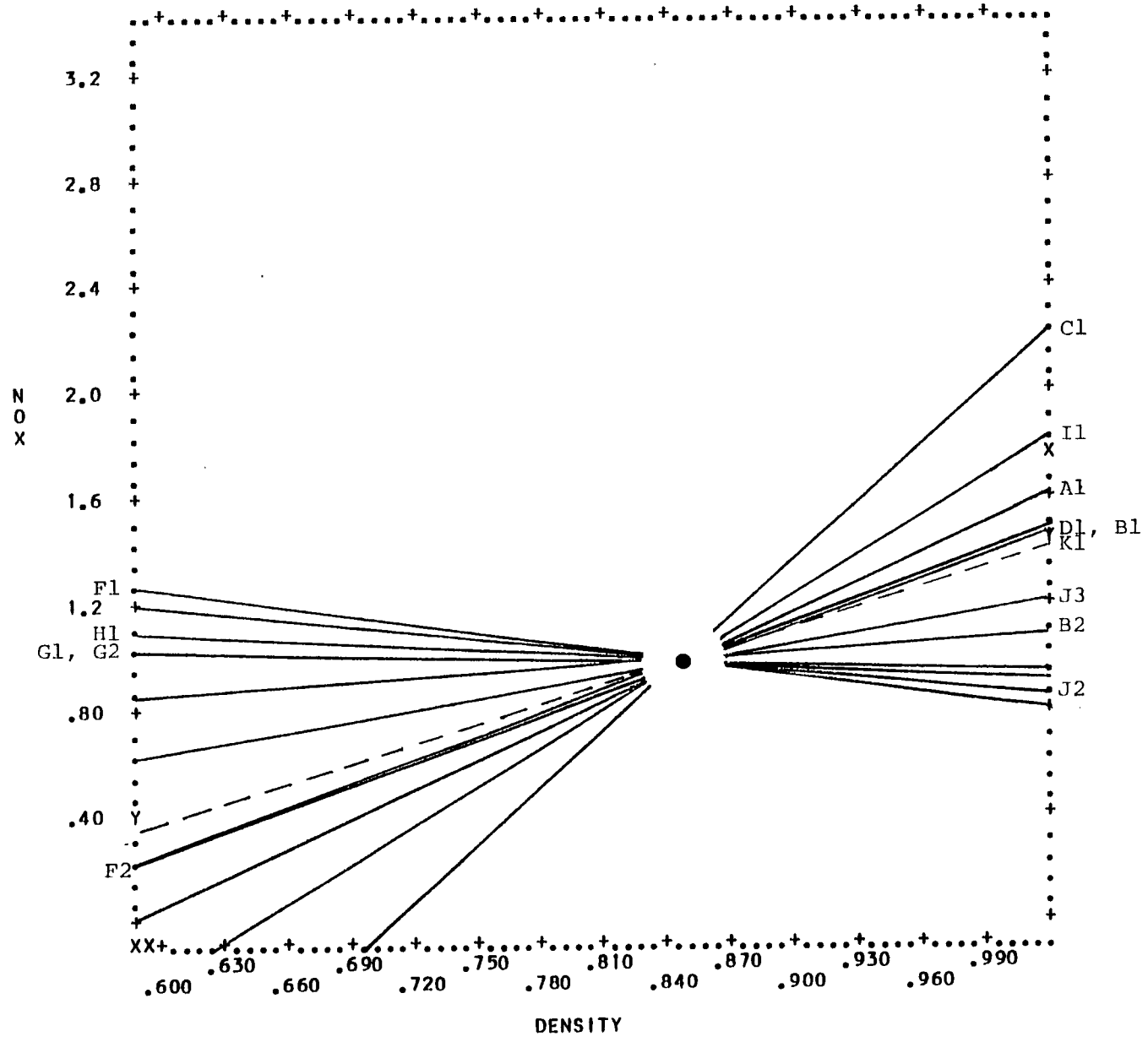
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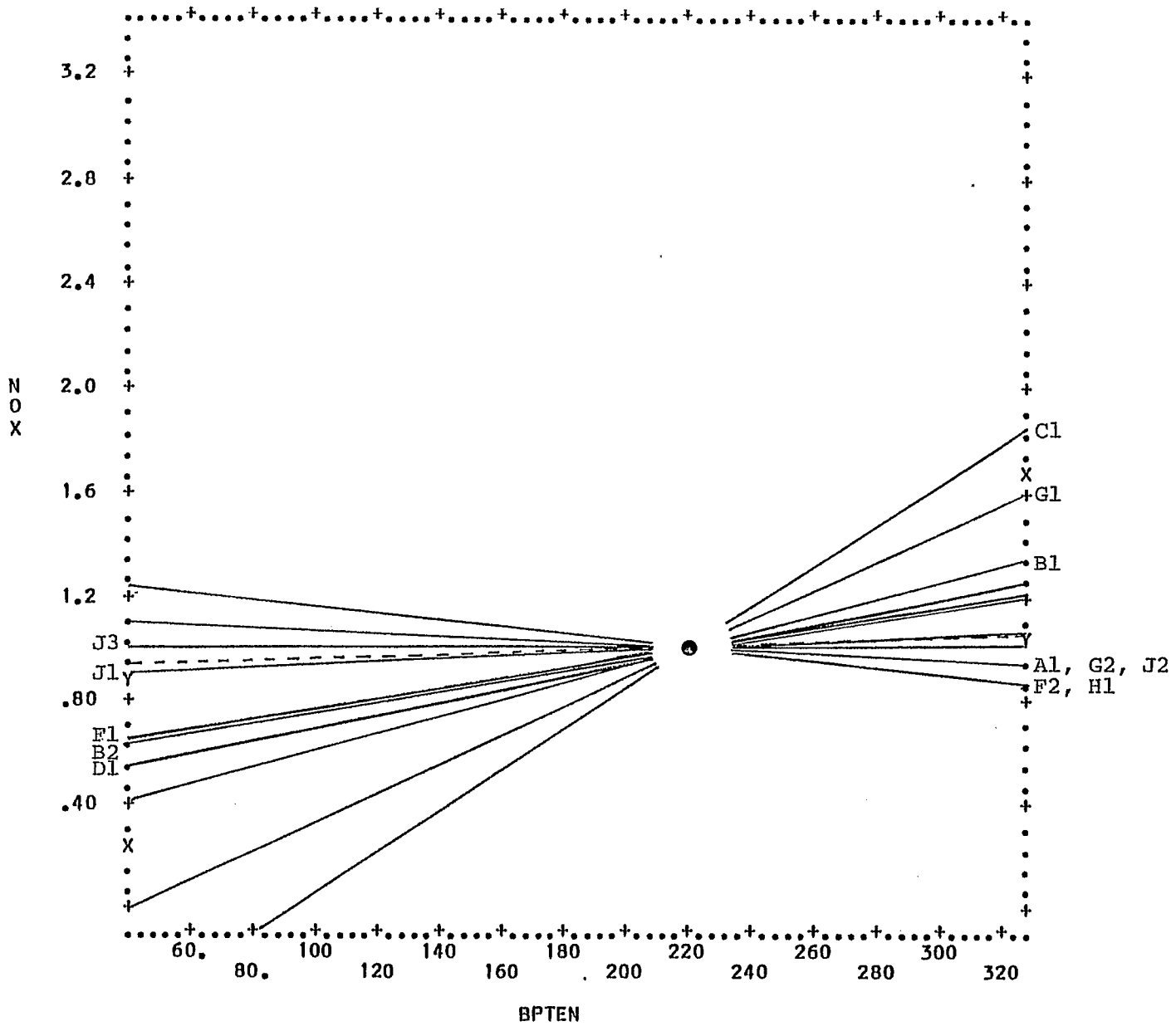
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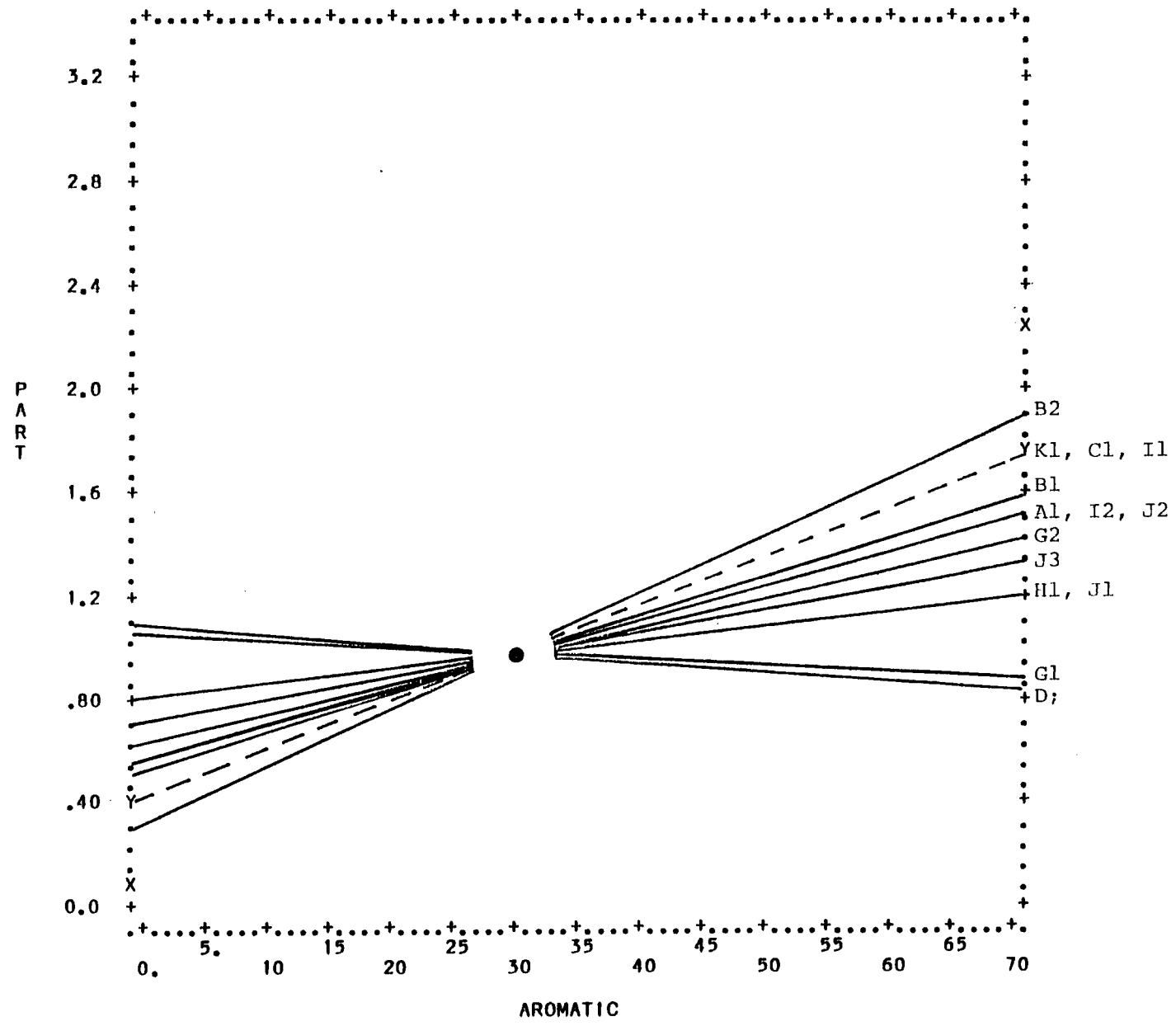
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60
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AROMATIC
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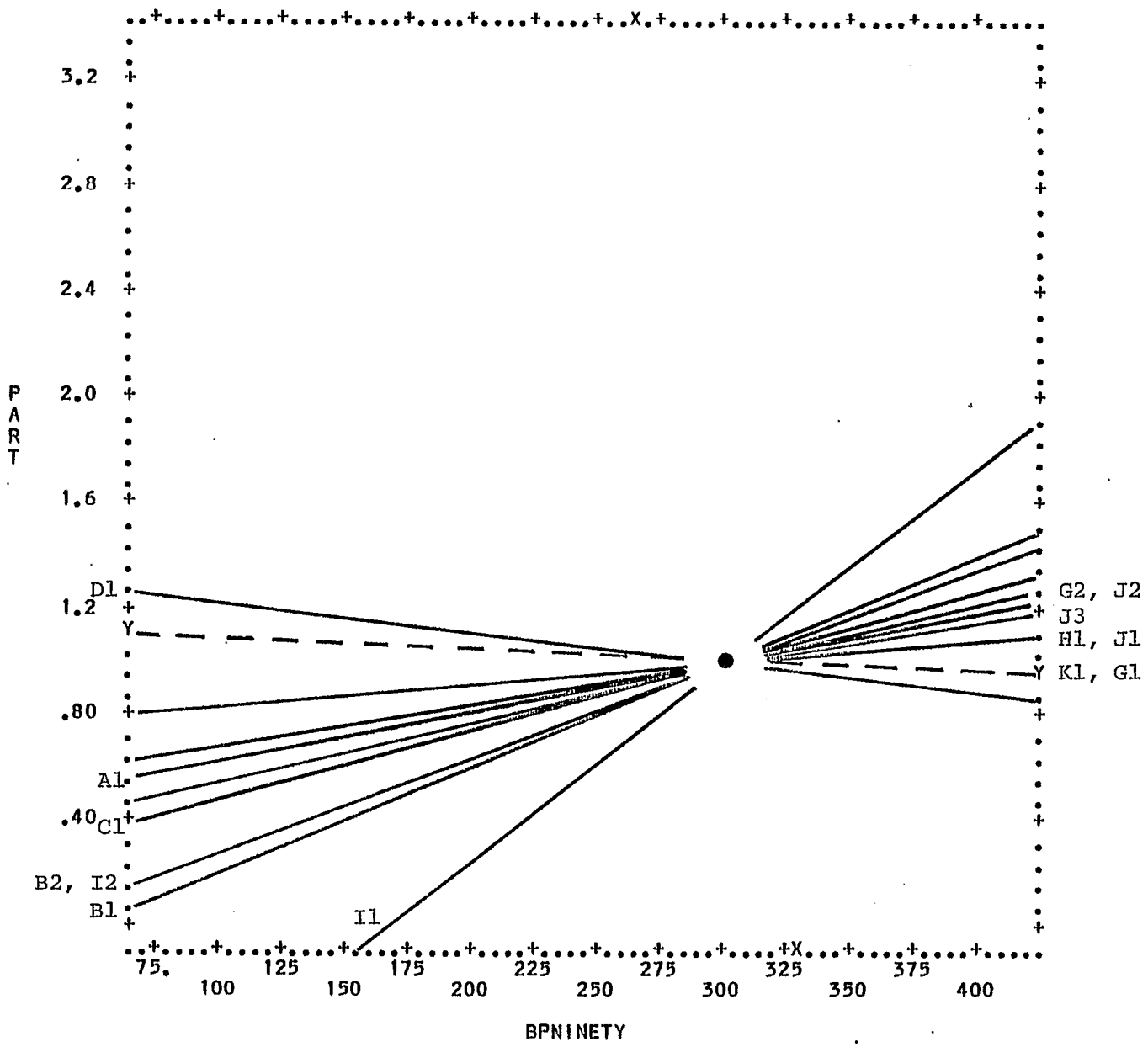
B1
A1, I2, J2
G2
J3
H1, J1
G1
D;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2.8
2.4
2.0
1.6
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.40
PART
D1
Y
A1
C1
B2, I2
B1
I1
G2, J2
J3
H1, J1
Y K1, G1
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125
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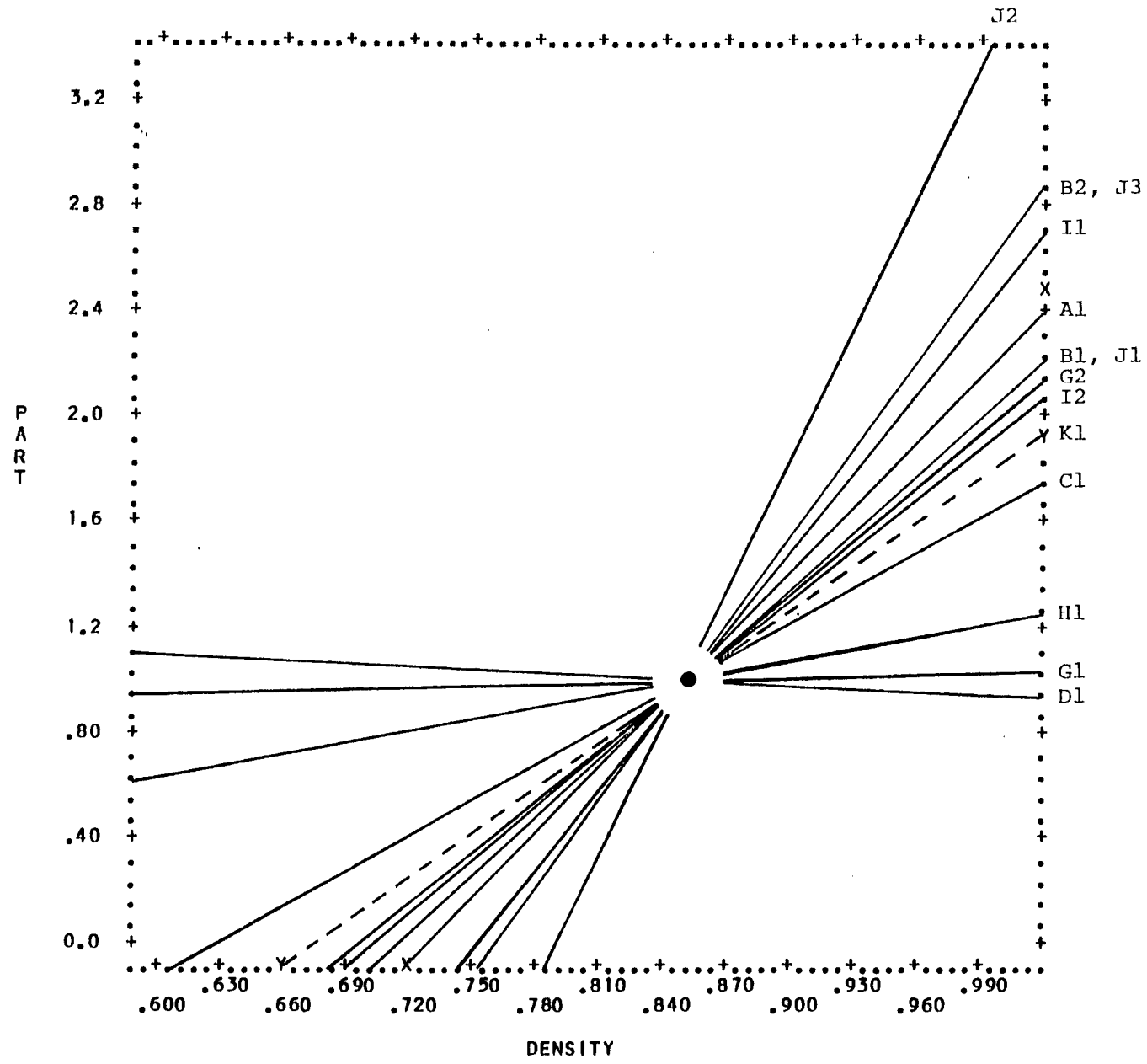
375
400
BPNINETY


J2
B2, J3
I1
A1
B1, J1
G2
I2
K1
C1
H1
G1
D1
PART
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2.8
2.4
2.0
1.6
1.2
.80
.40
0.0
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.750
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.810
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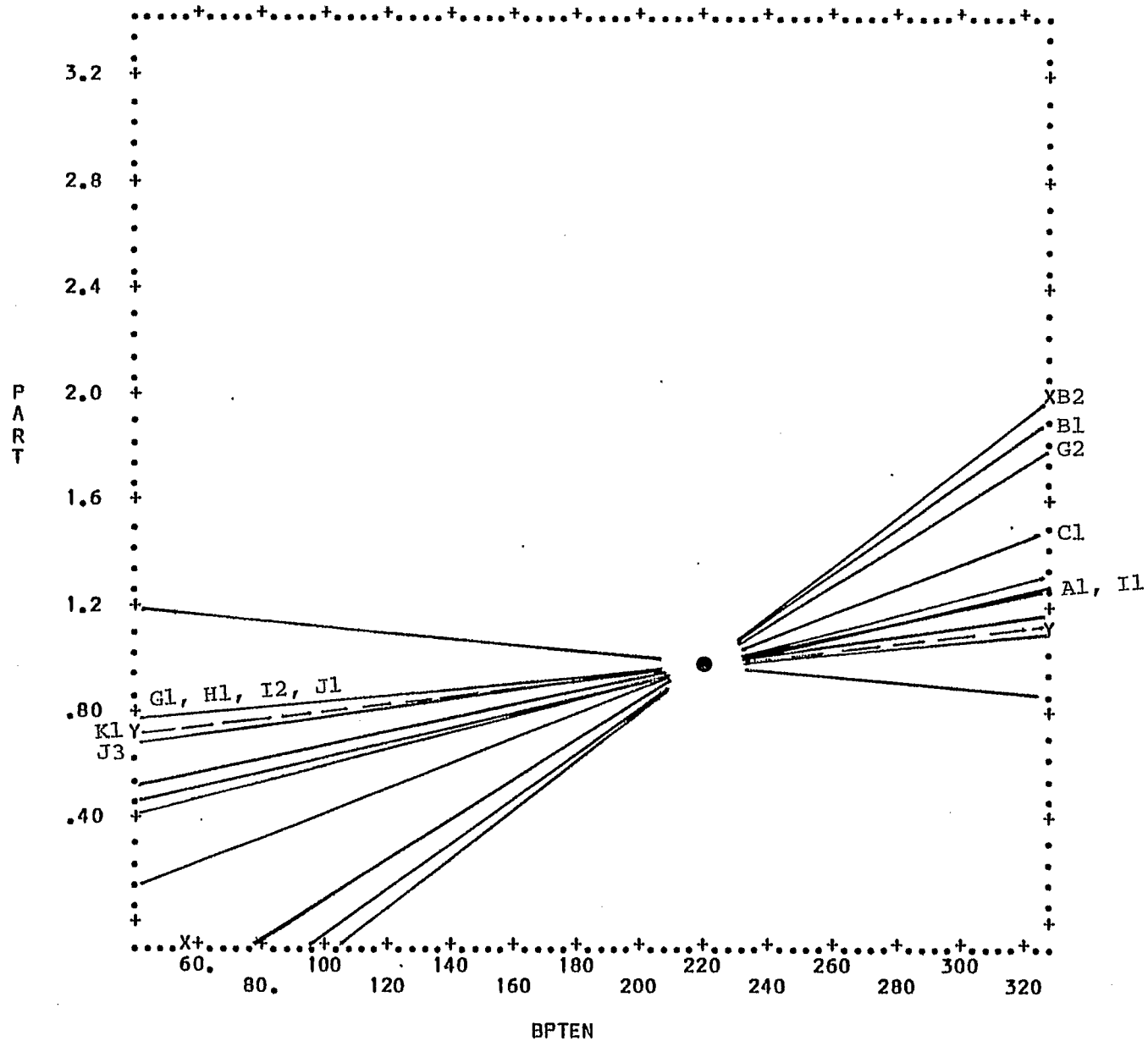
.960
.990
DENSITY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XB2
B1
G2
C1
A1, I1
Y
G1, H1, I2, J1
K1
Y
J3
X
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80.
100
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140
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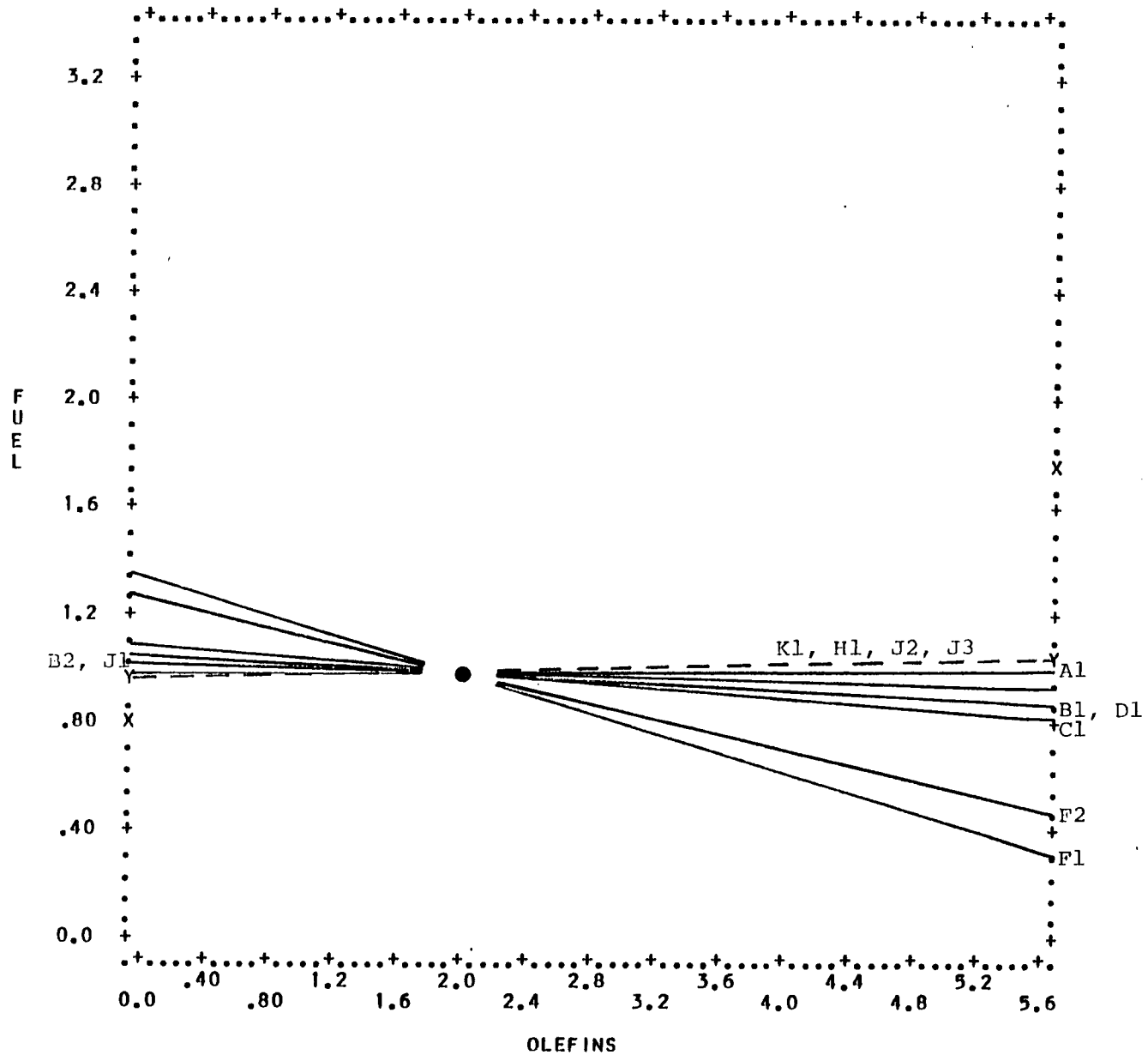
320
BPTEN


FUEL
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1.6
1.2
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.40
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B2, J1
K1, H1, J2, J3
A1
B1, D1
C1
F2
F1
0.0
.40
.80
1.2
1.6
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2.4
2.8
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3.6
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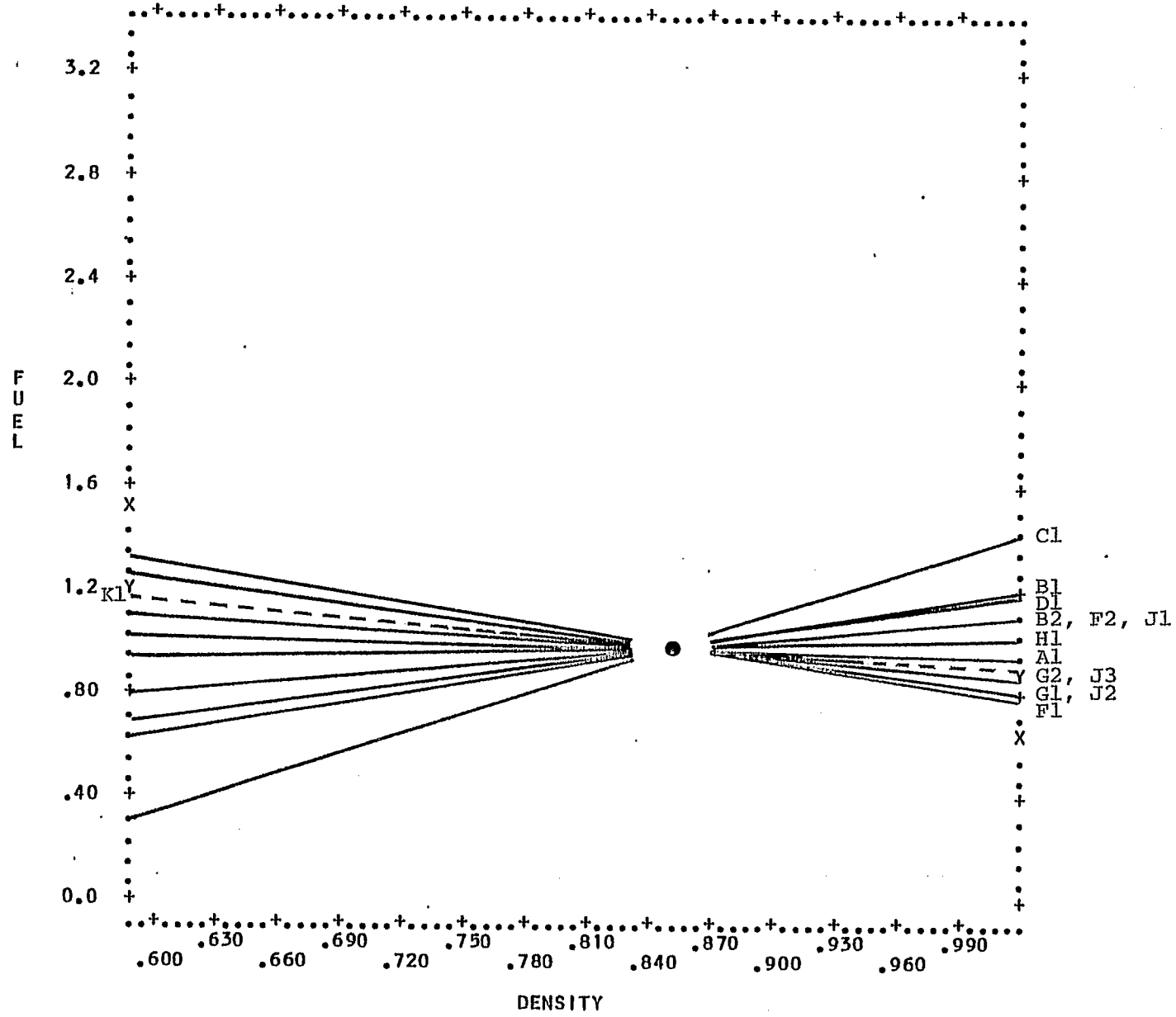
4.4
4.8
5.2
5.6
OLEFINS


FUEL
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2.4
2.0
1.6
1.2
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.40
0.0
K1
C1
B1
D1
B2, F2, J1
H1
A1
G2, J3
G1, J2
F1
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.720
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.810
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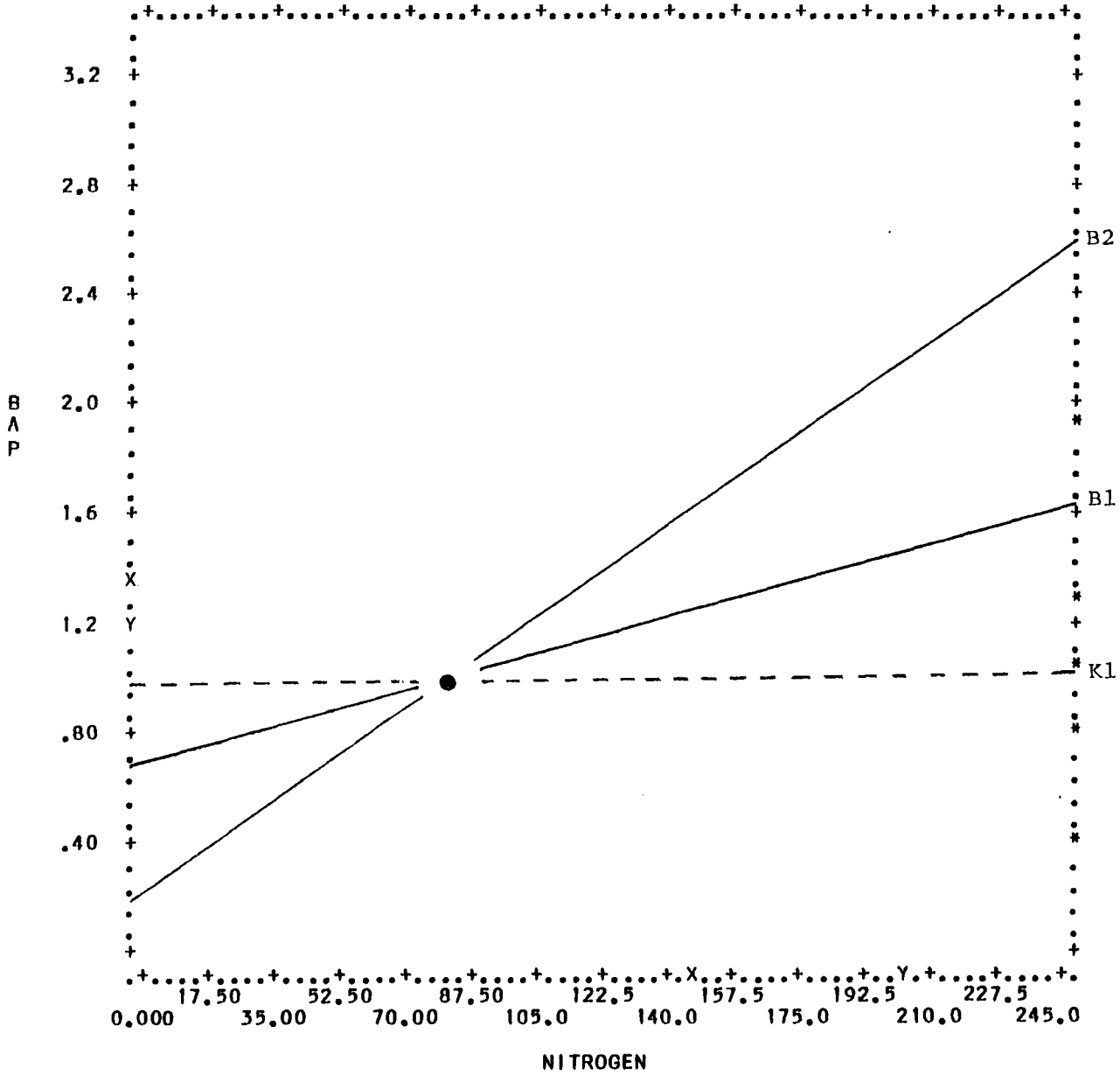
DENSITY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2.4
2.0
1.6
1.2
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.40
B
A
P
X
Y
B2
B1
K1
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17.50
35.00
52.50
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87.50
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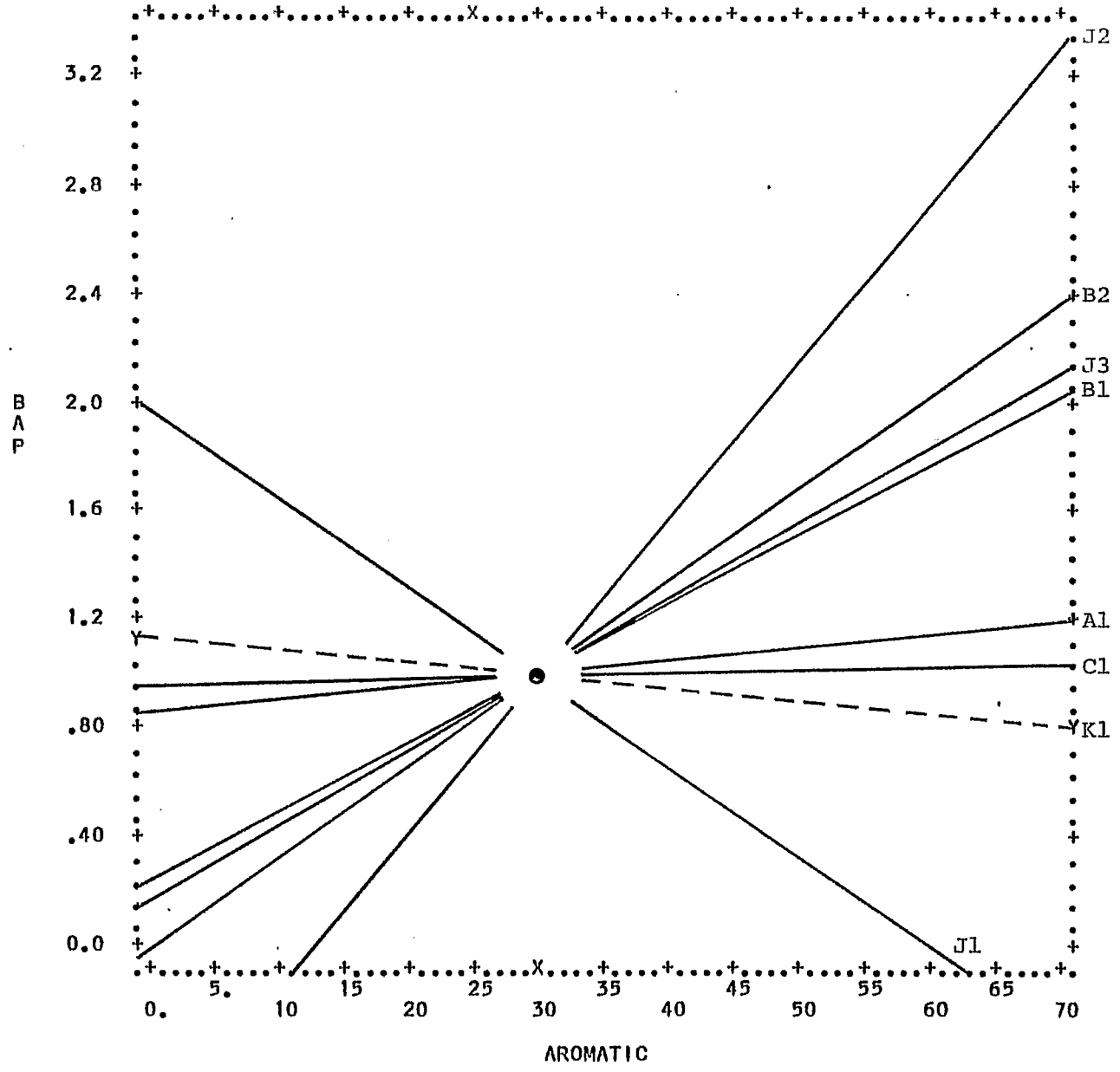
122.5
140.0
157.5
175.0
192.5
210.0
227.5
245.0
NITROGEN


J2
B2
J3
B1
A1
C1
K1
J1
3.2
2.8
2.4
2.0
1.6
1.2
.80
.40
0.0
BAP
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5.
10
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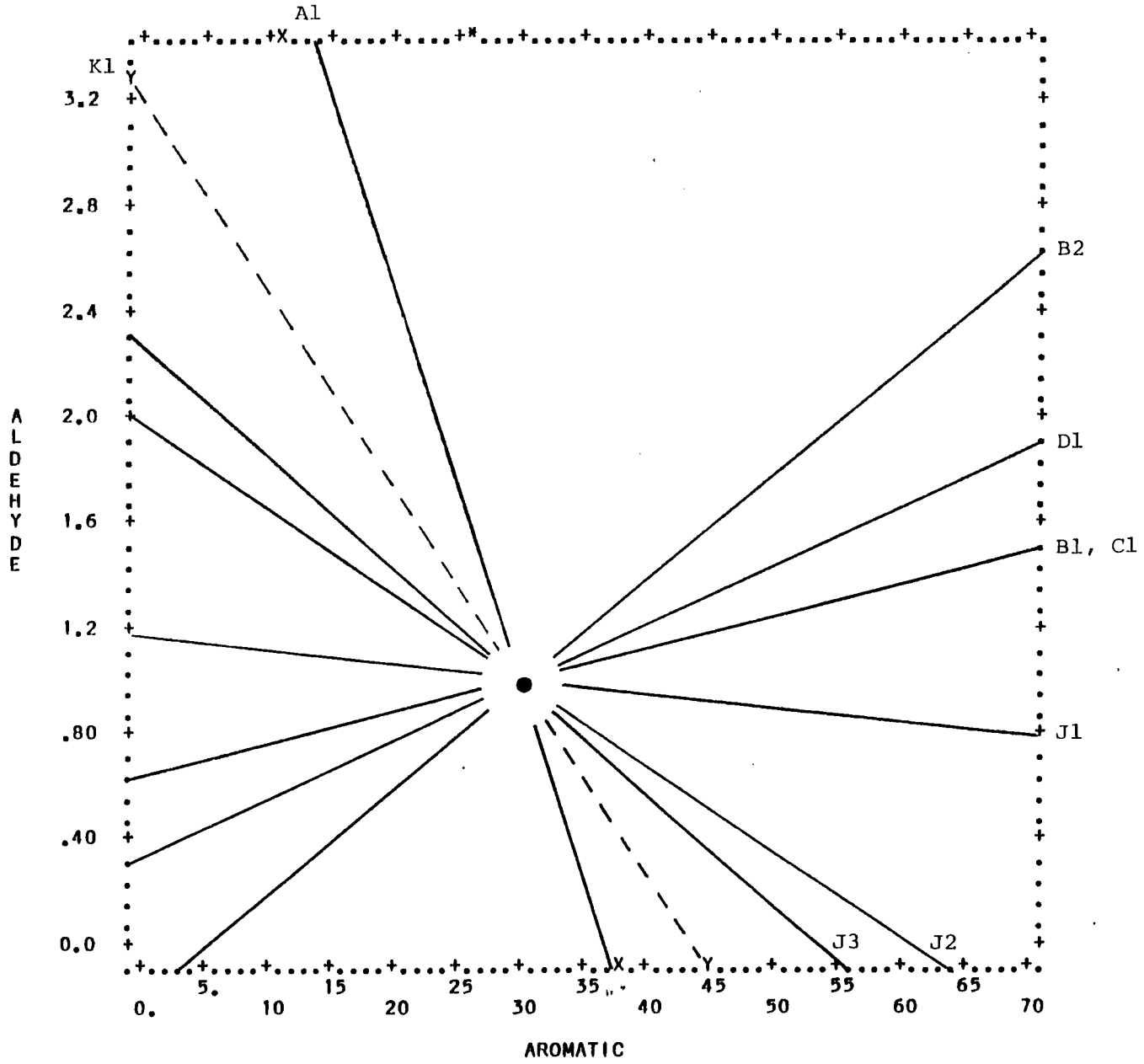
35
40
45
50
55
60
65
70
AROMATIC


A1
K1
B2
D1
B1, C1
J1
J3
J2
3.2
2.8
2.4
2.0
1.6
1.2
.80
.40
0.0
ALDEHYDE
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5.
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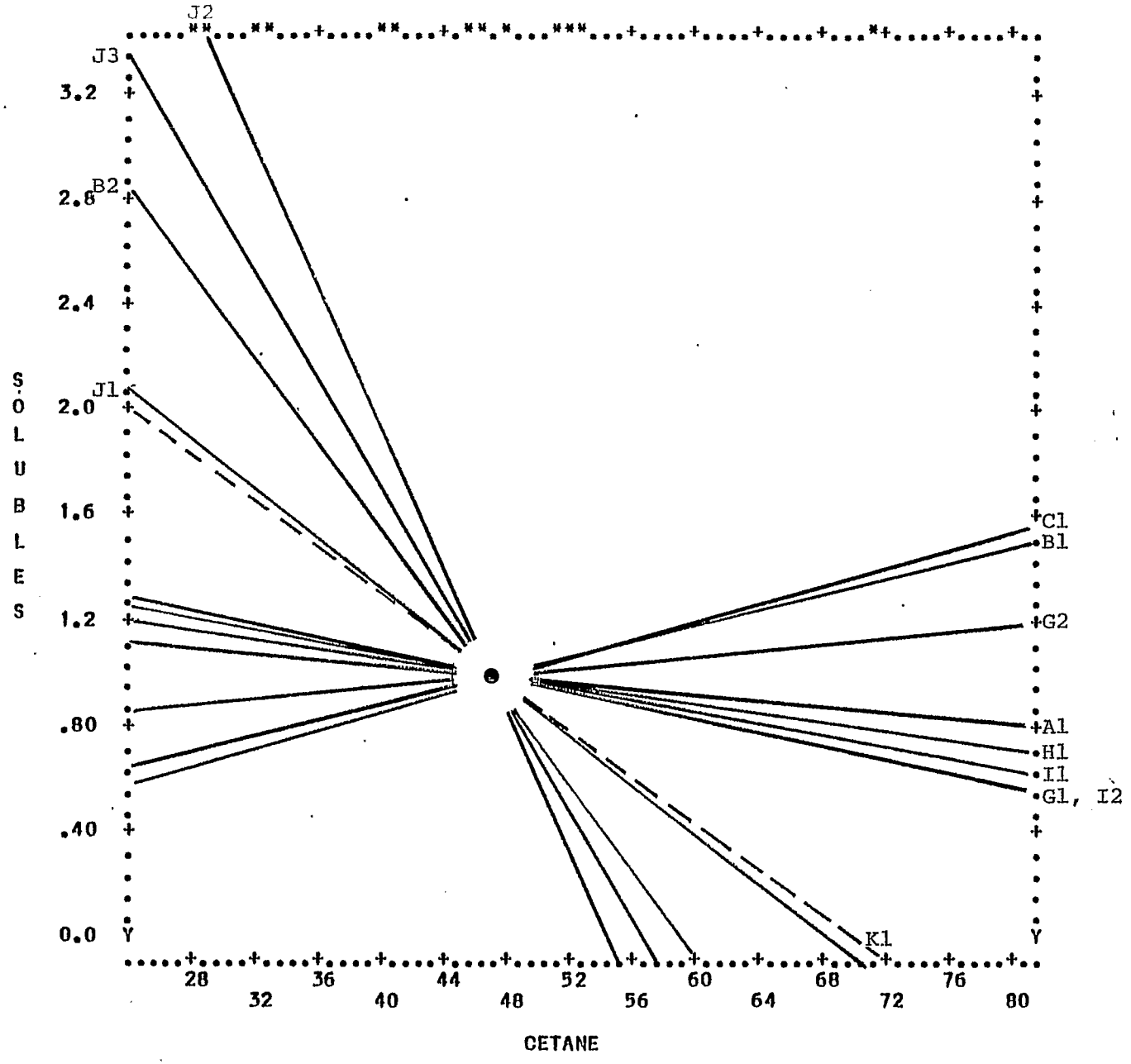
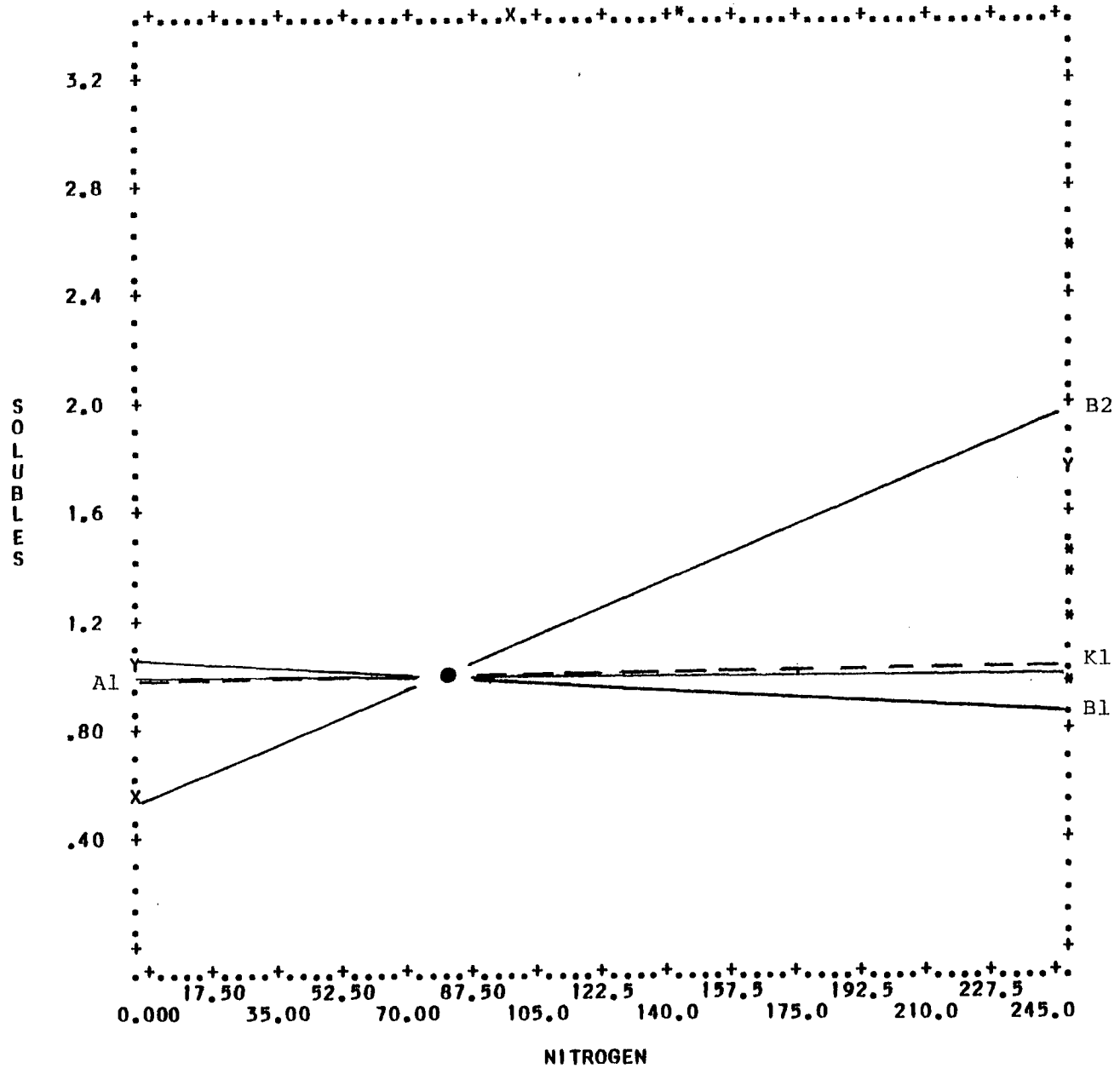
AROMATIC


J2
J3
3.2
B2
2.8
2.4
J1
2.0
1.6
1.2
.80
.40
0.0
Y
SOLUBLES
C1
B1
G2
A1
H1
I1
G1, I2
K1
Y
28
32
36
40
44
48
52
56
60
64
68
72
76
80
CETANE


SOLUBLES
3.2
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2.4
2.0
1.6
1.2
.80
.40
B2
K1
A1
B1
0.000
17.50
35.00
52.50
70.00
87.50
105.0
122.5
140.0
157.5
175.0
192.5
210.0
227.5
245.0
NITROGEN

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