Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP42 Section:	12.2
Reference:	24
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Vol. II

COKE OVEN CHARGING EMISSION CONTROL TEST PROGRAM

VOLUME II SUPPORTING APPENDICES

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CONTENTS

	Page
List of Figures	iii
List of Tables	vii
Sections	
Volume II	
V Appendices	A-1
A - Volume Flow Curves and Associated Data	A-1
B - Manual Sampling	B-1
C - Computer Programming Documentation	C-1
D - Leaking Coke Oven Doors	D-1
E - Particulate Size Distribution	E-1

FIGURES

Number		Page
A-1	Test OB, #2 Wilputte Guide (Volume Flow in Cu. Ft/Min.)	A-7
A-2	Test 1, #2 Wilputte Guide (Volume Flow in Cu. Ft/Min.)	A-8
A-3	Test 1A, #2 Wilputte Stack (Volume Flow in Cu. Ft/Min.)	A-9
A-9	Test 1B, #2 Wilputte Guide and Stack (Volume Flow in Cu. Ft/Min.)	A-10
A-5	Test 8A, #3 Wilputte Stacks (Volume Flow in Cu. Ft/Min.)	A-11
A-6	Test 2, Actual and Standard Volume Flow	A-13
A-7	Test 3, Actual and Standard Volume Flow	A-15
A-8	Test 4, Actual and Standard Volume Flow	A-16
A-9	Test 5, Actual and Standard Volume Flow	A-17
A-10	Test 6, Actual and Standard Volume Flow	A-19
A-11	Test 7, Actual and Standard Volume Flow	A-21
A-12	Test 8, Actual and Standard Volume Flow	A-23
A-13	Test 9, Actual and Standard Volume Flow	A-25
A-14	Test 10, Actual and Standard Volume Flow	A-27
A-15	Test 11, Actual and Standard Volume Flow	A-29
A-16	Test 12, Actual and Standard Volume Flow	A-31 A-33
A-17	Test 13, Actual and Standard Volume Flow	A-35 A-37
A-18	Test 14, Actual and Standard Volume Flow	A-39
A-19	Test 15, Actual and Standard Volume Flow	A-41
A-20	Test 16, Actual and Standard Volume Flow	A-43 A-45
A-21	Test 17, Actual and Standard Volume Flow	A-47

FIGURES (CONTINUED)

Number		Page
A-22	Test 18, Actual and Standard Volume Flow	A-49
A-23	Test 19, Actual and Standard Volume Flow	A-51 A-53
A-24	Test 20, Actual and Standard Volume Flow	A-55
A-25	Test 21, Actual and Standard Volume Flow	A-57 A-58
A-26	Test 22, Actual and Standard Volume Flow	A-61
A-27	Test 23, Actual and Standard Volume Flow	A-63
A-28	Test 24, Actual and Standard Volume Flow	A-65
A-29	Test 25, Actual and Standard Volume Flow	A-67
A-30	Test 26, Actual and Standard Volume Flow	A-69
A-31	Test 27, Actual and Standard Volume Flow	A-71 A-73
A-32	Test 28, Actual and Standard Volume Flow	A-75
B-1	The Particulate Sampling Train	B-2
B-2	The Bag Sampler	B-5
B-3	Sampling Trains	B-6
B-4	The Total Hydrocarbon Analyzer Set-Up	B-7
B-5	Mass-Particulate Sample Process	B-15
B-6	Number of Particles Sized Per Total Area Viewed Versus Particle Diameter for Sample Number 1051	B-34
B-7	Number of Particles Sized Per Total Area Viewed Versus Particle Diameter for Sample Number 1072	B-35
B-8	Number of Particles Sized Per Total Area Viewed Versus Particle Diameter for Sample Number 1076	B-36
B-9	Number of Particles Sized Per Total Area Viewed Versus Particle Diameter for Sample Number 1109	B-37
B-10	Number of Particles Sized Per Total Area Viewed Versus Particle Diameter for Sample Number 1222	B-38

FIGURES (CONTINUED)

Number		Page
B-11	Size Distribution by Particle Diameter for Samples	B-42
B-12	Volume Percent Versus Particle Diameter for Samples	B-43
B-13	Background Curves for Andersen Cascade Impactor - Limestone at 0.25 cfm	B-66
B-14	Background Curves for Andersen Cascade Impactor - Limestone at 0.66 cfm	B-66
B-15	Background Curves for Andersen Cascade Impactor - Iron Oxide at 0.247 cfm	B-67
B-16	Background Curves for Andersen Cascade Impactor - Iron Oxide at 0.65 cfm	B-67
B-17	Calibration Curve for Large Cyclone Using Limestone	B-68
B-18	Calibration Curve for Small Cyclone	B-68
C-1	Coke Oven Charge Data Recording Overview	C-2
C-2	Coke Oven Data Processing Overview	C-3
C-3	Input Data Record Format - Program "BILL"	C-6
C-4	Output Data Record Format - Program "BILL"	C-7 C-8
C-5	Output Test Header Record Format - Program "BILL"	C-10
C-6	Functions of Computer Program "BILL"	C-12
C-7	Linear Threshold Values	C-14
C-8	Data Transfer Details	C-15
C-9	Functions of Computer Program "ANDY"	C-16
C-10	Output Data Record Format - Program "ANDY"	C-20 C-21
C-11	Data Transfer Details	C-192
D-1	Leaking Coke Oven Doors	D-2
D-2	Instrument Layout, J & L P-4 Battery - Pittsburgh Works 1973	D-3

FIGURES (CONTINUED)

Number		Page
D-3	Cross-Sectional View of Leaking Coke Oven Door Collecting and Measurement Equipment	D-4
D-4	Collecting Hood	D-5
D-5	Installing Collecting Hood	D-5
D-6	Measurement Duct	D-7
D-7	Measurement Duct in Place on Oven	D-8
D-8	Particulate Sampling of Leaking Door Measurement Duct	D-9
E-1	Larry Car Charging Coke Oven	E-3
E-2	Carrousel Interior Exposed	E-5
E-3	Carrousel in Operational Configuration	E-6
E-4	Housing with Two Particulate Samplers	E-8
E-5	Cumulative Size Distribution - Particle Number Percent	E-14
E-6	Cumulative Size Distribution - Weight Percent	E-15
E-7	Efficiency Curves	E-17
E-8	Test 27, 150 X	E-27
E-9	Test 27, 150 X	E-27
E-10	Test 28, 150 X	E-28
E-11	Test 28, 150 X	E-28
E-12	Test 28, 150 X	E-29
E-13	Brink Data	E-35
E-14	Coulter Analysis	E-37

TABLES

Number		Page
A-1	Temperature Record for the Coke Oven Tests	A-2
A-2	Preliminary Test Temperatures	A-3
A-3	Volume Flow	A-4 A-5 A-6
B-1	Summary of Samples Taken in the Field	B-11 B-12 B-13 B-14
B-2	Mass Results - Field Data	B-17
B-3	Mass Analytical Results	B-18
B-4	Mass Concentration Results	B-19
B-5	Andersen Analysis Summary	B-21
B-6	Andersen Analysis Summary	B-22
B-7	Andersen Analysis Summary	B-23
B-8	Andersen Analysis Summary	B-24
B-9	Andersen Analysis Summary	B-25
B-10	Andersen Analysis Summary	B-26
B-11	Andersen Analysis Summary	B-27
B-12	Andersen Analysis Summary	B-28
B-13	Andersen Analysis Summary	B-29
B-14	Andersen Analysis Summary	B-30
B-15	Andersen Analysis Summary	B-31
B-16	Cross Reference Information - AISI/EPA Larry Car	B-32
B-17	Optical Size Distribution Data on Sample Number 1051	B-39
B-18	Optical Size Distribution Data on Sample Number 1972	B-39

TABLES (CONTINUED)

Number		Page
B-19	Optical Size Distribution Data on Sample Number 1076	B-40
B-20	Optical Size Distribution Data on Sample Number 1009	B-40
B-21	Optical Size Distribution Data on Sample Number 1222	B-41
B-22	Cumulative Percent Optical Size Distribution Data	B-41
B-23	Particle Diameter Versus Cumulative Percent (By Volume)	B-45
B-24	Results of Tar Analysis	B-46
B-25	Benzpyrene Analysis	B-48
B-26	Wavelengths and Flame Gases Used in the Elemental Analysis	B-49
B-27	Sample Combinations Used in Elemental Analysis	B-51
B-28	Filter Number 1	B-52
B-29	Filter Number 2	B-52
B-30	Aluminum	B-53
B-31	Antimony	B-53
B-32	Barium	B-53
B-33	Beryllium	B-54
B-34	Cadmium	B-54
B-35	Calcium	B-55
B-36	Cobalt	B-55
B-37	Chromium	B-55
B-38	Copper	B-56
B-39	Callium	B-56
B-40	Germanium	B-56
B-41	Lead	B-57
B-42	Iron	B-57
B-43	Magnesium	B-57

TABLES (CONTINUED)

Number		Page
B-44	Manganese	B-58
B-45	Mercury	B-58
B-46	Molybdenum	B-59
B-47	Potassium	B-59
B-48	Nickel	B-59
B-49	Selenium	B-60
B-50	Sodium	B-60
B-51	Strontium	B-60
B-52	Thallium	B-61
B-53	Titanium	B-61
B-54	Tin	B-61
B-55	Vanadium	B-62
B-56	Zinc	B-62
B-57	Coal Analysis (Ultimate and Proximate)	B-64
B-58	Sieve Analysis	B-65
B-59	H_2S Analytical Results	B-70
B-60	NO_x (NO_2) Analytical Results	B-71
B-61	NH_4 Analytical Results	B-72
B-62	CN Analytical Results	B-73
B-63	Phenol Analytical Results	B-74
B-64	SO_2 Analytical Results	B-75
B-65	Pyridine Analytical Results	B-76
B-66	Gas Chromatograph Parameters for Gas Analysis	B-78
B-67	Calculations for Gas Analysis	B-79
B-68	O_2, N_2, CO_2, THC, CH_4, CO and H_2 Results	B-80

TABLES (CONTINUED)

Number		Page
C-1	Wilputte Volume Flow/Location, NO_x	C-151 C-152
C-2	AISI/EPA Volume Flow/Location, NO_x	C-153
C-3	Wilputte Volume Flow/Location, CO_2	C-154 C-155
C-4	AISI/EPA Volume Flow/Location, CO_2	C-156
C-5	Wilputte Volume Flow/Location, NO	C-157 C-158
C-6	AISI/EPA Volume Flow/Location, NO	C-159
C-7	Wilputte Volume Flow/Location, CO	C-160 C-161
C-8	AISI/EPA Volume Flow/Location, CO	C-162
C-9	Wilputte Volume Flow/Location, THC	C-163
C-10	AISI/EPA Volume Flow/Location, THC	C-164
C-11	Miscellaneous Constants Card	C-168
C-12	Test Duct Card	C-169
C-13	Test Time Definition Card	C-170
C-14	Duct Area Card	C-171
C-15	Free Fall Velocity Card	C-172
C-16	Anisokinetic Weight Percent Card	C-173
C-17	Sample Velocity Weight Card	C-174
C-18	Input Tape Format	C-175
C-19	Data Field Format	C-177
C-20	Particulate Correction Factors, Q	C-185 C-186
C-21	Mass Loading Computations (Sample)	C-187
C-22	Data Record Structure	C-189

TABLES (CONTINUED)

Number		Page
D-1	Test #1 - Door Leak Experiment	D-11
D-2	Test #2 - Door Leak Experiment	D-12
D-3	Test #3 - Door Leak Experiment	D-13
D-4	Test #4 - Door Leak Experiment	D-14
E-1	Deposition Efficiency for Sampler at Coke Oven	E-12
E-2	Test 22	E-13
E-3	Test 24A	E-19
E-4	Test 26A	E-20
E-5	Test 27	E-21
E-6	Test 28	E-22
E-7	Numerical Number Percent Versus Size Range	E-24
E-8	Cumulative Percent for Particles > 18 μ - Uncorrected	E-25
E-9	Cumulative Percent for Particles > 18 μ - Corrected	E-26
E-10	Test #1 - Boom	E-31
E-11	Test #2 - Boom	E-32
E-12	Test #3 - Boom	E-33
E-13	Test #4 - Emission Guide	E-34

APPENDIX A

VOLUME FLOW CURVES AND ASSOCIATED DATA

This Appendix contains volume flow graphs showing the realtime flow data for all tests on which velocity was monitored. Tables are also presented showing minimum, maximum and average temperatures for the same tests and average volume flow values.

Tables A-1 and A-2 list the temperatures for official and preliminary tests, respectively. The values shown in these tables were used for correcting the particulate sampling velocities; however, continuous stack volume flows were calculated as a function of the realtime temperature values. During tests OB and 1, the prototype two duct emission guide was used after which a single duct unit was designed and used. In cases where all three locations are filled in, location 1, 2 and 3 are pusher side, center, and coke side emission points, respectively. For tests 1B, 13, and 14, location 1 is stack and location 2 is guide, while tests 2, 5, and 6 are reversed.

The average volume flows for all tests, including the preliminary tests, are shown in Table A-3. The average velocities can be computed by dividing the flows for the Wilputte stack or AISI/EPA guide by .85 square feet and the Wilputte guide by .69 square feet. It should be noted that a number of the AISI/EPA tests were aspirated and hence, should not be used as a measure of normal emission flow rates.

The flow graphs were calculated and plotted by computer for all tests except tests OB, 1, 1A, 1B, and 8A. Data for these tests were calculated and plotted manually and only under stack conditions.

TABLE A-1

TEMPERATURE RECORD FOR THE COKE-OVEN TESTS

TEST NUMBER	LOCATION 1 TEMPERATURE R°			LOCATION 2 TEMPERATURE R°			LOCATION 3 TEMPERATURE R°		
	MIN.	AVER.	MAX.	MIN.	AVER.	MAX.	MIN.	AVER.	MAX.
2	600	606	610	472*	494	518	622	636	672
5	621	636	648	549	626	807			
6	610	793	1894	640	768	1611			
7	612	687	803	664	848	1188	602	1002	1644
8	552	1039	1766	548	596	686	546	825	1444
9	555	562	568	561	602	685	656	746	910
10	642	654	670	612	640	666	602	1172	2074
11	612	667	696	582	704	766	578	1161	1765
12	585	601	640	562	615	648	564	1119	1811
13	460*	574	706	546	572	606			
14	540	543	562	556	601	619			
15	574	580	588	540	547	574			
16	584	596	611	576	582	588			
17	572	593	624	610	624	644	570	592	653
18	578	582	586	598	607	616	606	617	632
19	597	614	625	606	622	642	580	605	644
20	470*	579	585	573	586	605	554	507	588
21	594	620	696	586	615	658	649	943	1240
22	628	751	933						
23	552	635	809						
24	522*	529	536	678	708	742	592	733	1244
25	614	628	652	458*	614	1442	583	754	1190
26	548	597	711						
27	588	647	924						
28	536	574	624						

* The temperature transmitters were not properly calibrated and offsets in readings were found for

Test	Offset Voltage	Temperature Correction
2-2	32 MV	Add 65°R
13-1	40 MV	Add 80°R
24-1	10 MV	Add 21°R
25-2	41 MV	Add 82°R
20-1	40 MV	Add 80°R

Manual error corrections applied here are only accurate to ±10°

TABLE A-2

PRELIMINARY TEST TEMPERATURES

Test Number	LOCATION 1 Temperature F°			LOCATION 2 Temperature F°			LOCATION 3 Temperature F°		
	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.
8A	110	184	320	100	127	150	90	203	470
0B	110	118	120	80	81	90			
1	80	187	1200	70	196	150			
1A	90	162	345						
1B	130	144	160	80	95	100			

TABLE A-3
VOLUME FLOW

FLOW IN SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3	DESCRIPTION OF TEST		
OB	SIDE 1 SIDE 2					149.9 @ 44.9		Wilputte Prototype Guide		
1	SIDE 1 SIDE 2					215.4 @ 28.8		Wilputte Prototype Guide		
1A			169.4 @					Wilputte		
1B			137.5 @			104.1 @		Wilputte		
2					0	11.3	74.4	Wilputte		
3			292.1			22.5		Wilputte		
4		264.6			20.3			Wilputte		
5			270.1			100.5		Wilputte		
6				272.1			176.5	Wilputte		
7		132.3	167.2	169.4				Wilputte		
8		240.4	134.5	146.3				Wilputte		
9		16.8	224.4	129.4				Wilputte		
10					107.6	96.3	129.5	Wilputte		

@ Values in actual cubic feet per minute * Aspirated ** Aspirated: Fans failed during test

TABLE A-3 (CONTINUED)
VOLUME FLOW

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3	DESCRIPTION OF TEST		
11					156.3	146.8	141	Wilputte		
12					157.7	85.9	104.3	Wilputte		
13			172.3			61.7		Wilputte		
14		13.3			97.2			Wilputte		
15					363.5*	166.8*		AISI/EPA		
16					318.5*		366 *	AISI/EPA		
17					223 *	207.3*	406.6*	AISI/EPA		
18					337.5*	48.8**	63 **	AISI/EPA		
19					5.4	0	87.5	AISI/EPA		
20					0	.9	108.7	AISI/EPA		
21					305.5*	225.9*	190.8	AISI/EPA		
22			169					Wilputte		
23			140					Wilputte		

@ Values in actual cubic feet per minute * Aspirated ** Aspirated: Fans failed during test

TABLE A-3 (CONCLUDED)
VOLUME FLOW

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3	DESCRIPTION OF TEST		
24					7.1	.7	80.4	AISI/EPA		
25					326.8	296.2	225.0	AISI/EPA		
26			12					Wilputte		
27						196.2		AISI/EPA		
28			87.3					Wilputte		

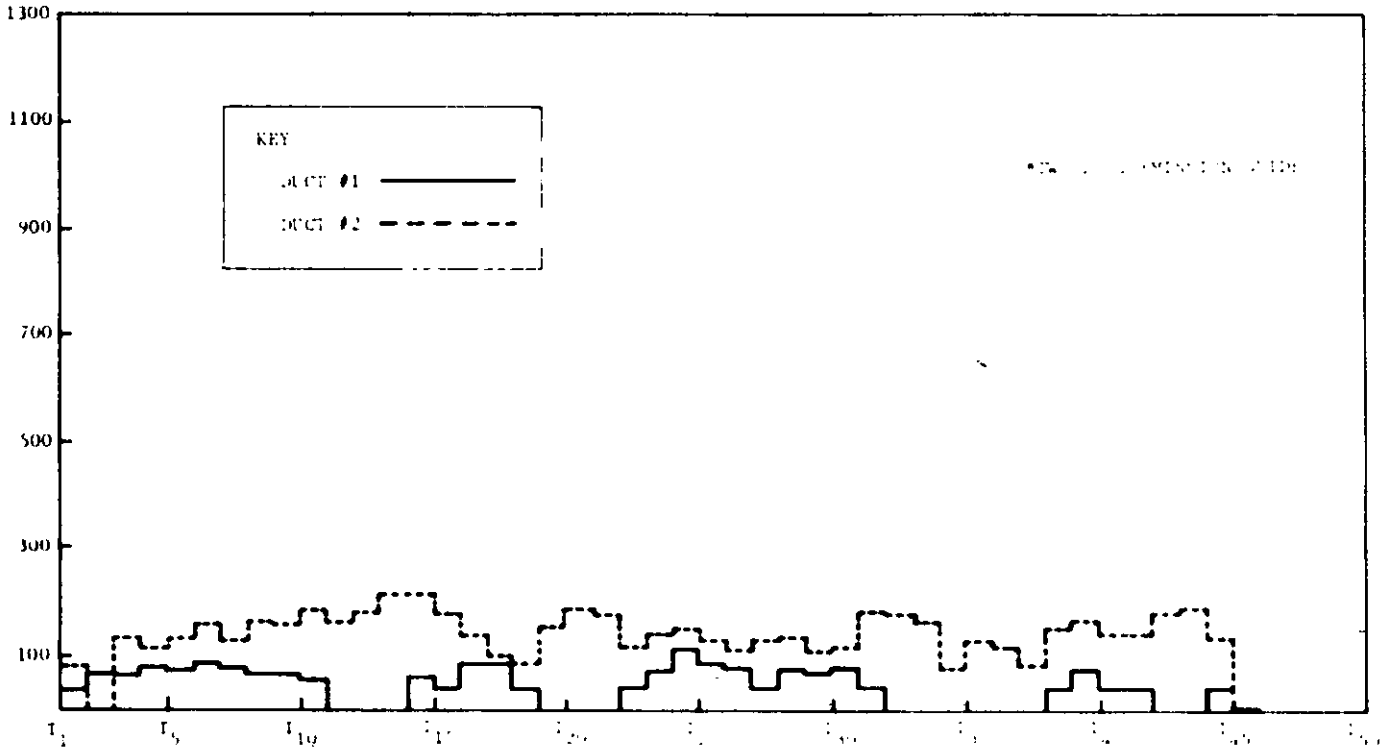


FIGURE A-1
TEST OB #2 WILPUTTE GUIDE *
(VOLUME FLOW IN CU FT /MIN.)

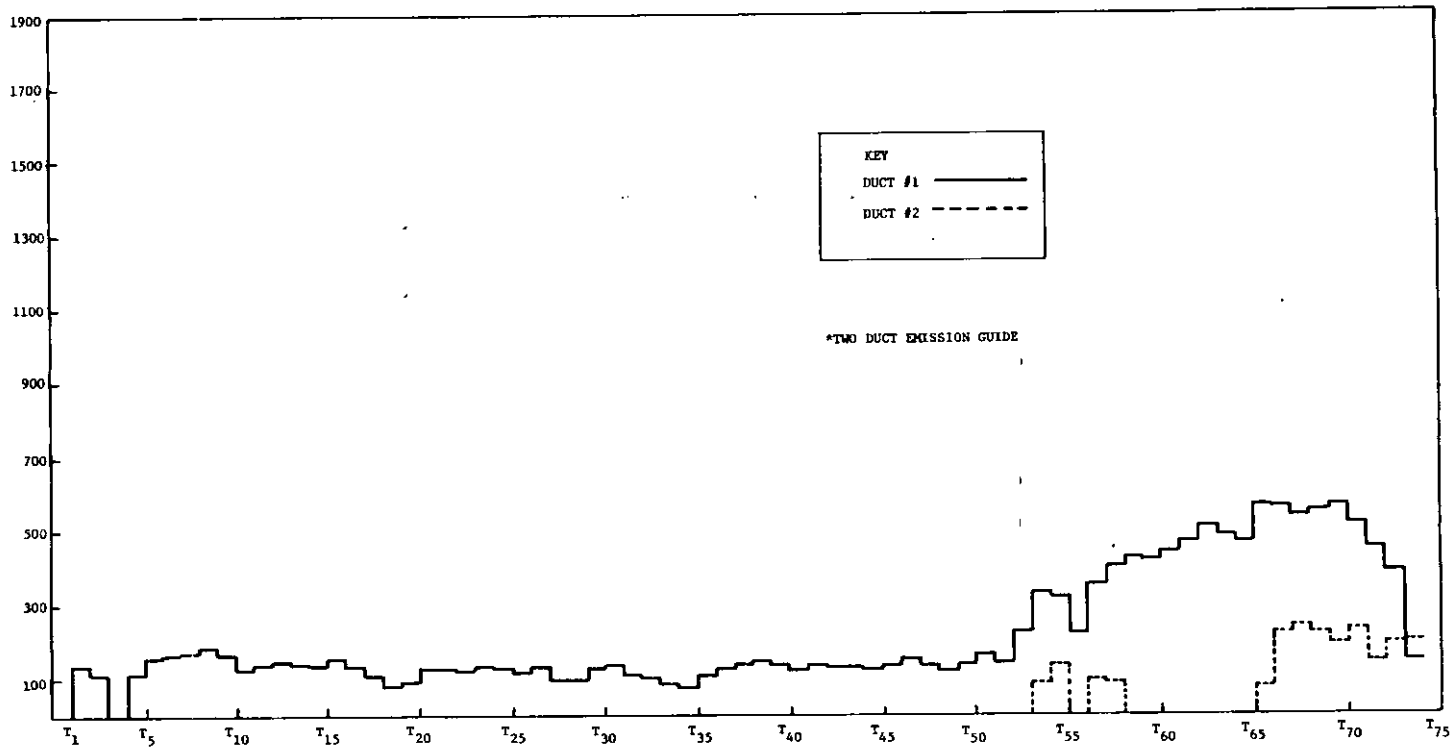


FIGURE A-2
TEST #1, #2 WILPUTTE GUIDE*
(VOLUME FLOW IN CU. FT./MIN.)

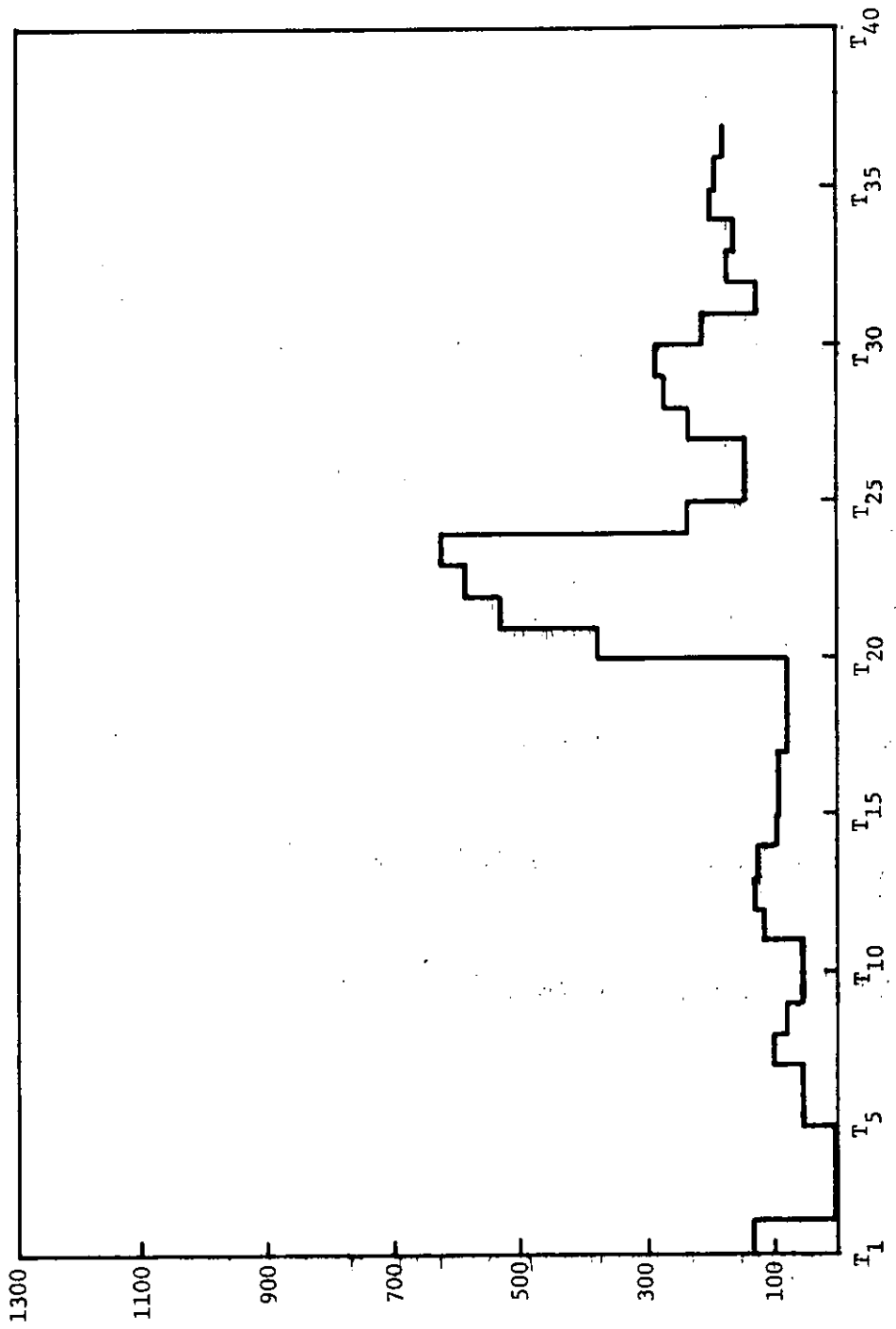


FIGURE A-3
TEST #1A, #2 WILPUTTE STACK
(VOLUME FLOW IN CU. FT./MIN.)

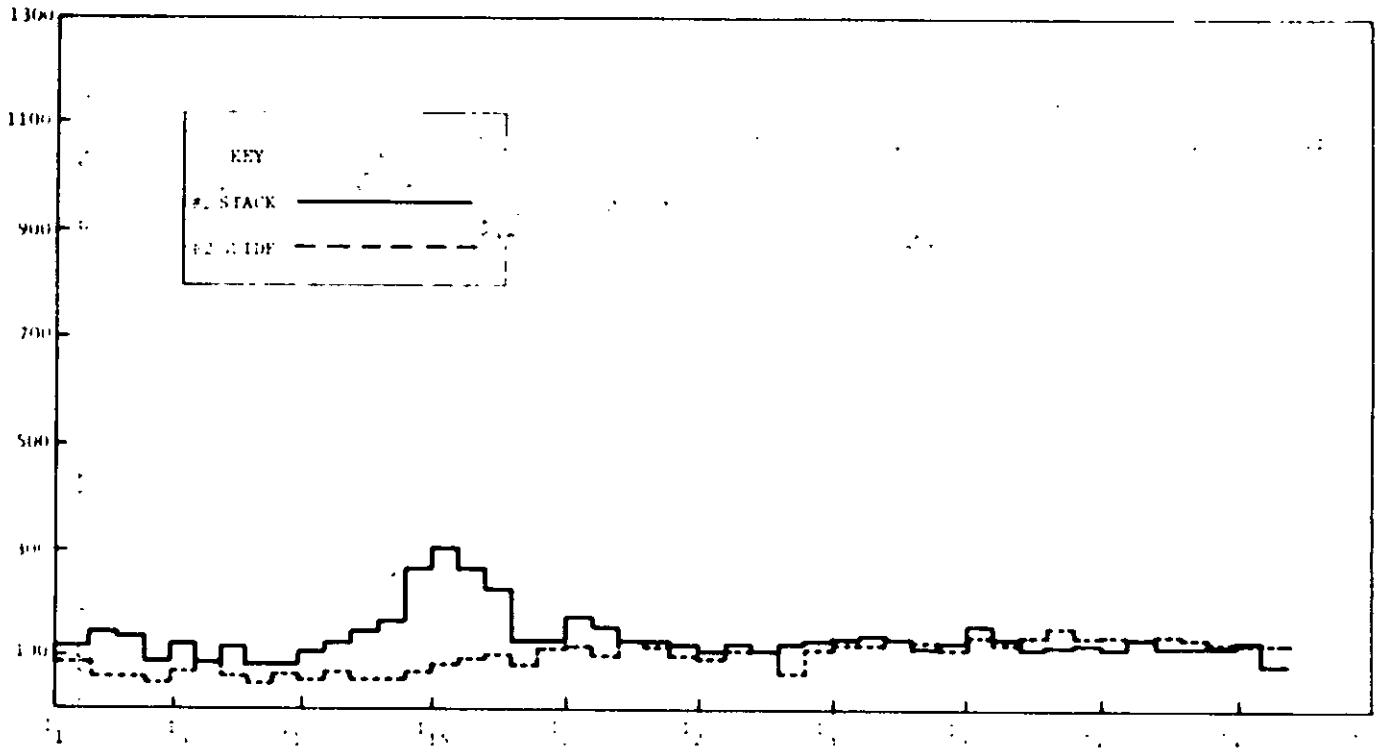


FIGURE A 4
TEST #18, #2 WILPUTTE GUIDE AND STACK
(VOLUME FLOW IN CU FT MIN) #2 STACK #2 GUIDE

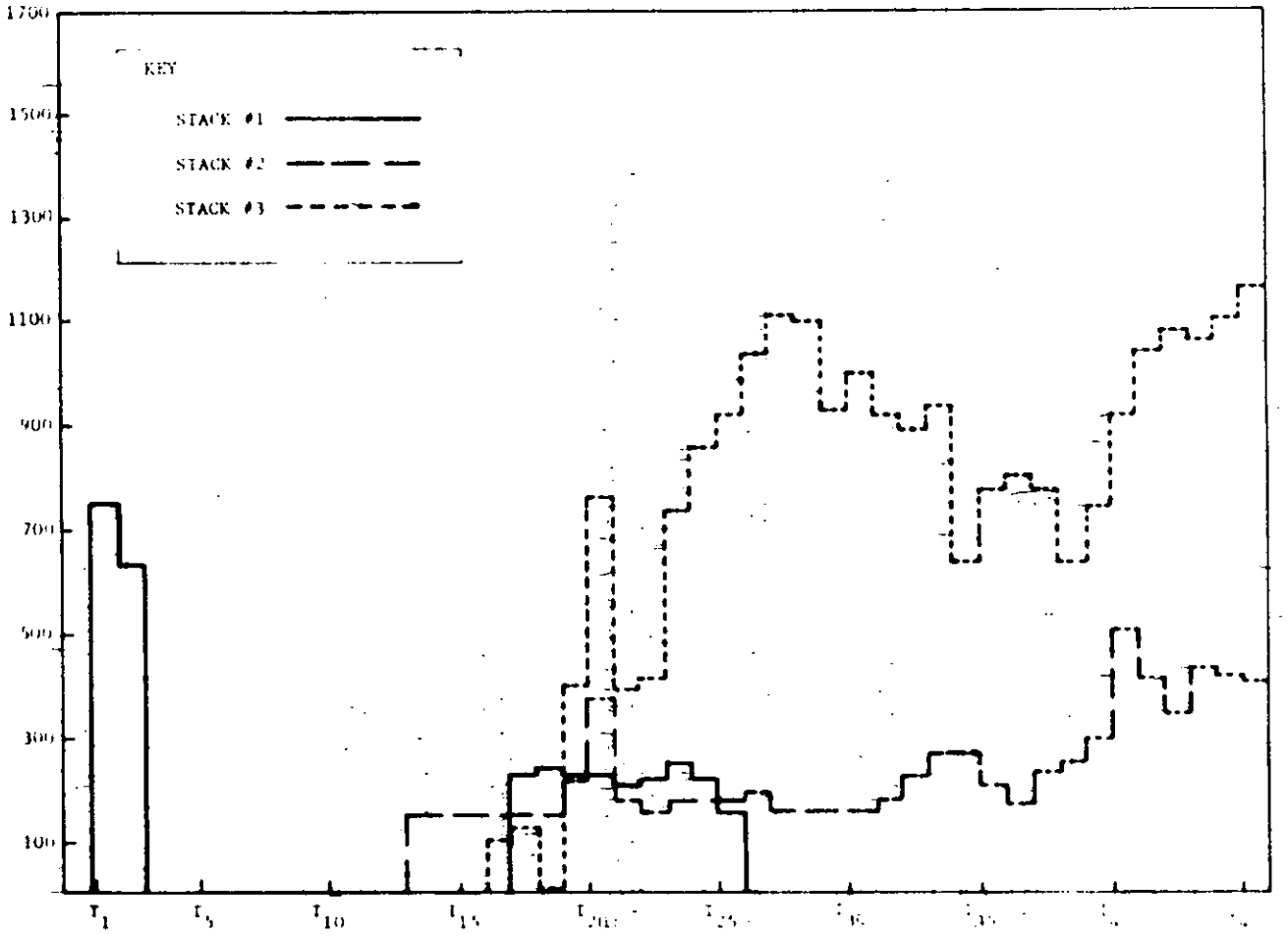
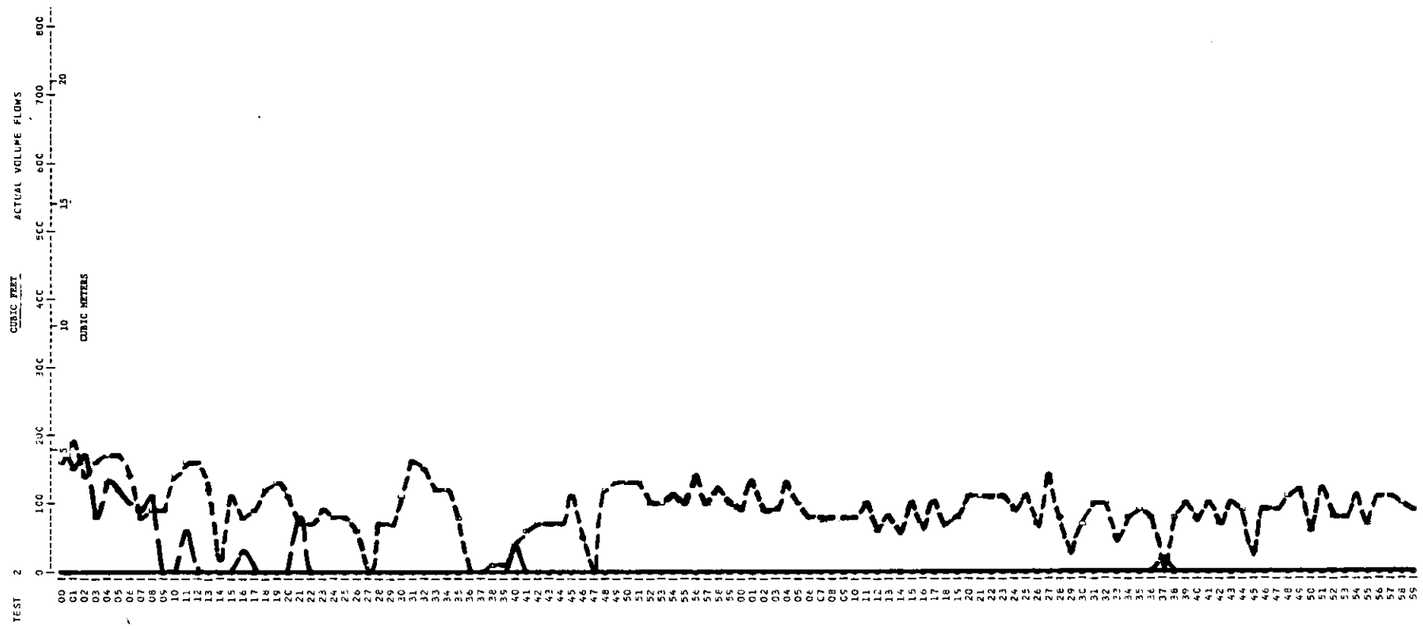
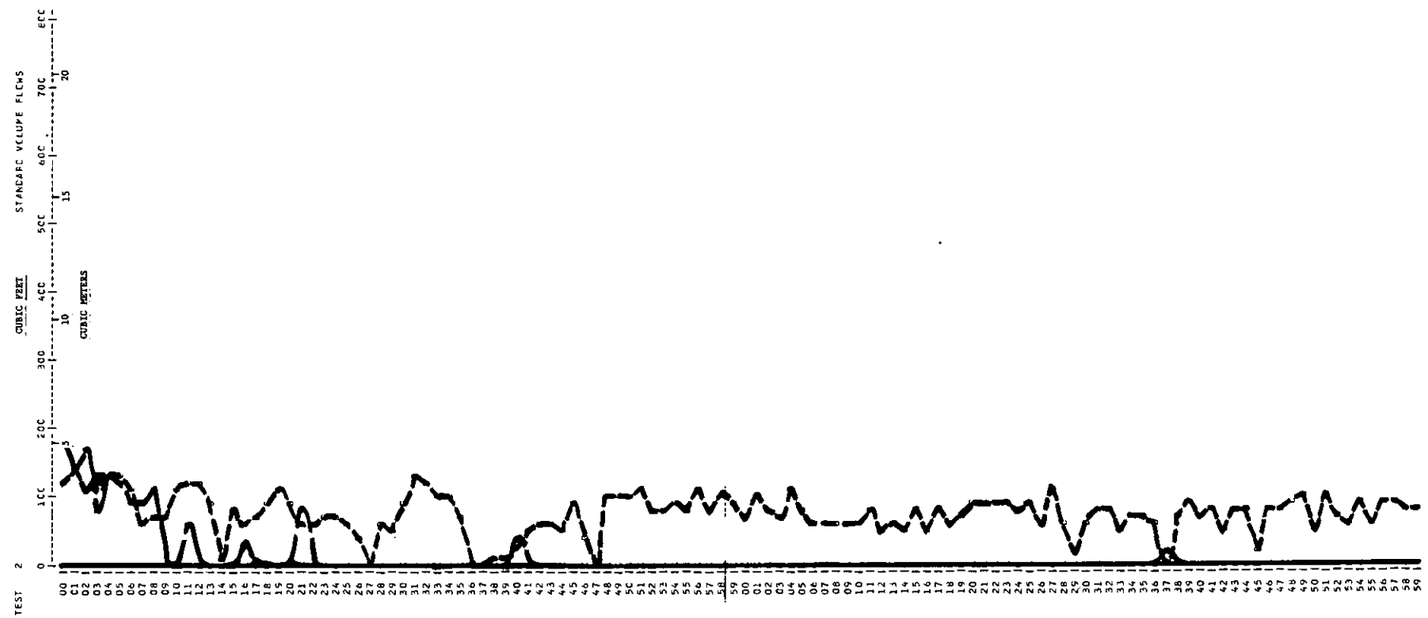


FIGURE A-5
TEST 6A, 3 WILPUTTE STACKS
(VOLUME FLOW IN CU. FT./MIN.)

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KEY, TEST 2	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - -

FIGURE A-6

TEST 3

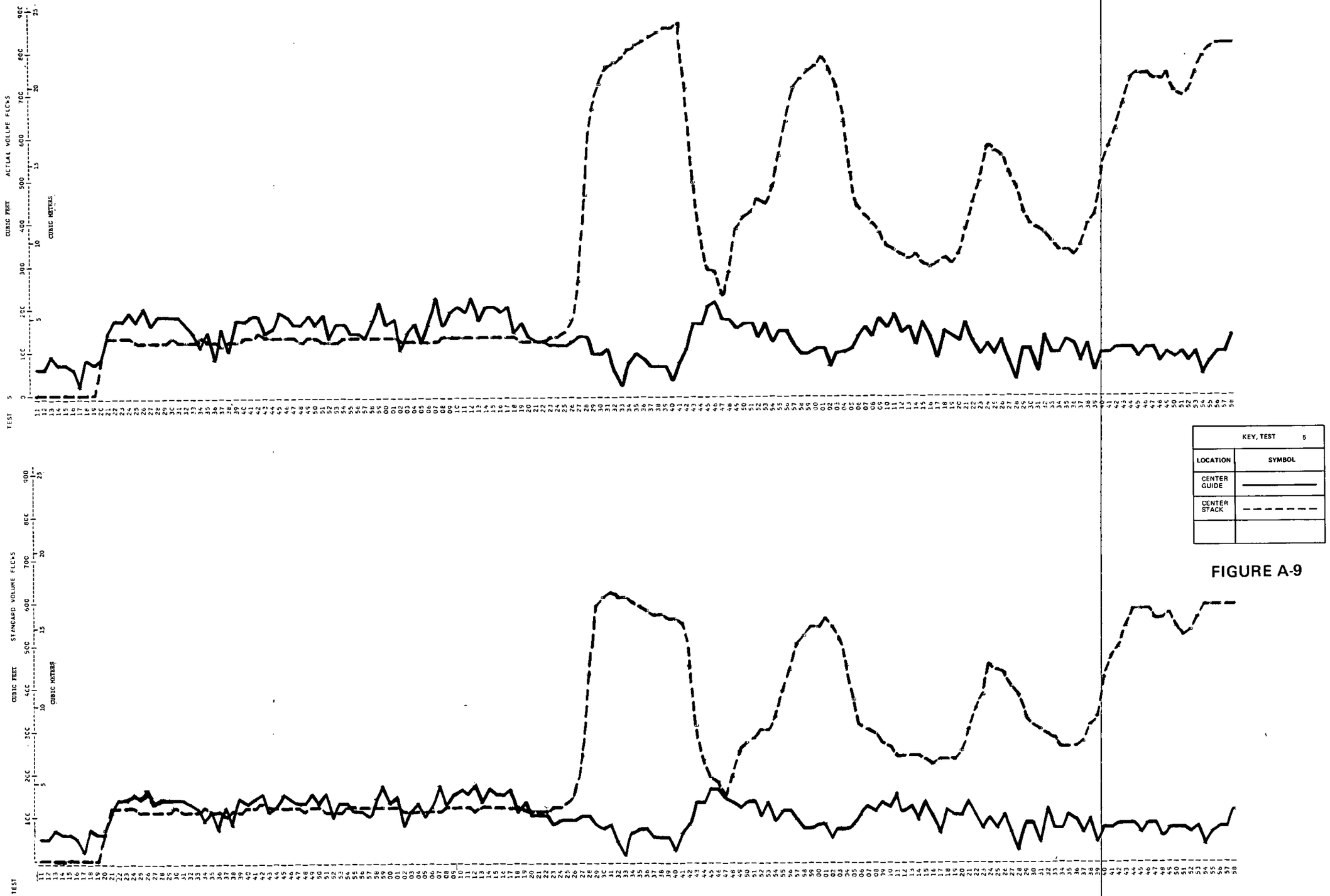
A malfunction of the volume flow differential pressure system caused the loss of volume flow data for this test.

FIGURE A-7

TEST 4

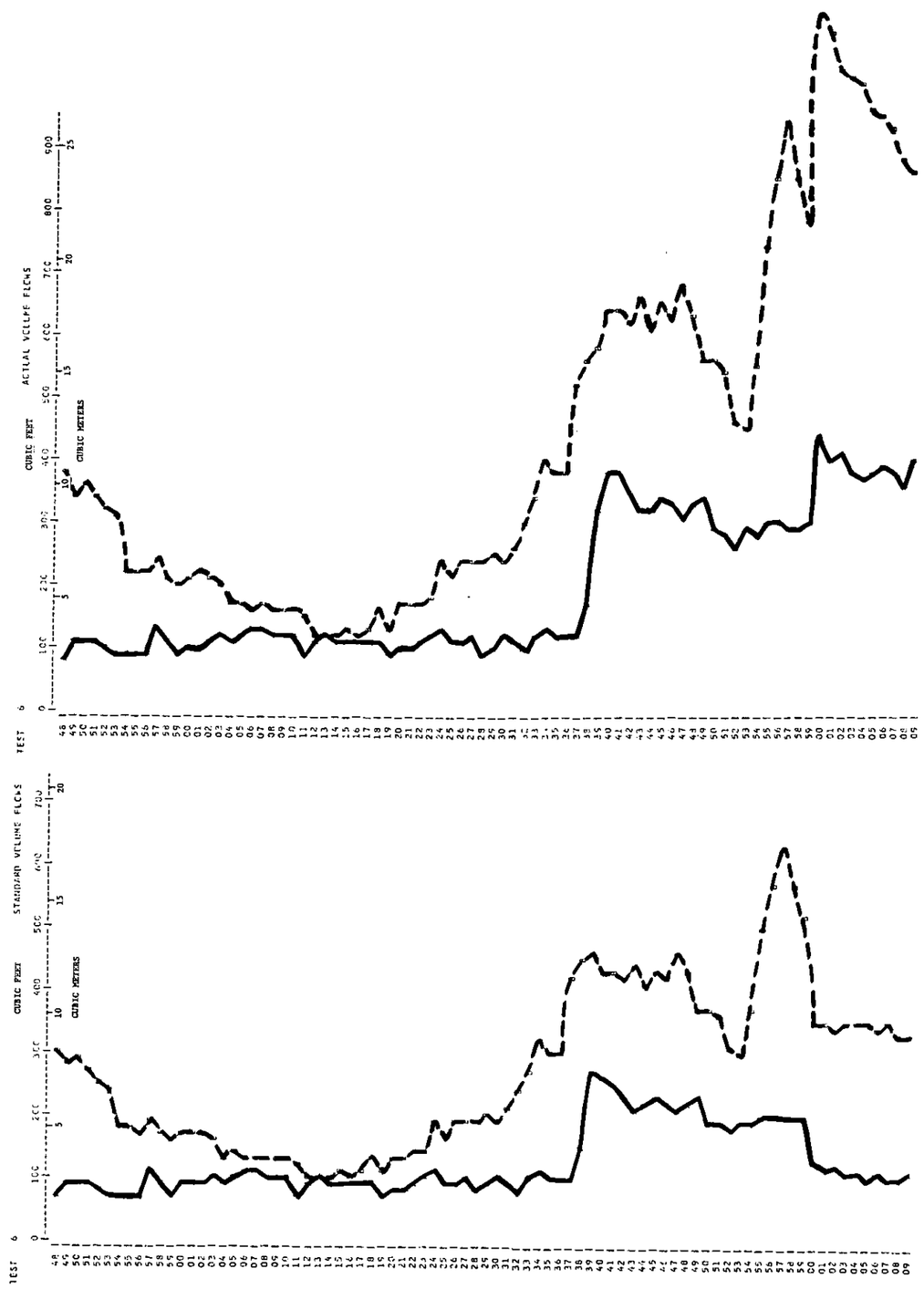
A malfunction of the volume flow differential pressure system caused the loss of volume flow data for this test.

FIGURE A-8



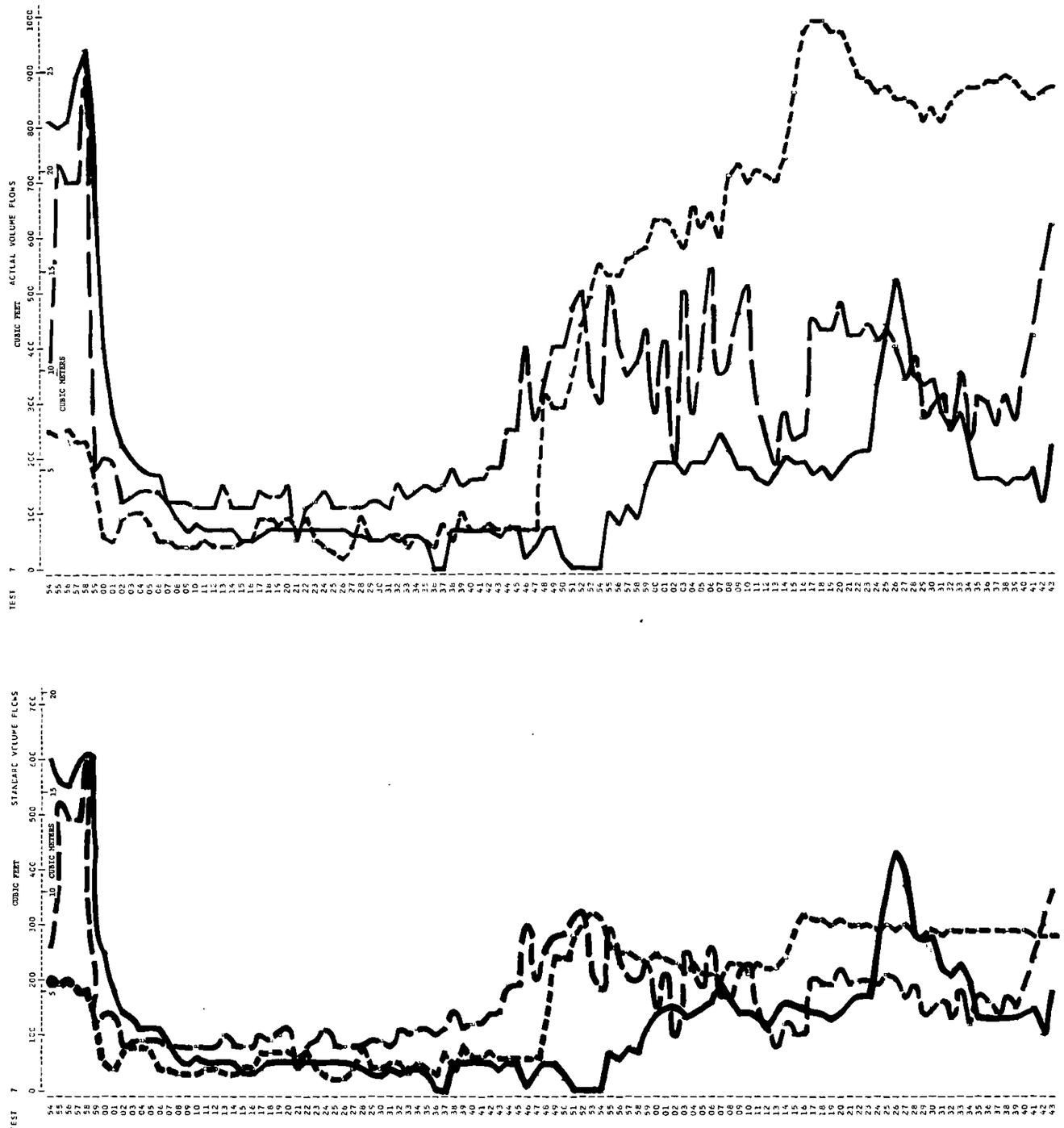
KEY, TEST 5	
LOCATION	SYMBOL
CENTER GUIDE	———
CENTER STACK	- - - - -

FIGURE A-9



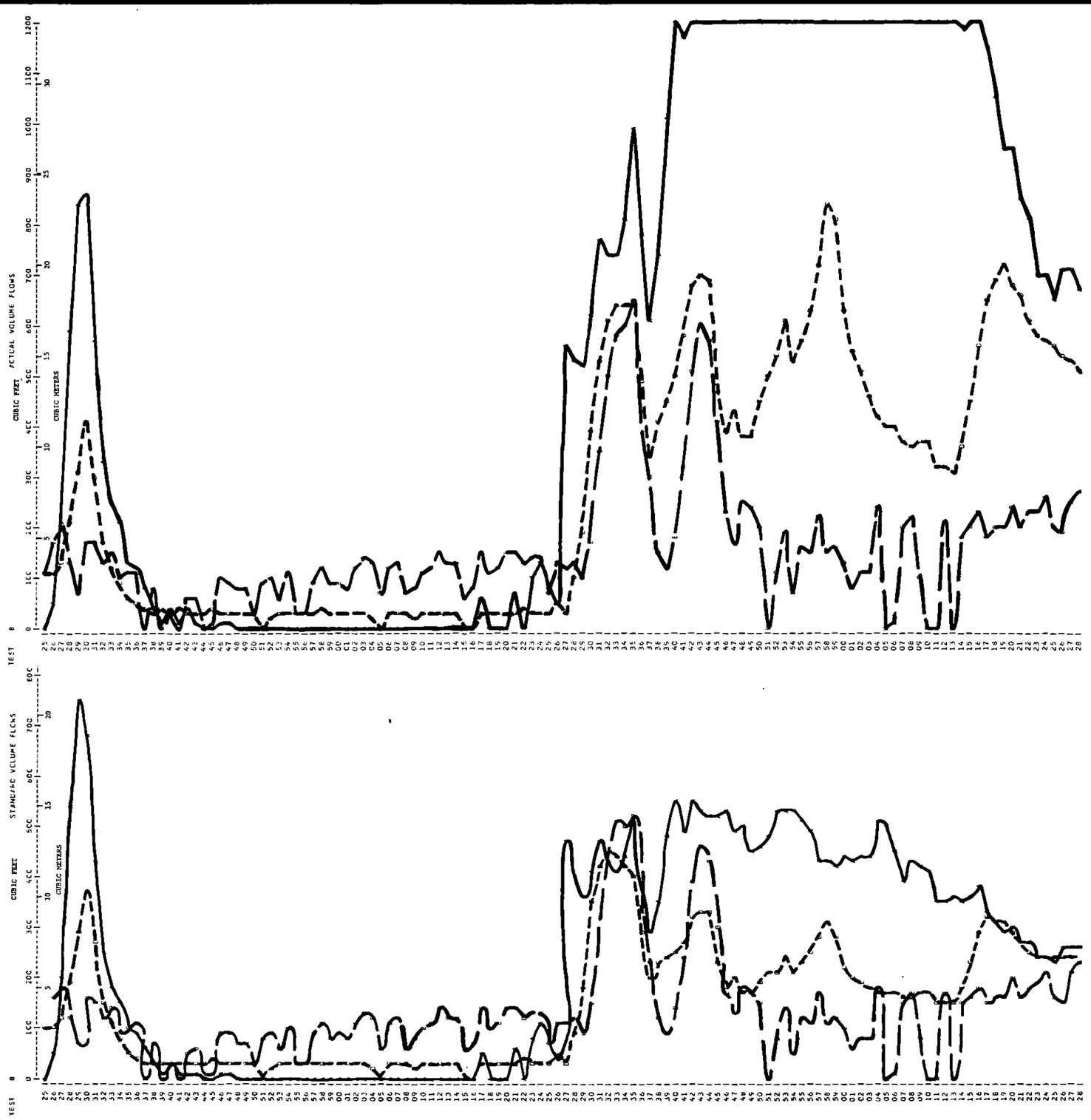
KEY, TEST 6	
LOCATION	SYMBOL
COKE GUIDE	———
COKE STACK	- - - - - -

FIGURE A-10



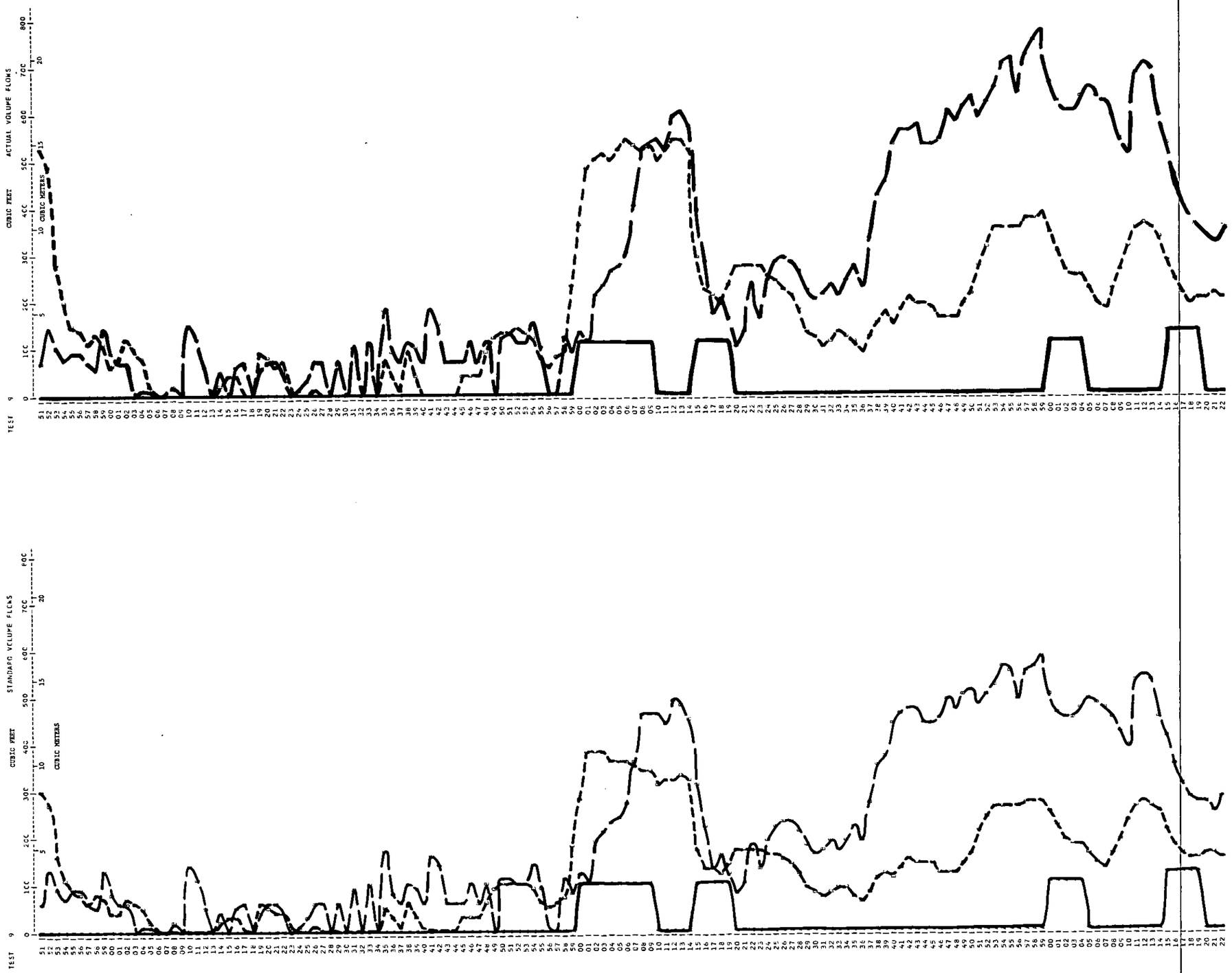
KEY, TEST 7	
LOCATION	SYMBOL
PUSHER STACK	———
CENTER STACK	— — — —
COKE STACK	- - - - -

FIGURE A-11



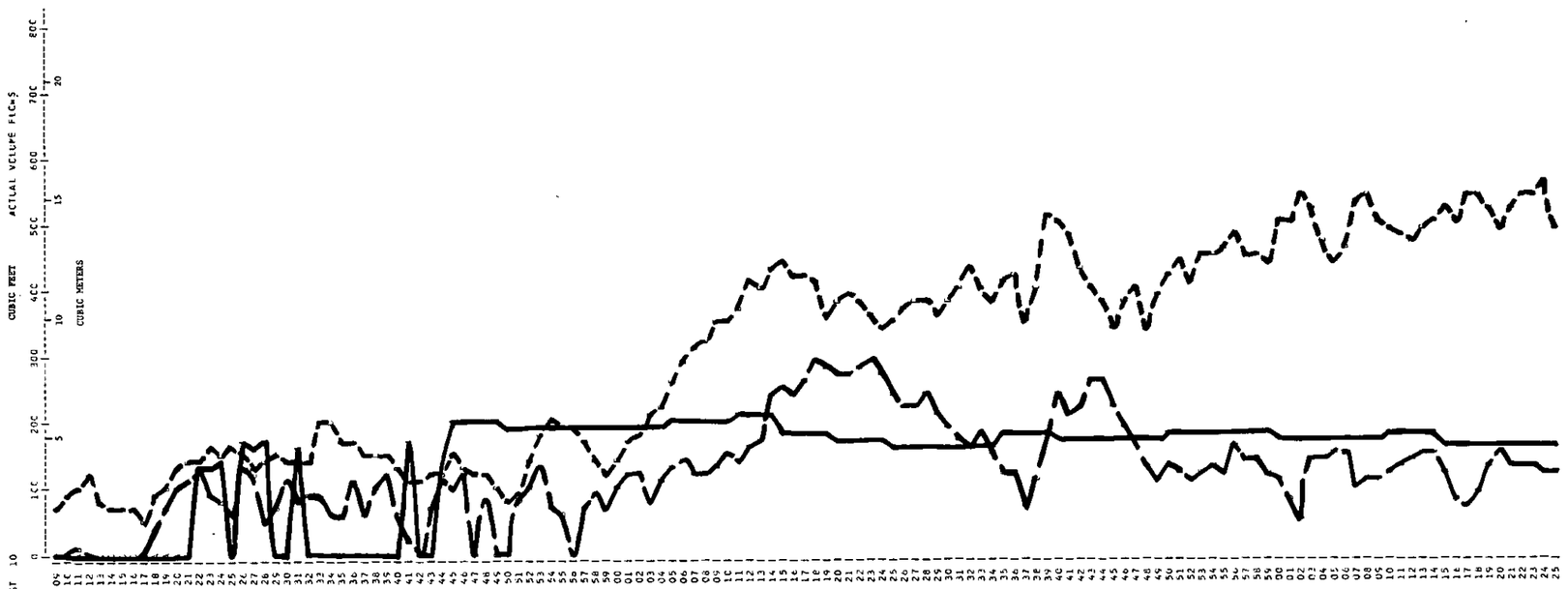
KEY, TEST 8	
LOCATION	SYMBOL
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CENTER STACK	— — — —
COKE STACK	- - - - - -

FIGURE A-12



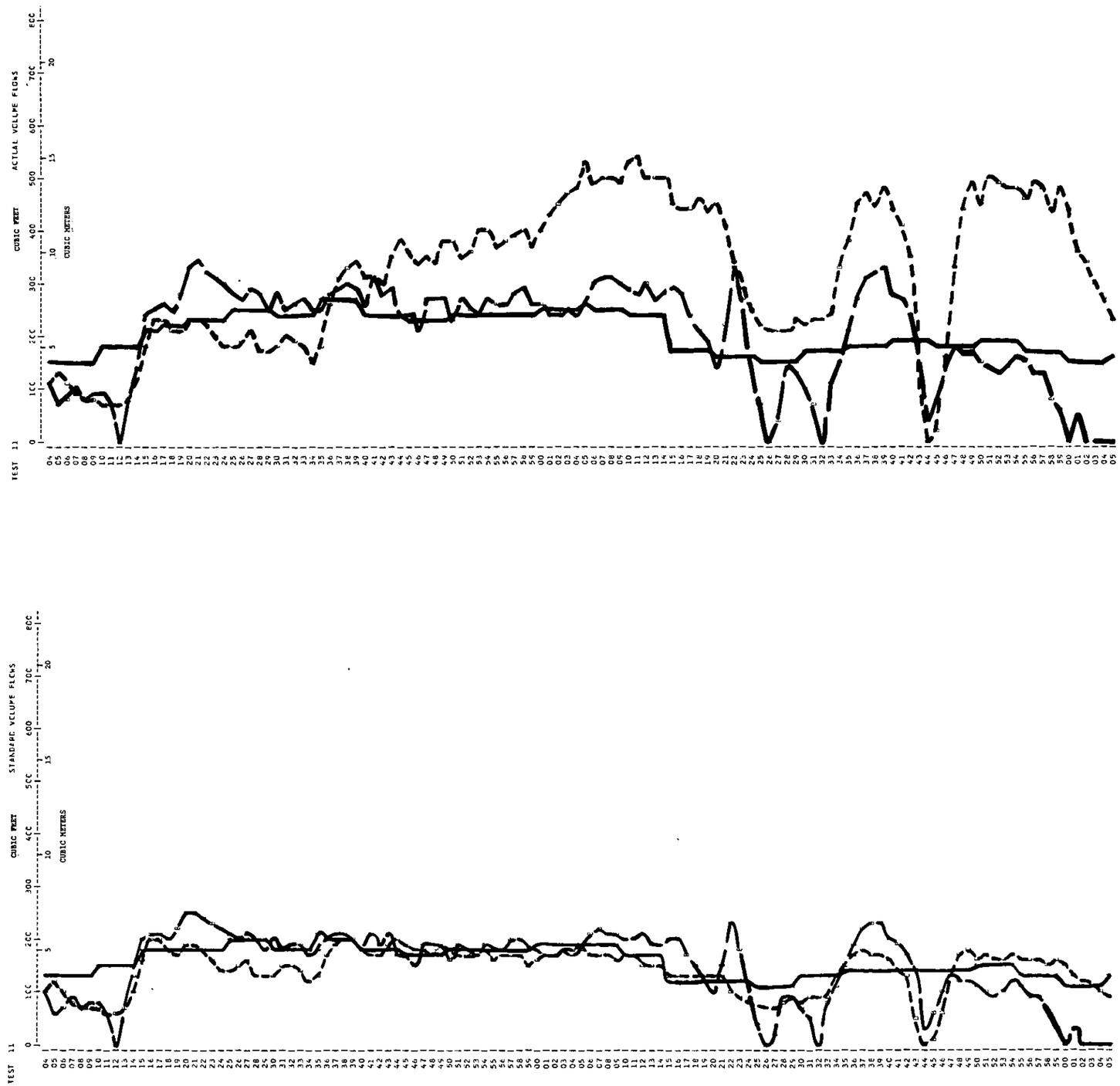
KEY, TEST 9	
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CENTER STACK	— — — —
COKE STACK	- - - - -

FIGURE A-13



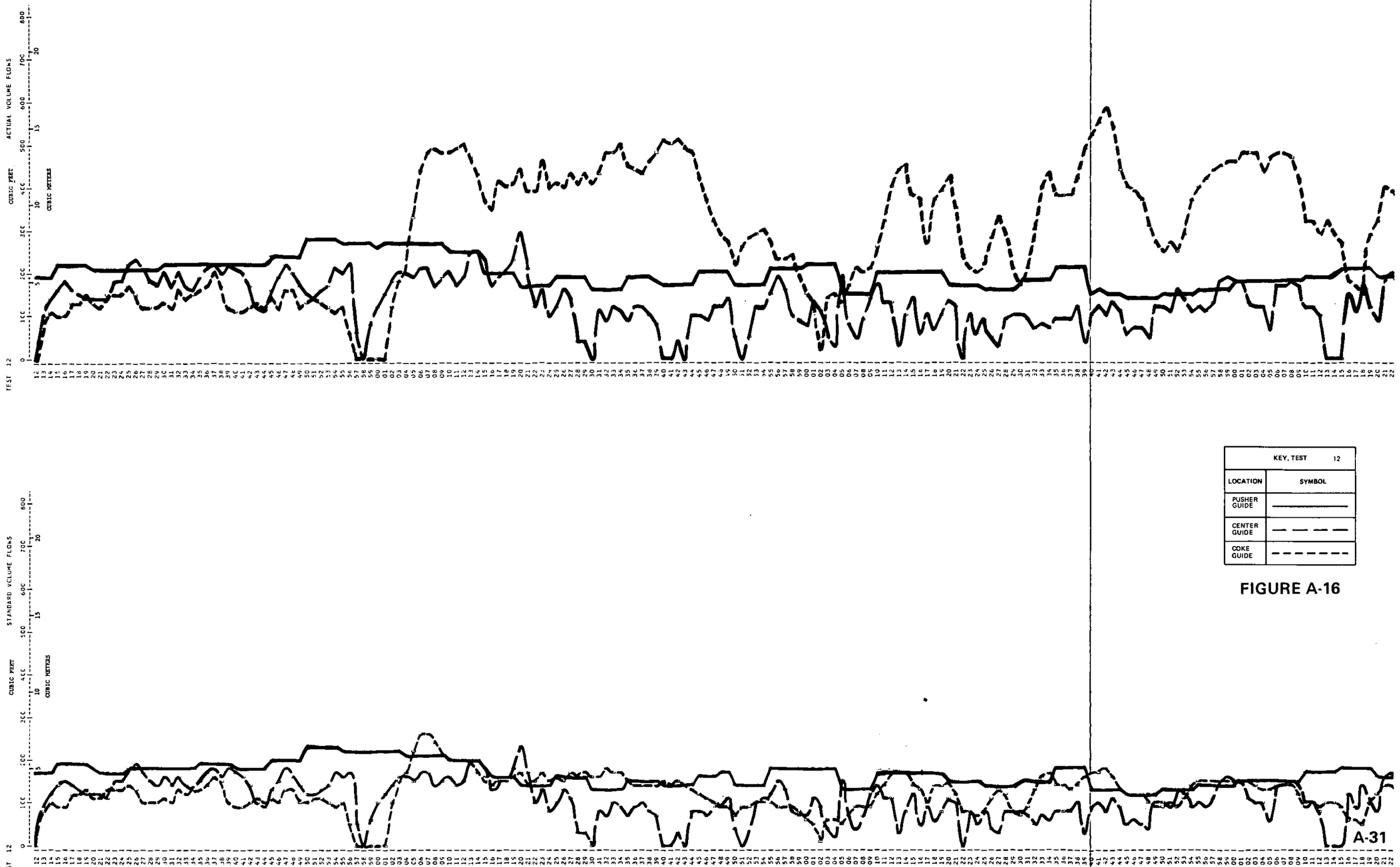
KEY, TEST 10	
LOCATION	SYMBOL
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CENTER GUIDE	— — — —
COKE GUIDE	- - - - -

FIGURE A-14



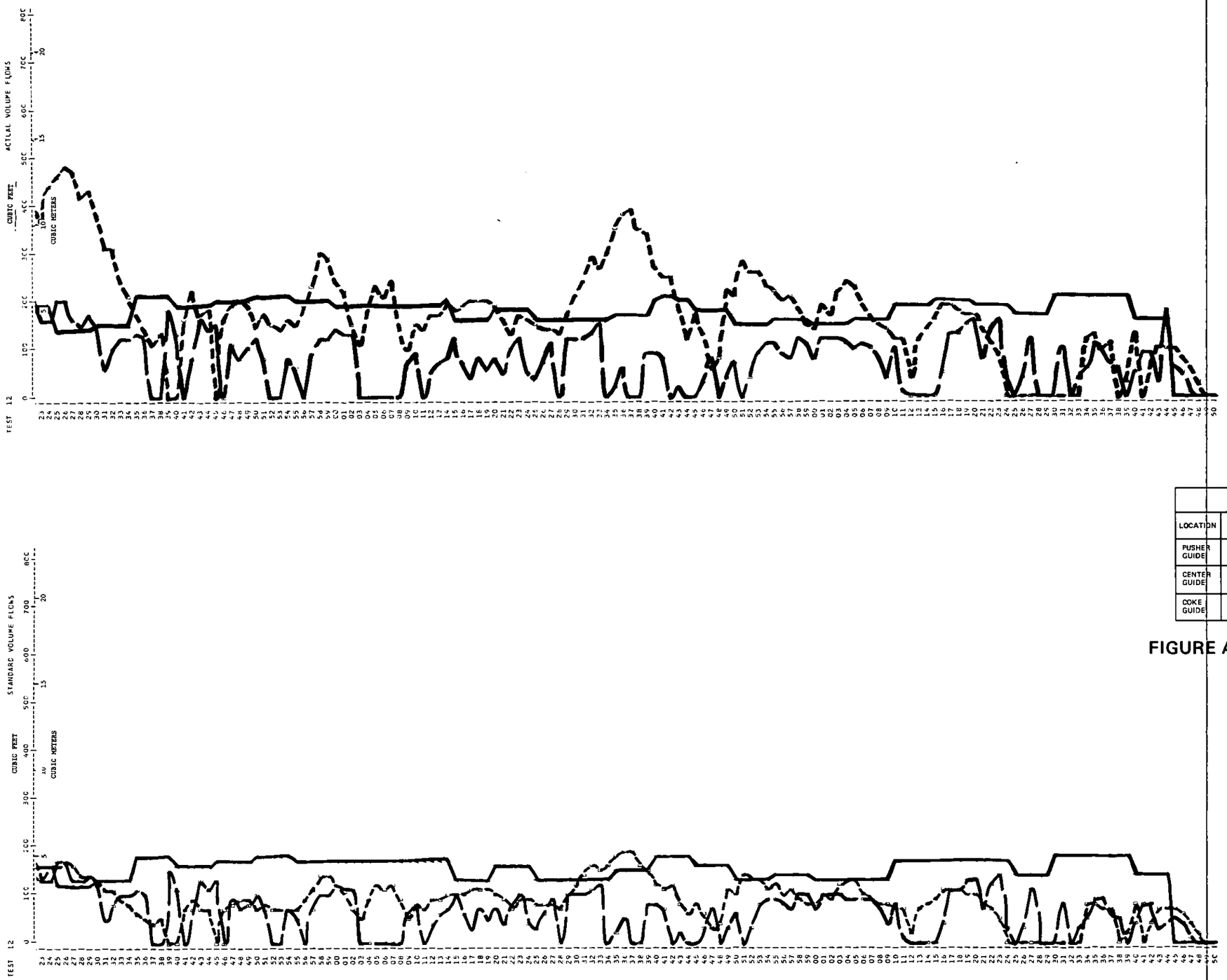
KEY, TEST 11	
LOCATION	SYMBOL
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CENTER GUIDE	— — — —
COKE GUIDE	- - - - - -

FIGURE A-15



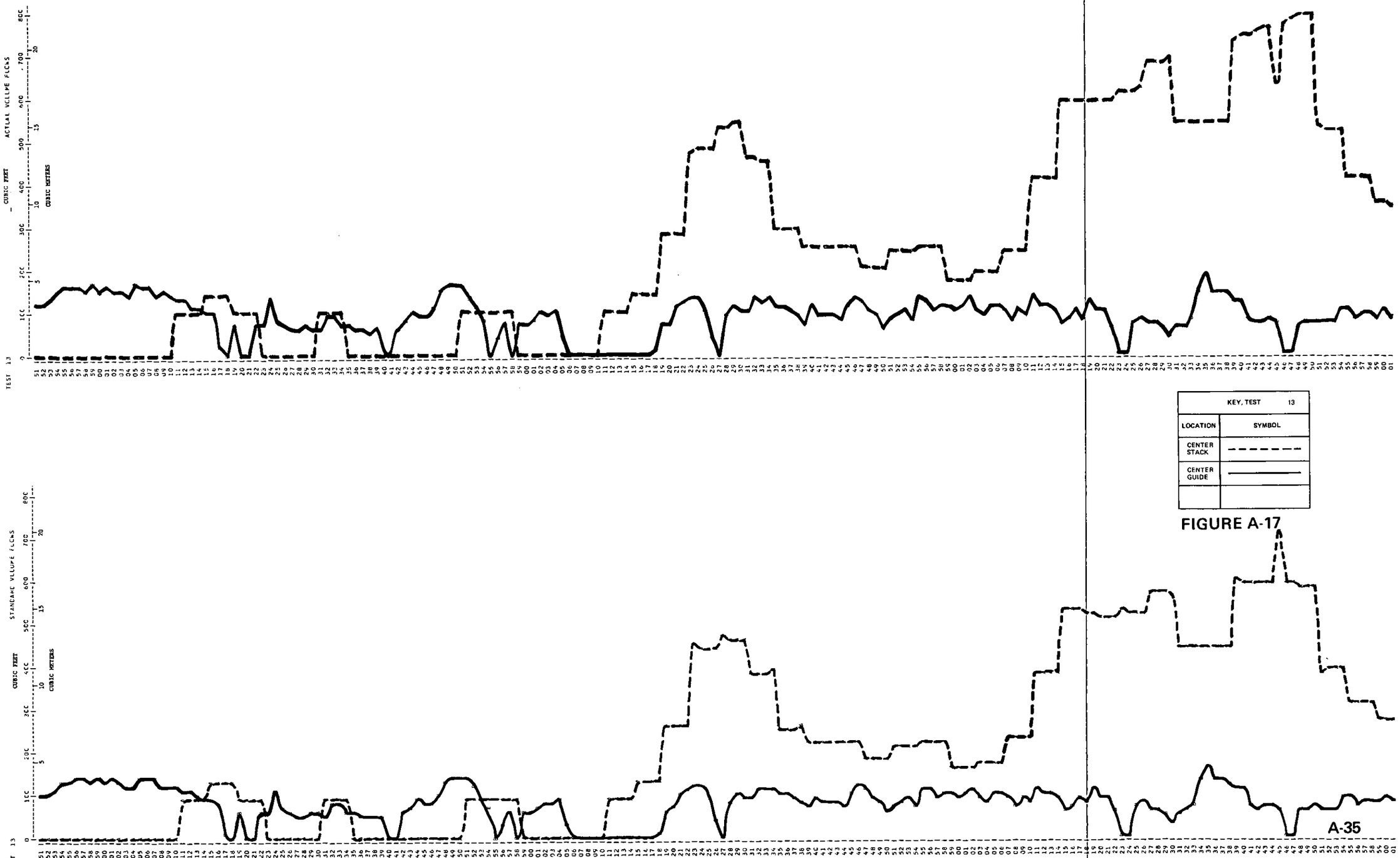
KEY, TEST 12	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - - -

FIGURE A-16



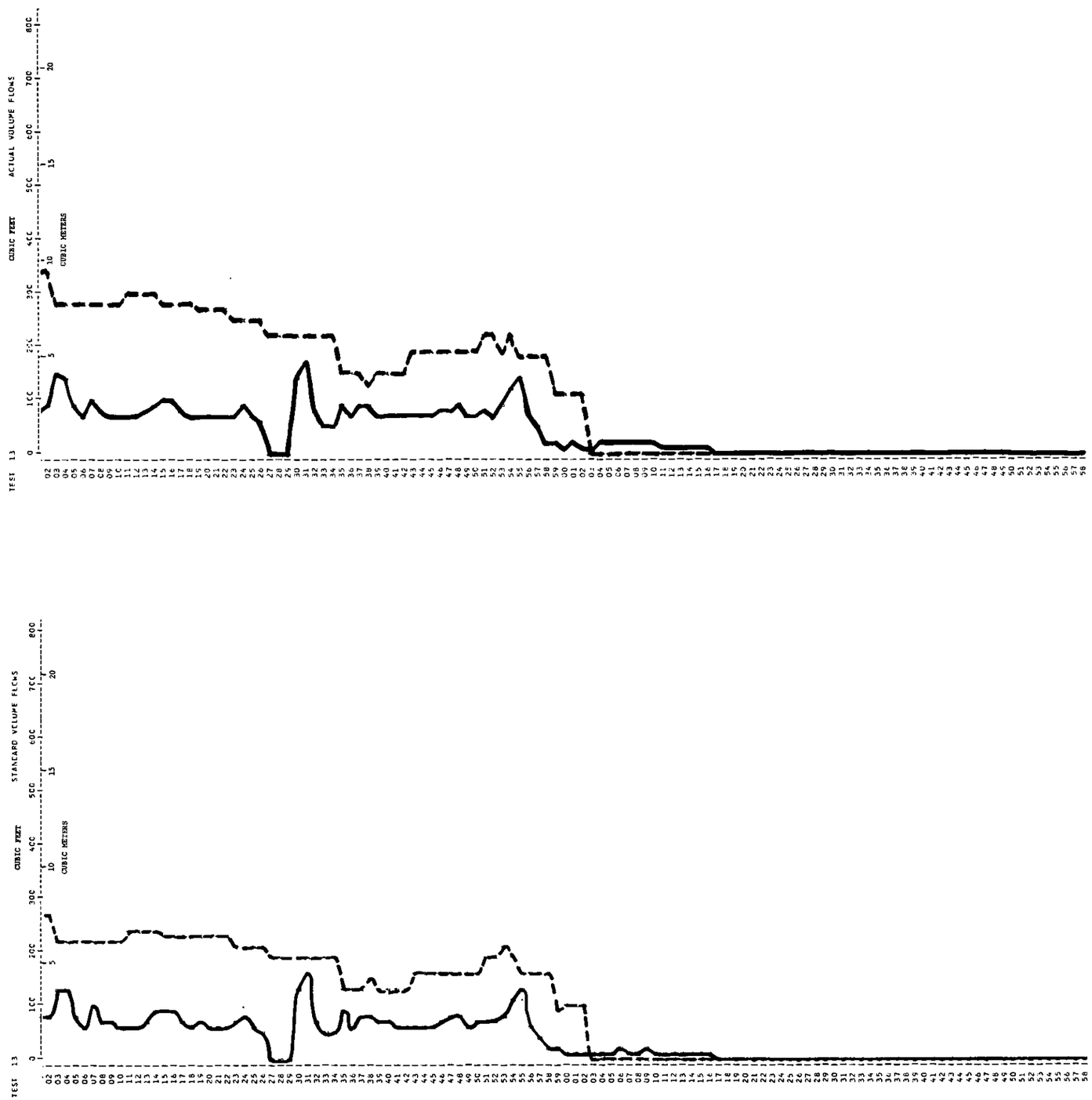
KEY, TEST 12	
LOCATION	SYMBOL
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CENTER GUIDE	— — — —
COKE GUIDE	- - - - - - -

FIGURE A-16 (CONTINUED)



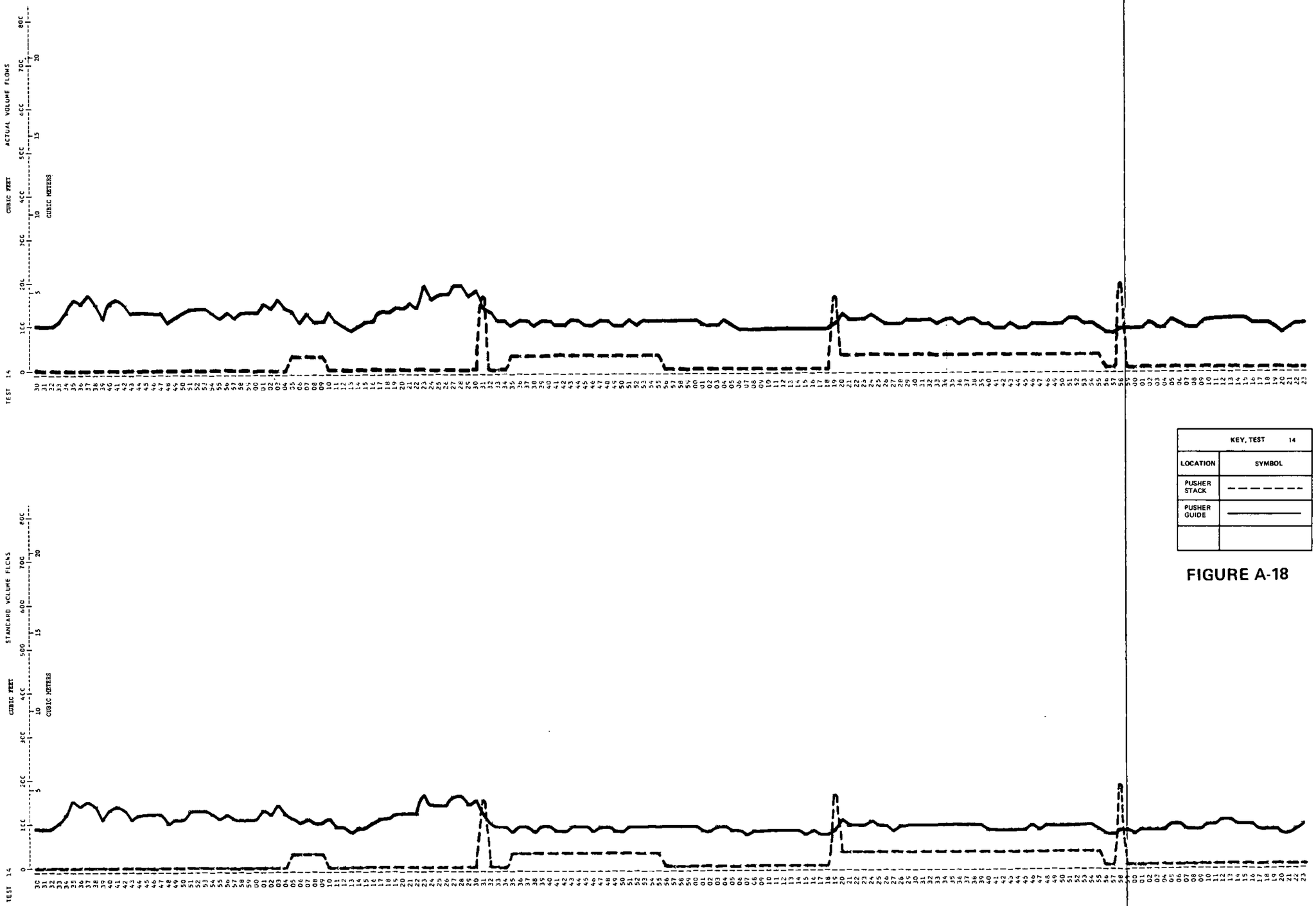
KEY, TEST 13	
LOCATION	SYMBOL
CENTER STACK	- - - - - -
CENTER GUIDE	———

FIGURE A-17



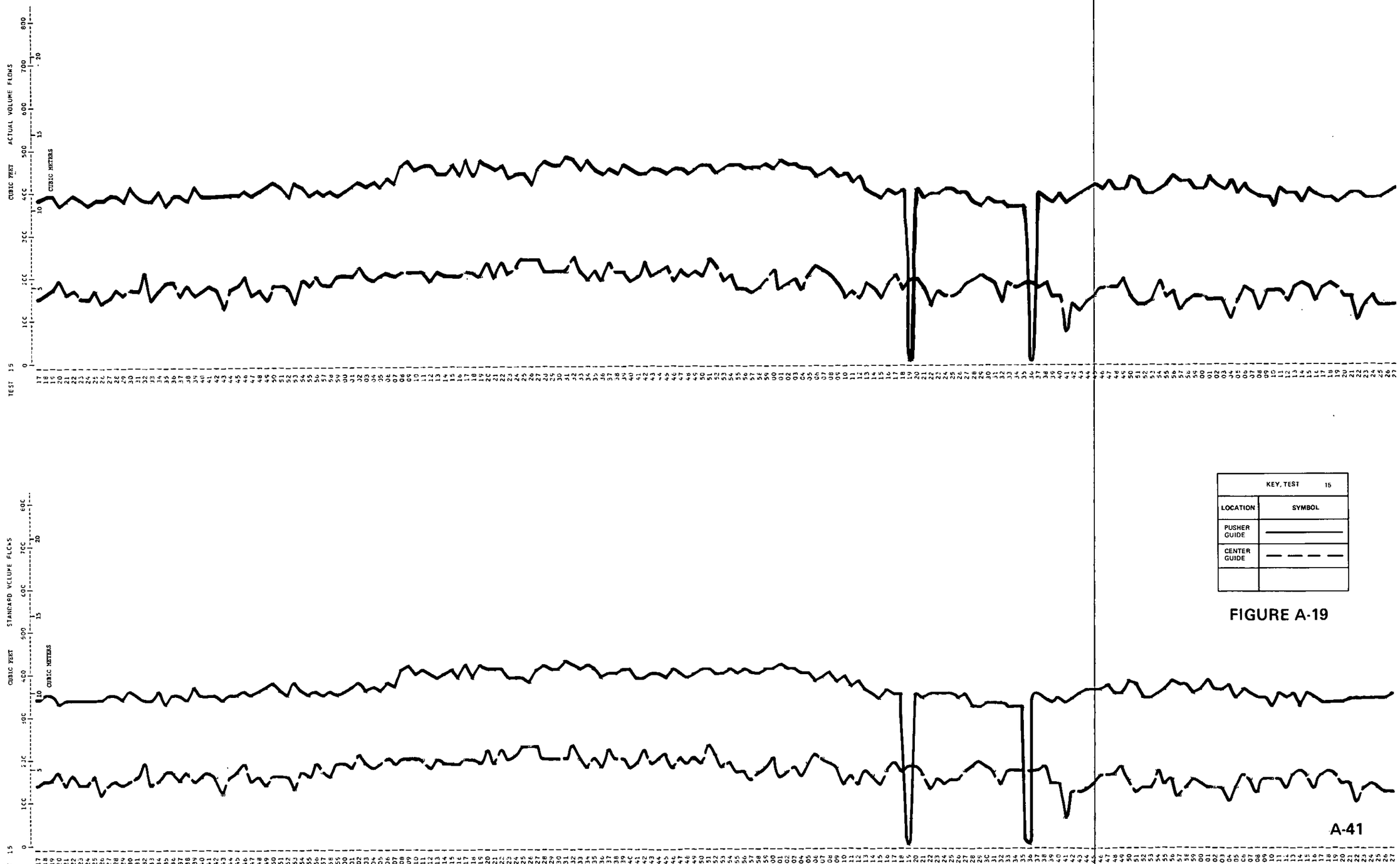
KEY, TEST 13	
LOCATION	SYMBOL
CENTER STACK	- - - - - - - -
CENTER GUIDE	———————

FIGURE A-17 (CONTINUED)



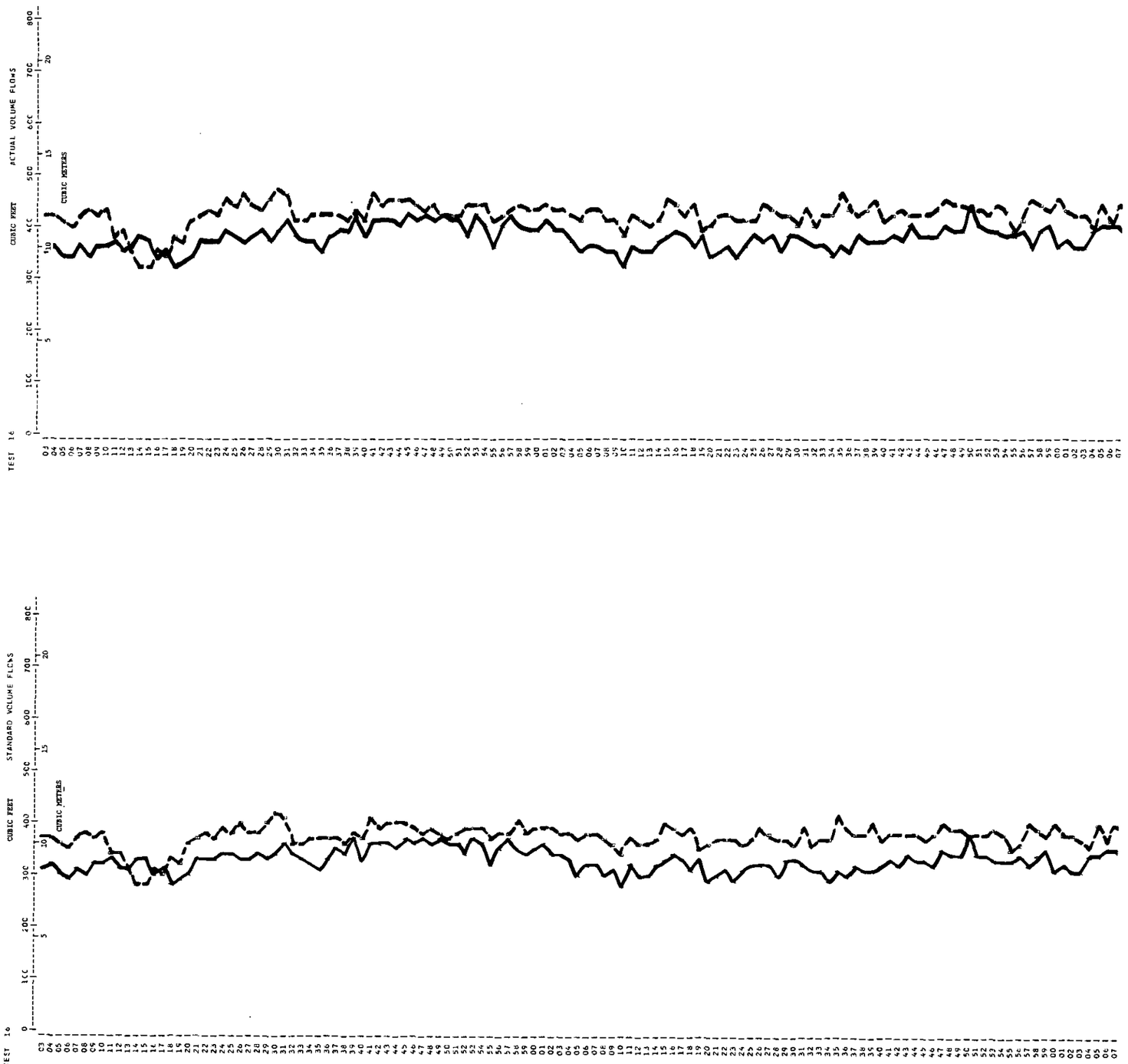
KEY, TEST 14	
LOCATION	SYMBOL
PUSHER STACK	- - - - - -
PUSHER GUIDE	———

FIGURE A-18



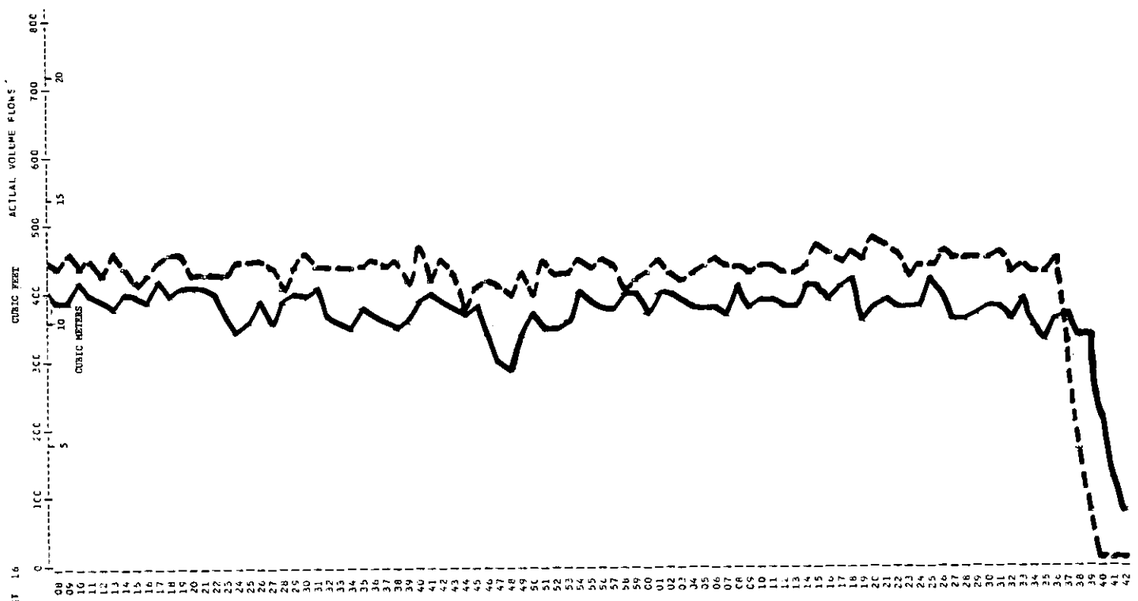
KEY, TEST 15	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —

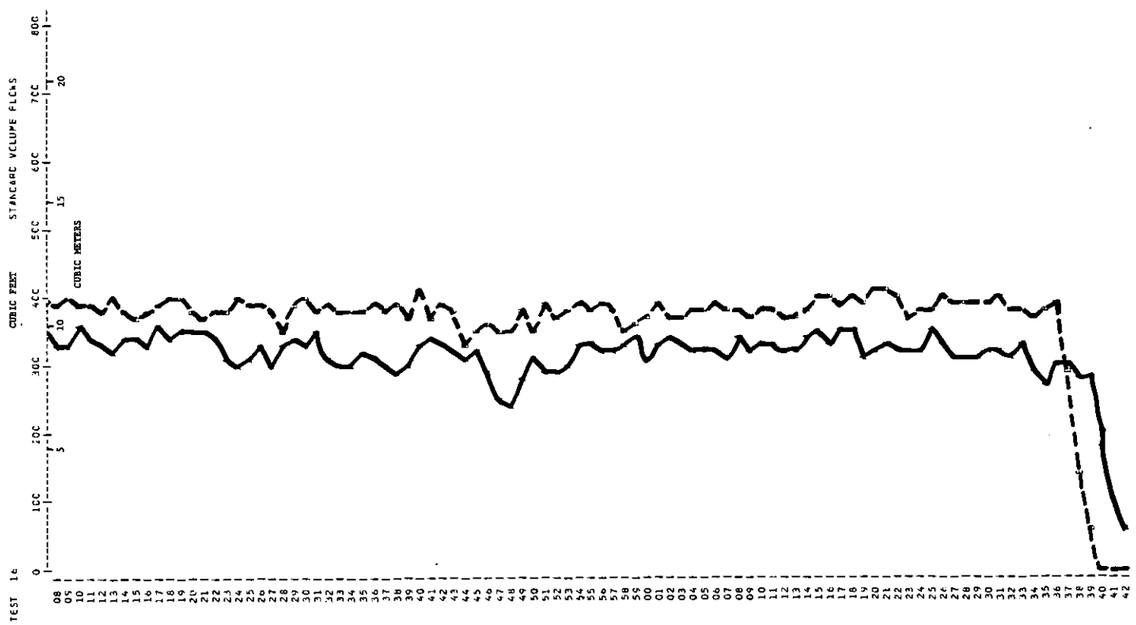
FIGURE A-19



KEY, TEST 16	
LOCATION	SYMBOL
PUSHER GUIDE	———
COKE GUIDE	- - - - - -

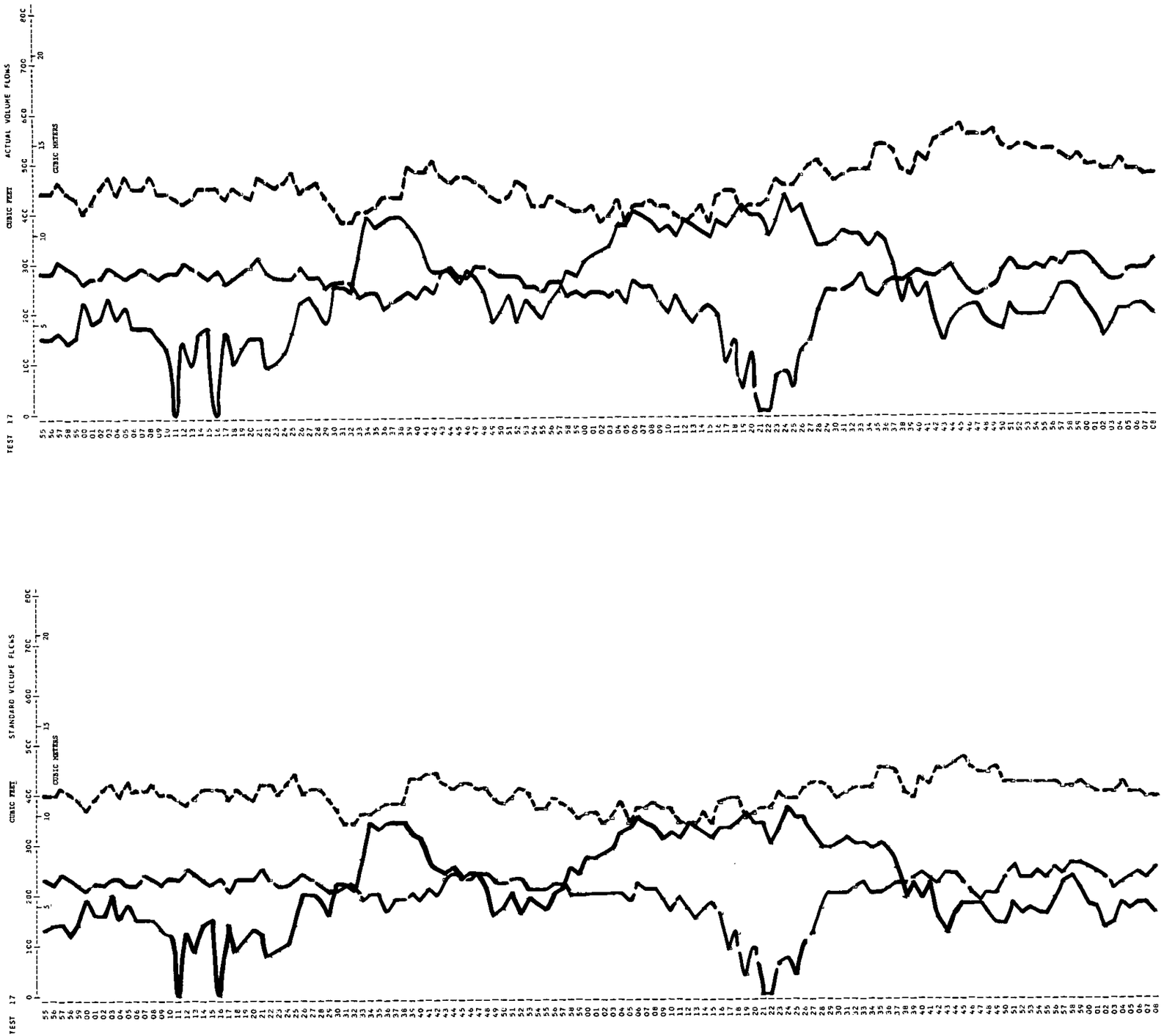
FIGURE A-20





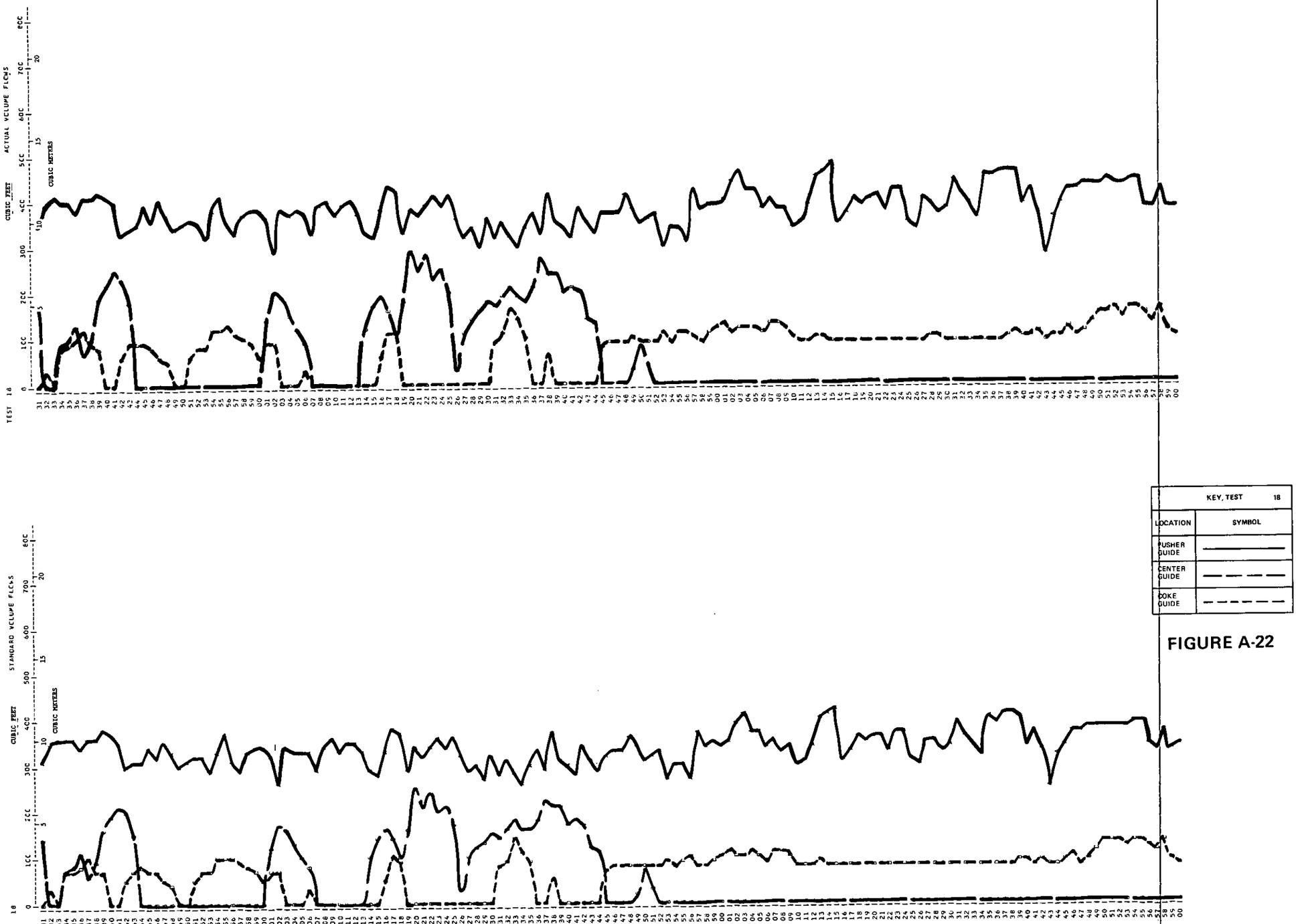
KEY, TEST 16 .	
LOCATION	SYMBOL
PUSHER GUIDE	———
COKE GUIDE	- - - - - -

FIGURE A-20 (CONTINUED)



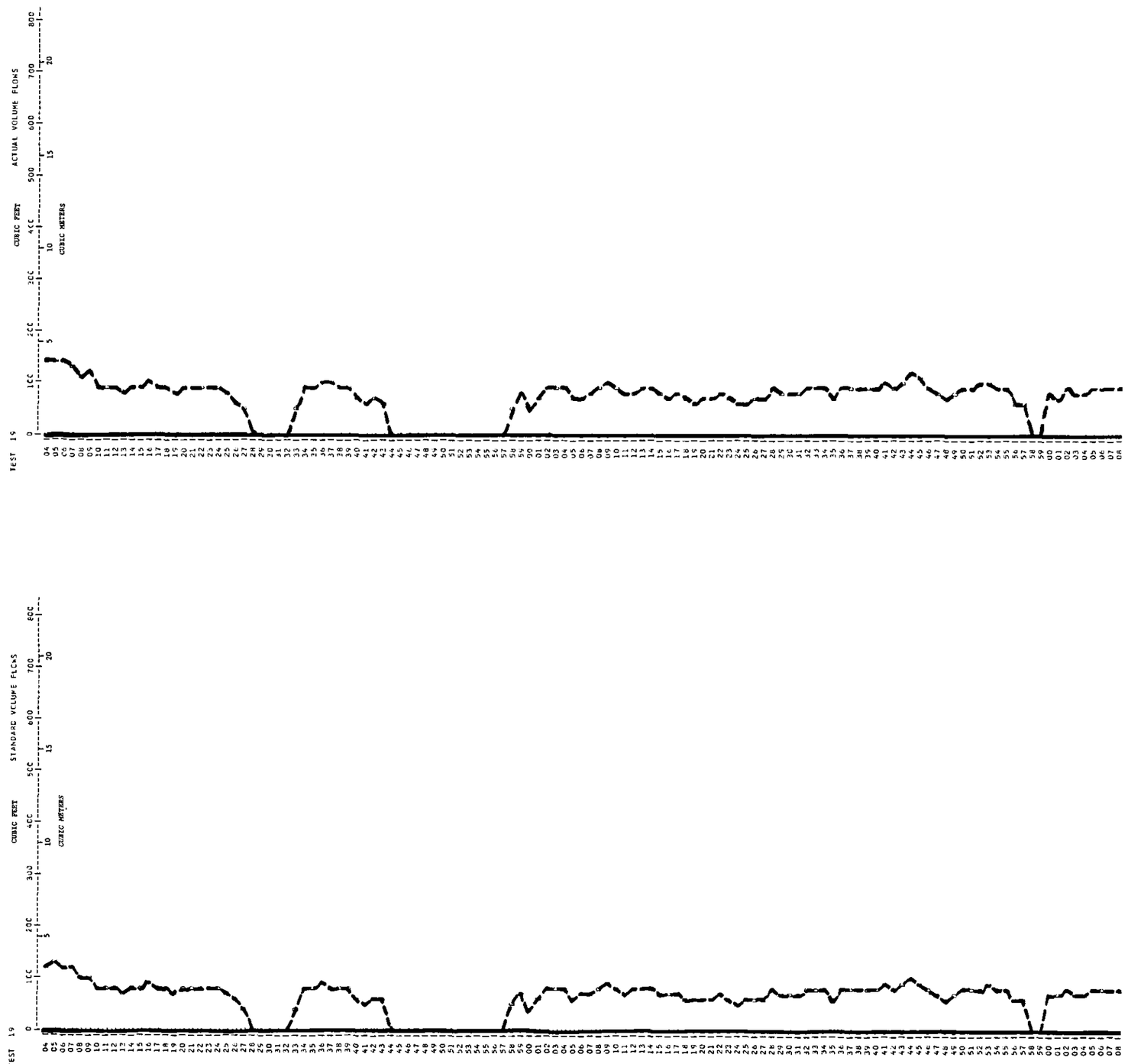
KEY, TEST 17	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	— — — — —

FIGURE A-21



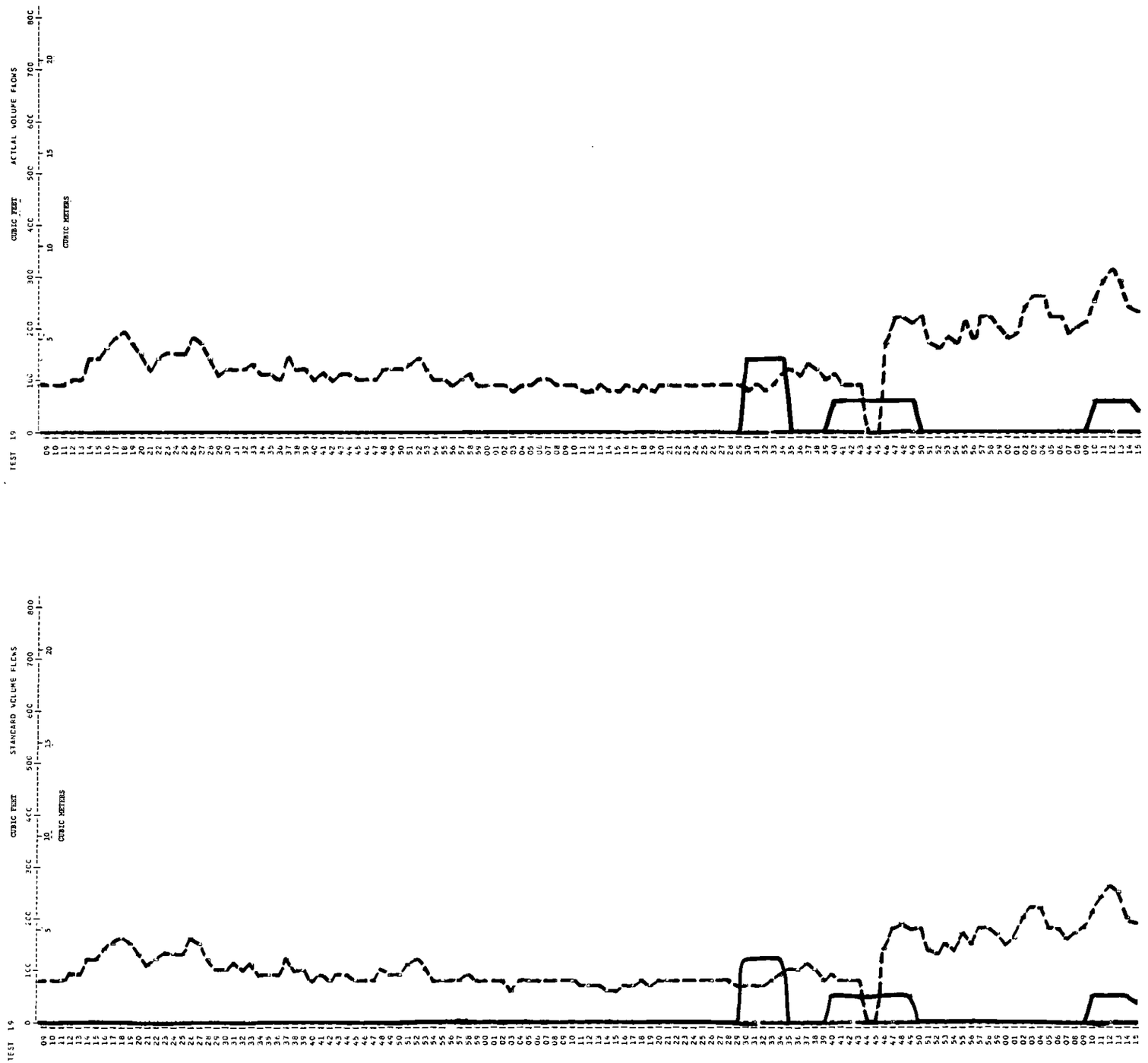
KEY, TEST 18	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - -

FIGURE A-22



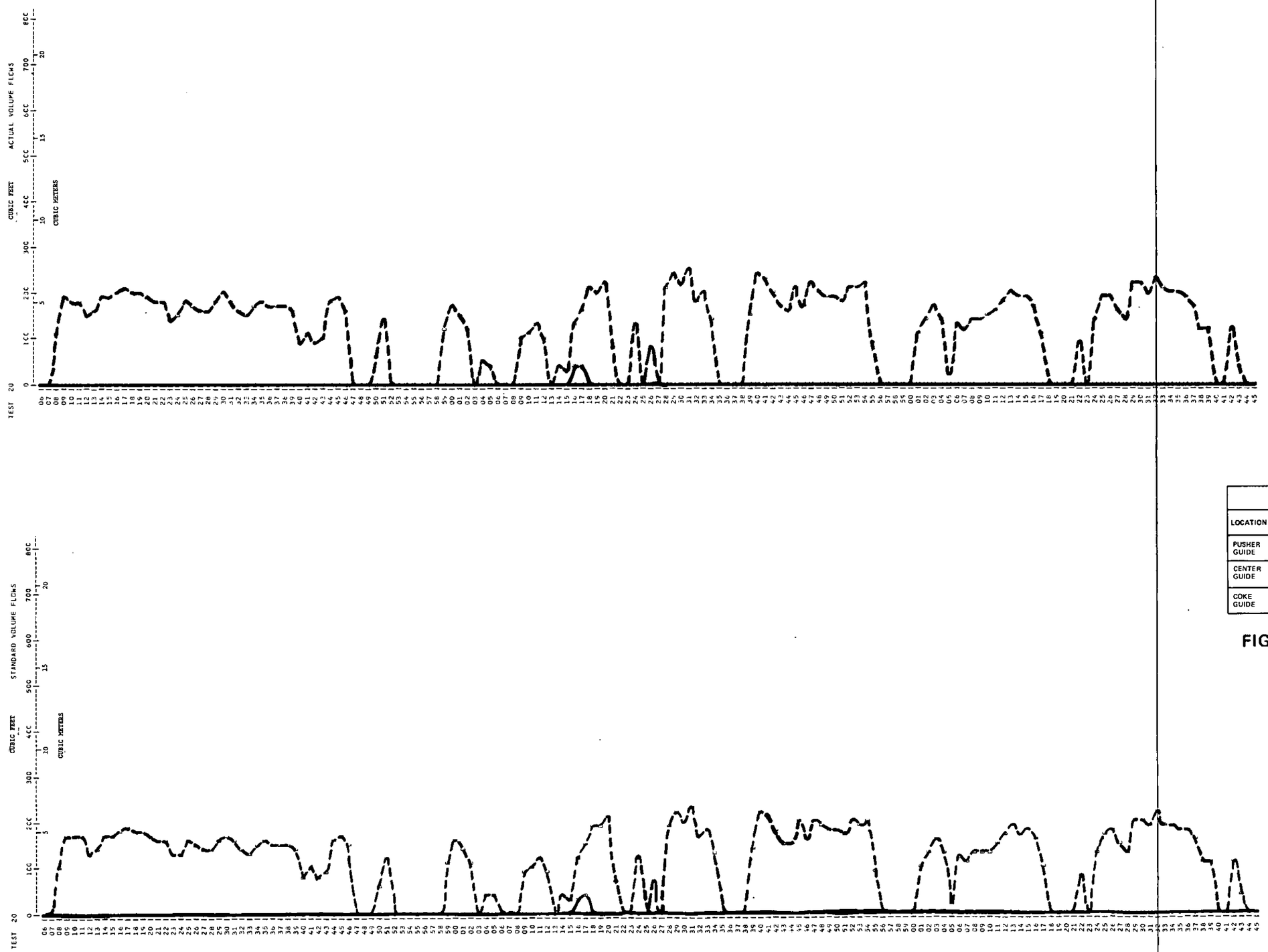
KEY, TEST 19	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - -

FIGURE A-23



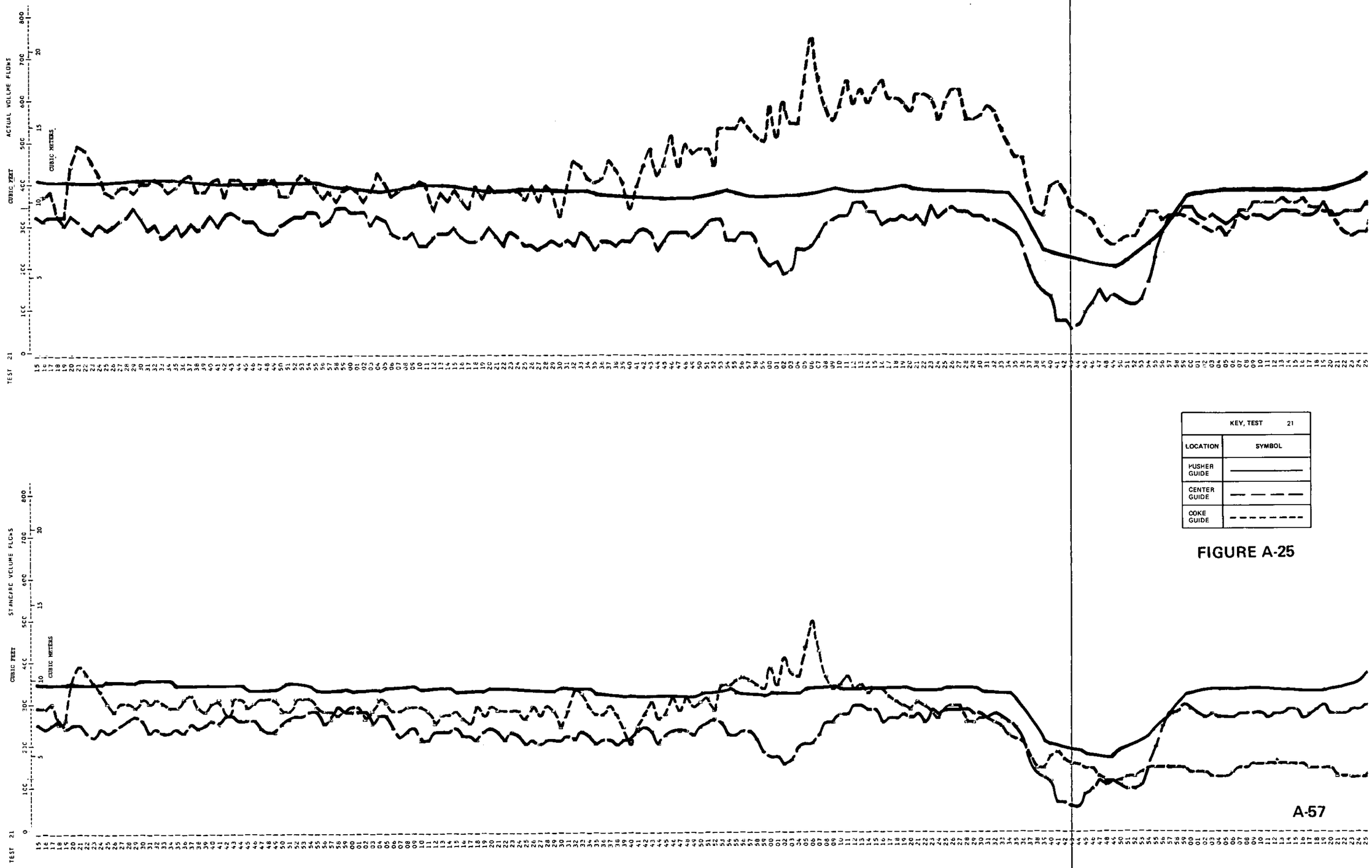
KEY, TEST 19	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — —
COKE GUIDE	- - - - -

FIGURE A-23 (CONTINUED)



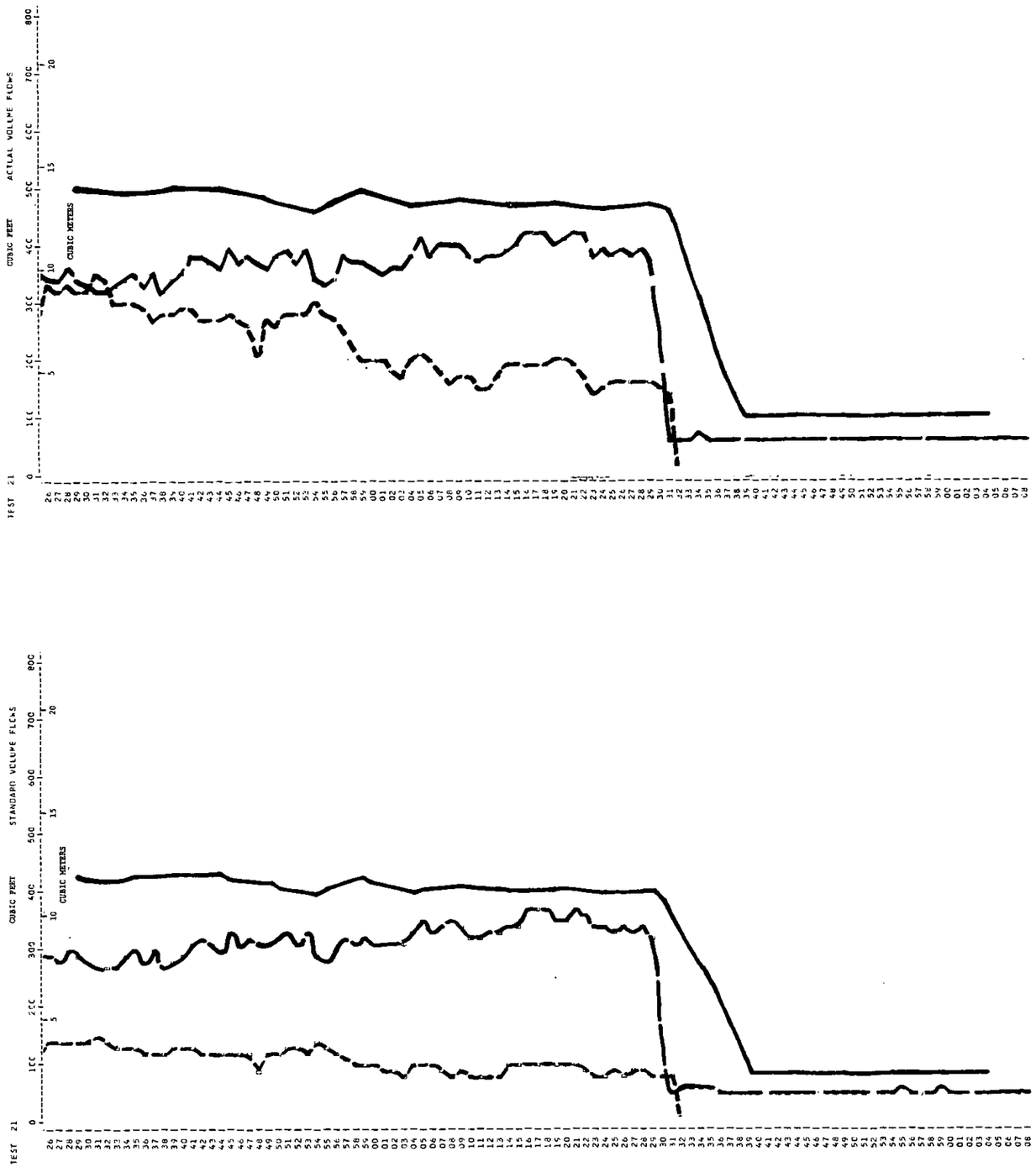
KEY, TEST 20	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - - -

FIGURE A-24



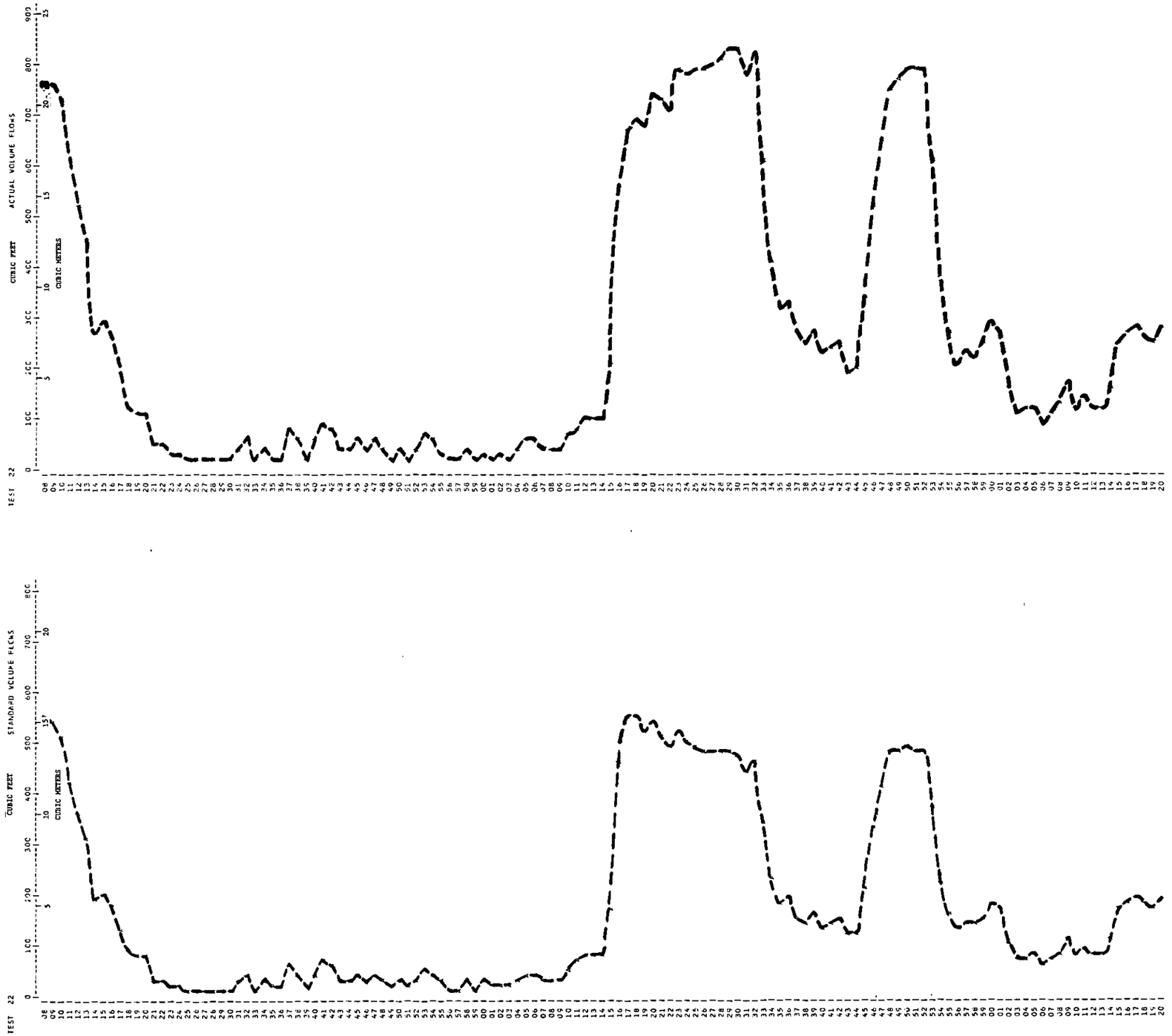
KEY, TEST 21	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - - -

FIGURE A-25



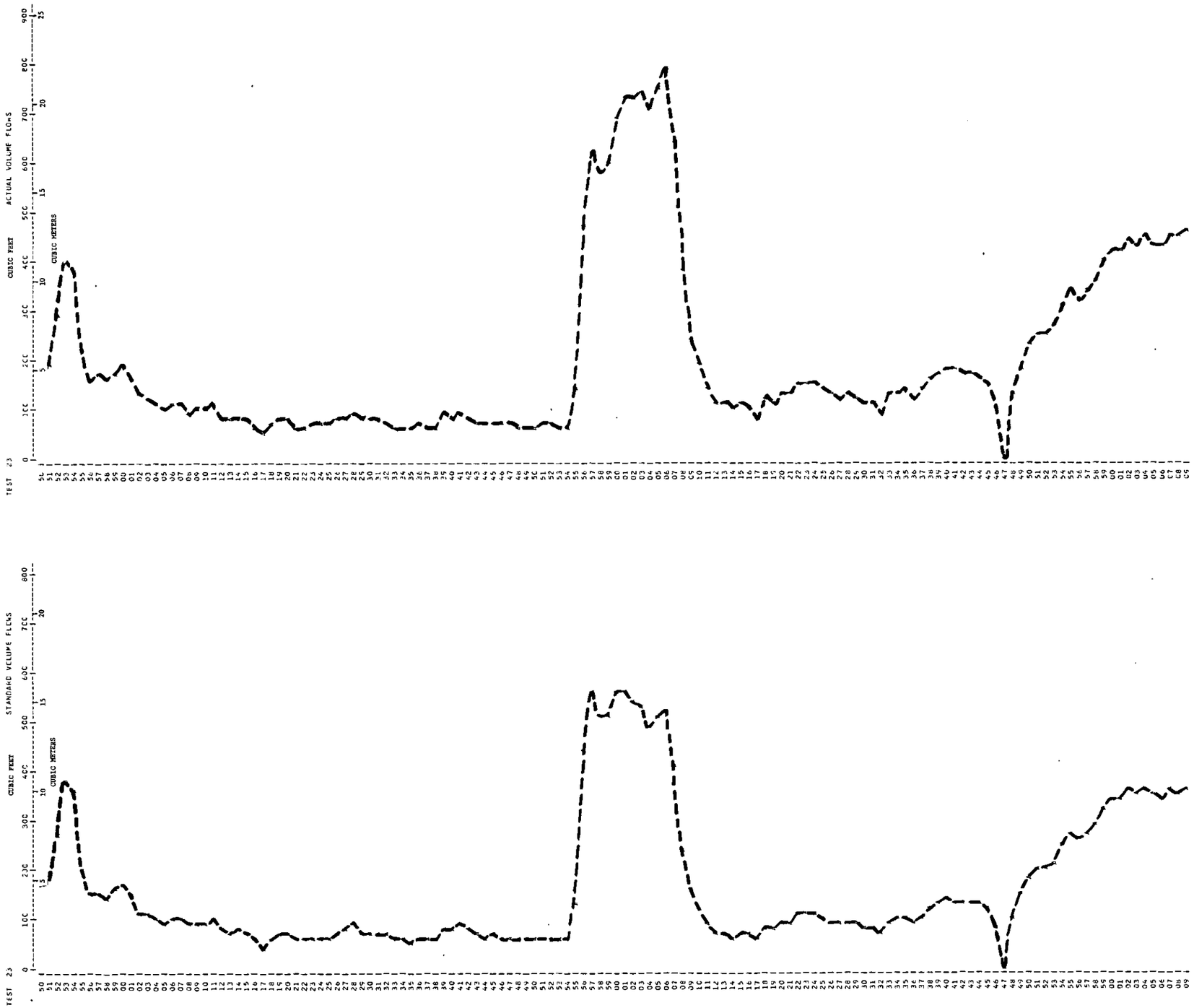
KEY, TEST 21	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - -

FIGURE A-25 (CONTINUED)



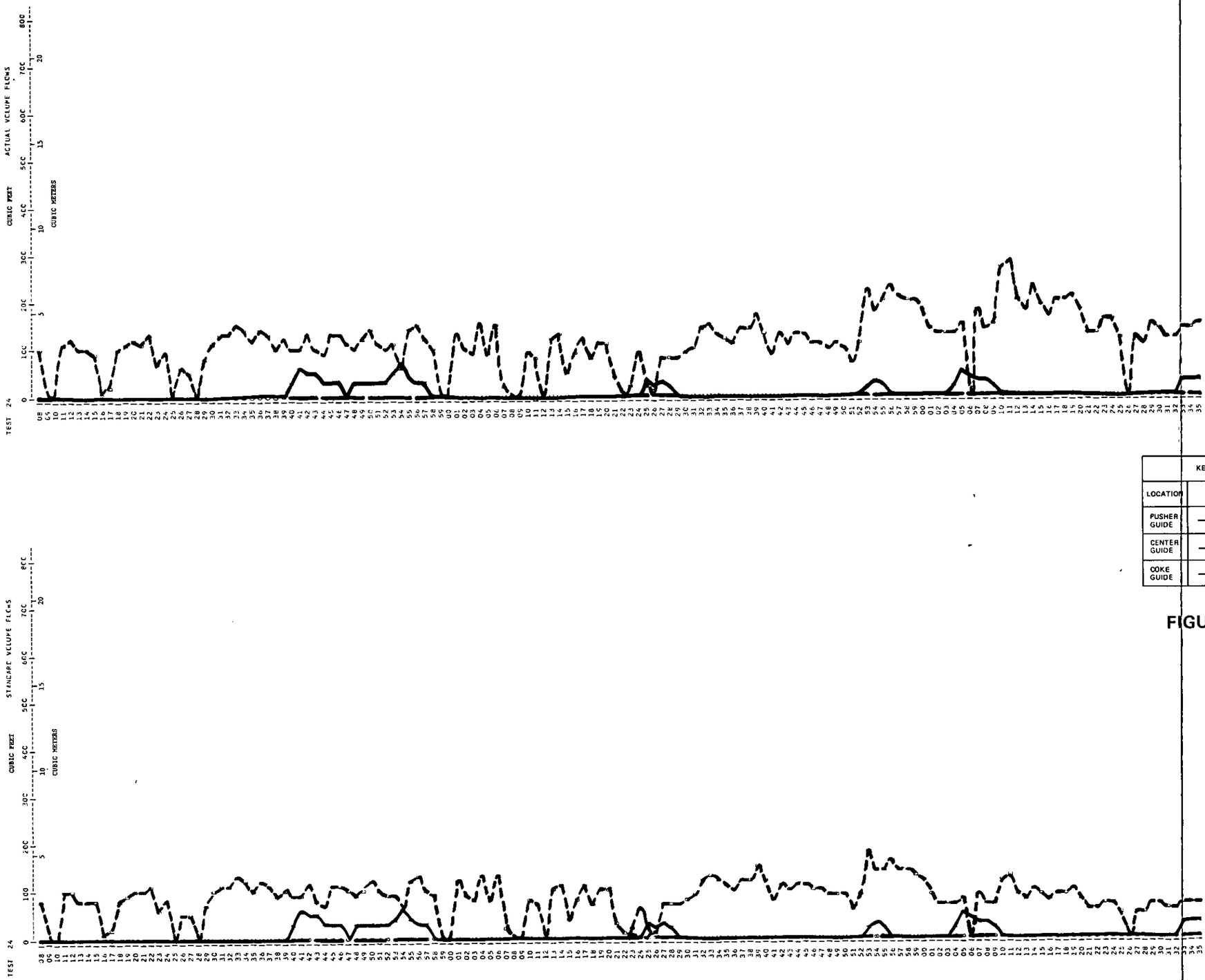
KEY, TEST 22	
LOCATION	SYMBOL
CENTER STACK	- - - - - -

FIGURE A-26



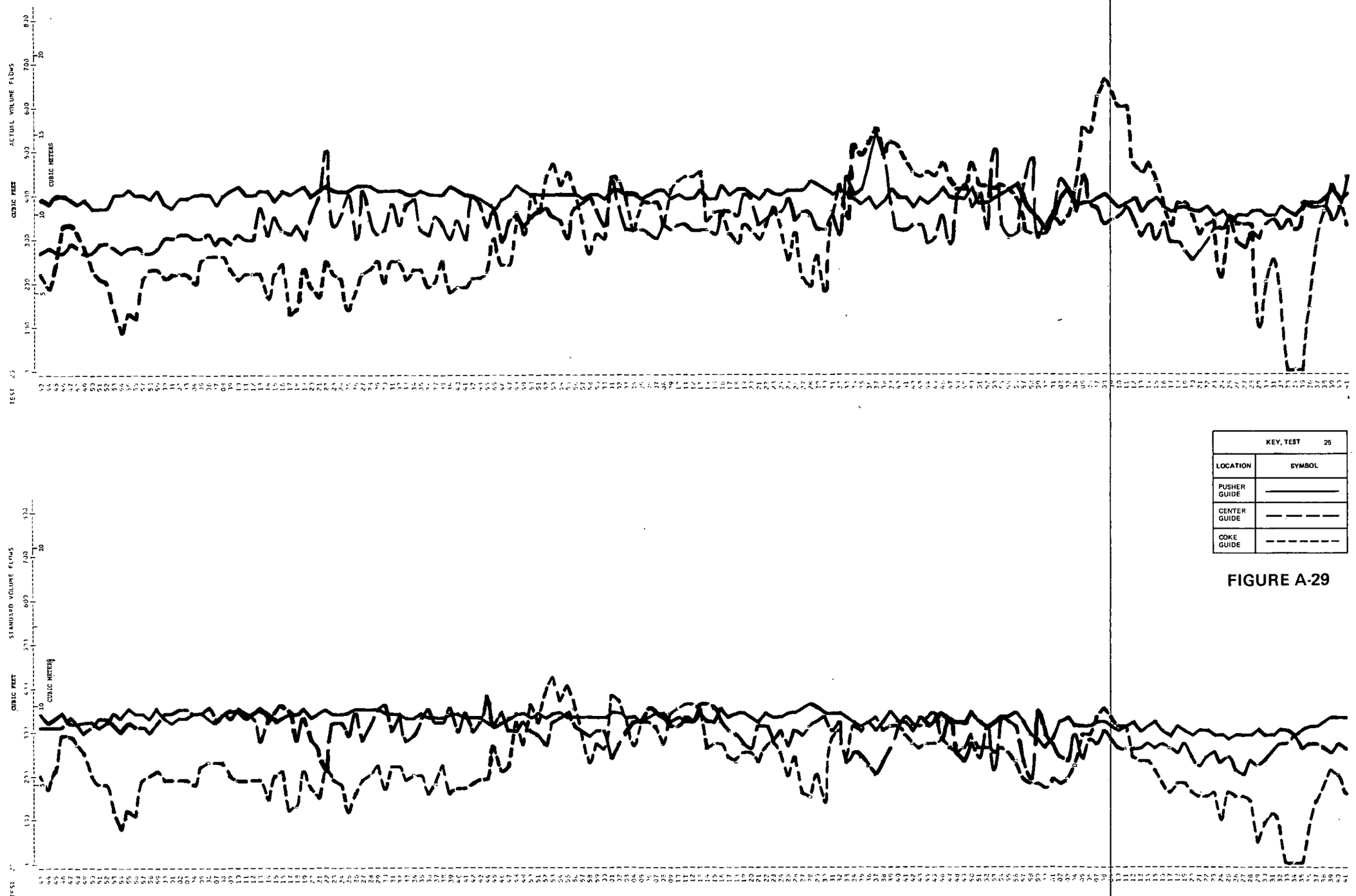
KEY, TEST 23	
LOCATION	SYMBOL
CENTER STACK	- - - - - - -

FIGURE A-27



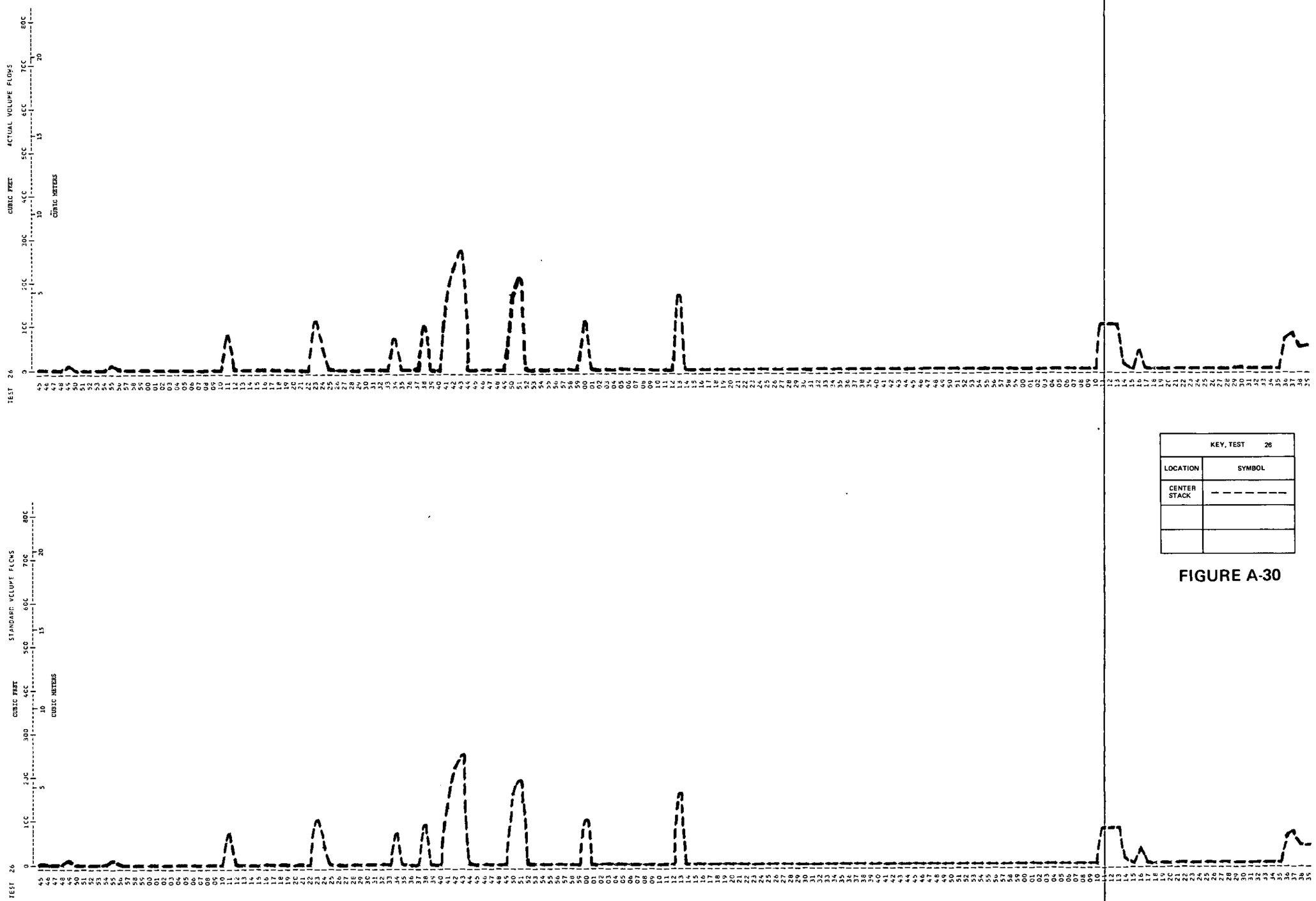
KEY, TEST 24	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — —
COKE GUIDE	— — —

FIGURE A-28



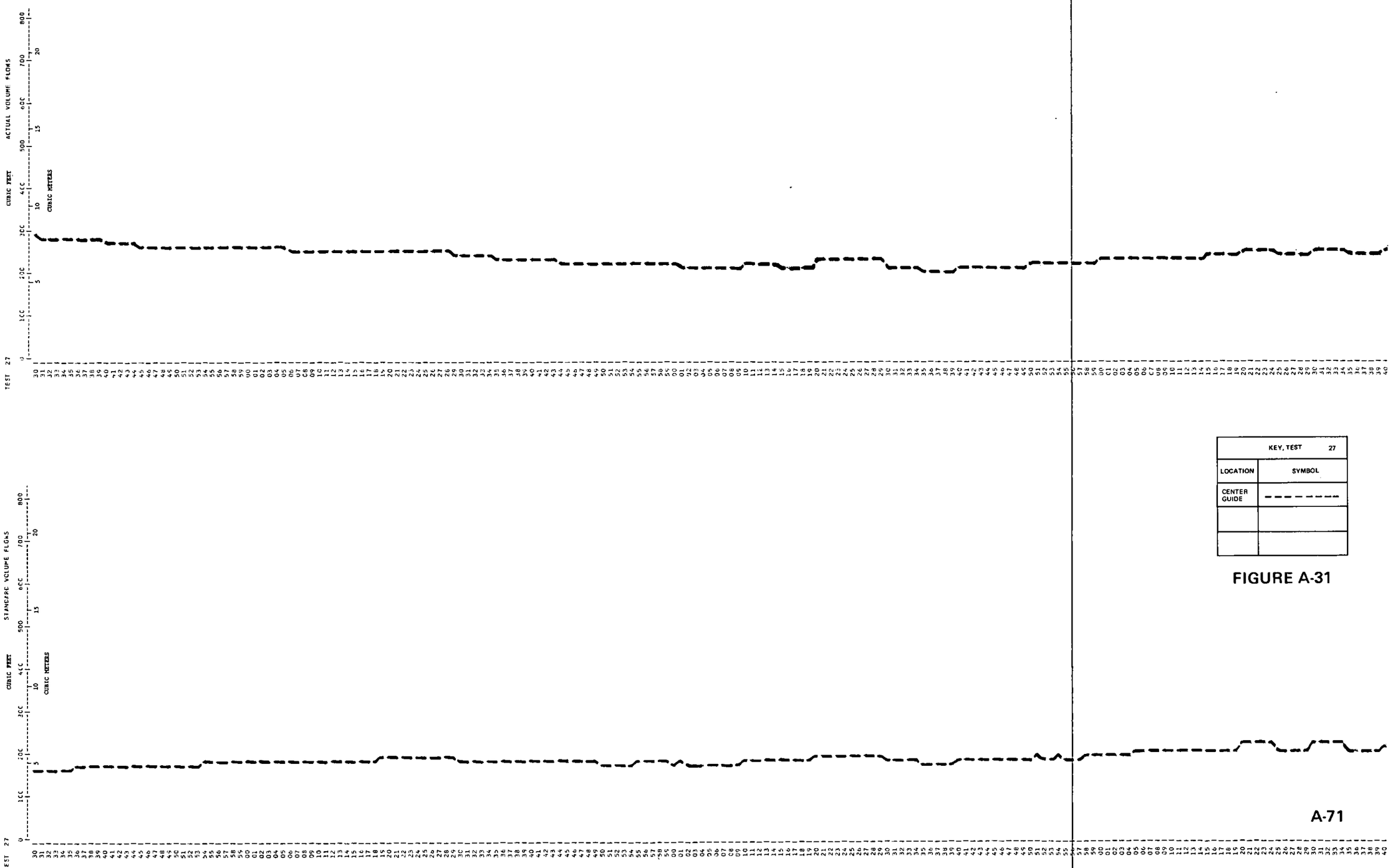
KEY, TEST 25	
LOCATION	SYMBOL
PUSHER GUIDE	———
CENTER GUIDE	— — — —
COKE GUIDE	- - - - - - -

FIGURE A-29



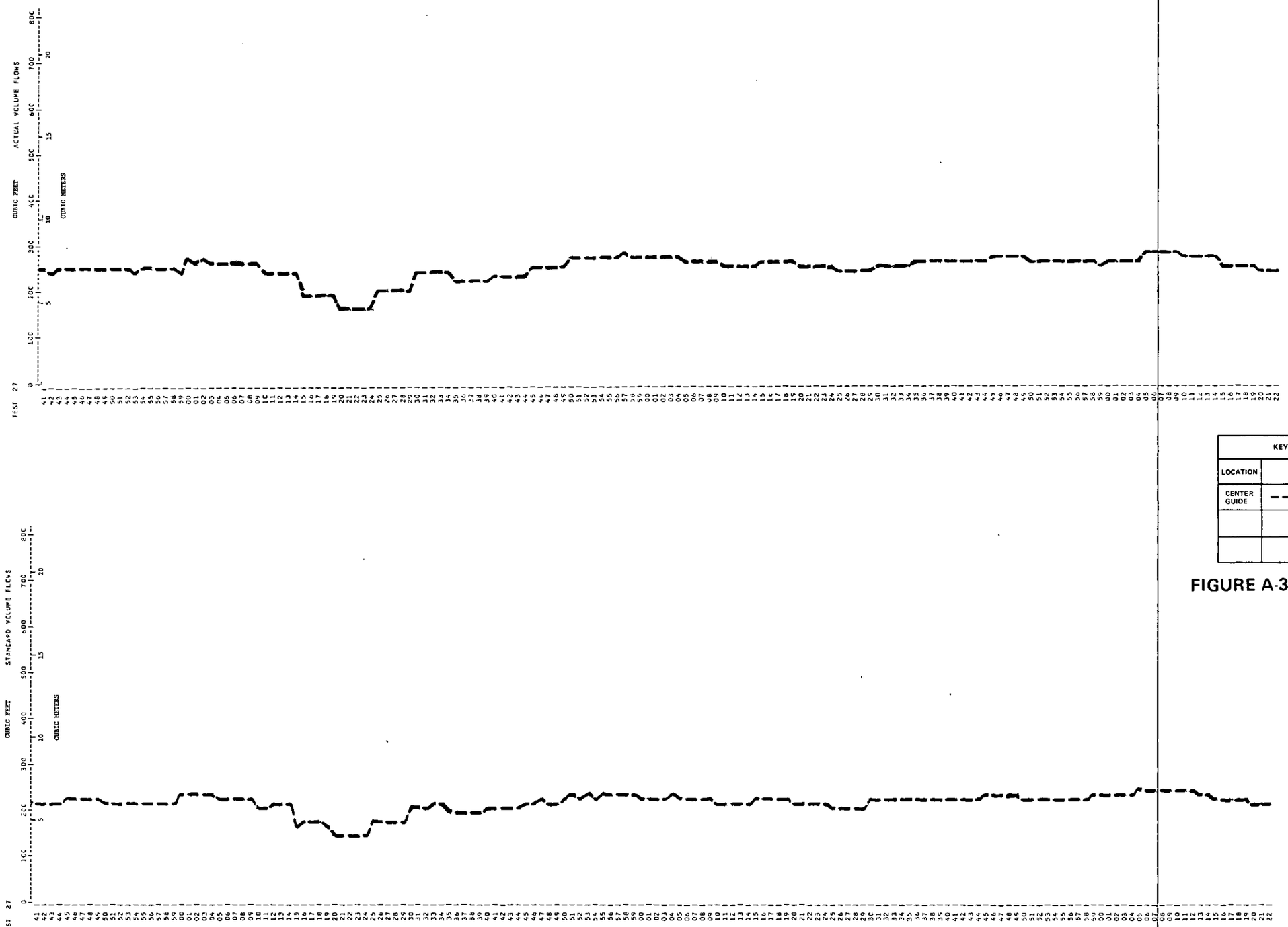
KEY, TEST 26	
LOCATION	SYMBOL
CENTER STACK	- - - - - - -

FIGURE A-30



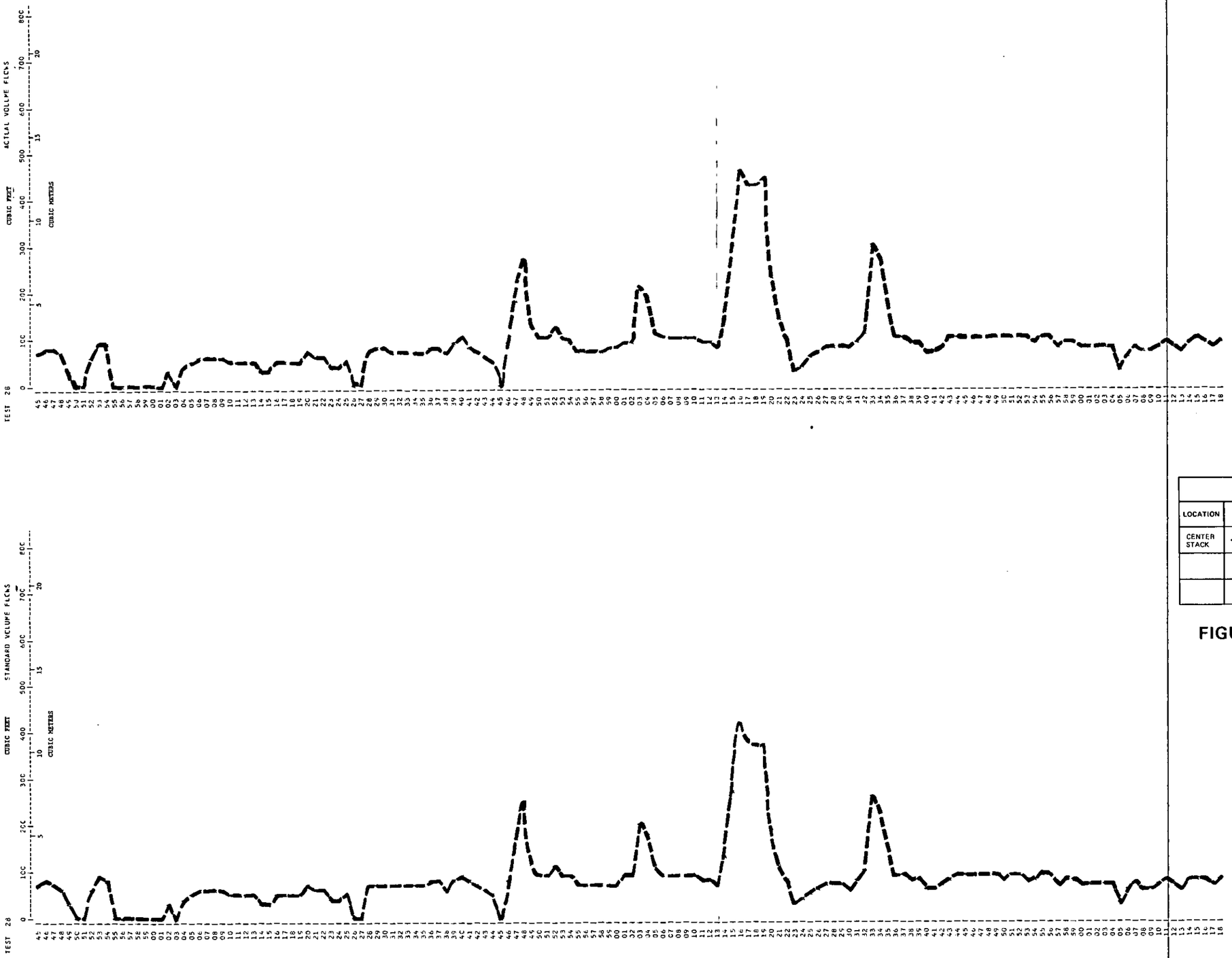
KEY, TEST 27	
LOCATION	SYMBOL
CENTER GUIDE	- - - - - - - -

FIGURE A-31



KEY, TEST 27	
LOCATION	SYMBOL
CENTER GUIDE	- - - - - - -

FIGURE A-31 (CONTINUED)



KEY, TEST 28	
LOCATION	SYMBOL
CENTER STACK	- - - - - -

FIGURE A-32

APPENDIX B
MANUAL SAMPLING

This appendix contains the data collected and analyzed by the Midwest Research Institute. This information was used with the continuous data for the final data reduction procedures performed at MITRE.

The description of the manual sampling system, the operating procedures, and the discussion of the analyses performed is divided into two basic parts in this appendix. Part One includes the description of particulate collection system, and the second portion includes a description of the gas analyses system.

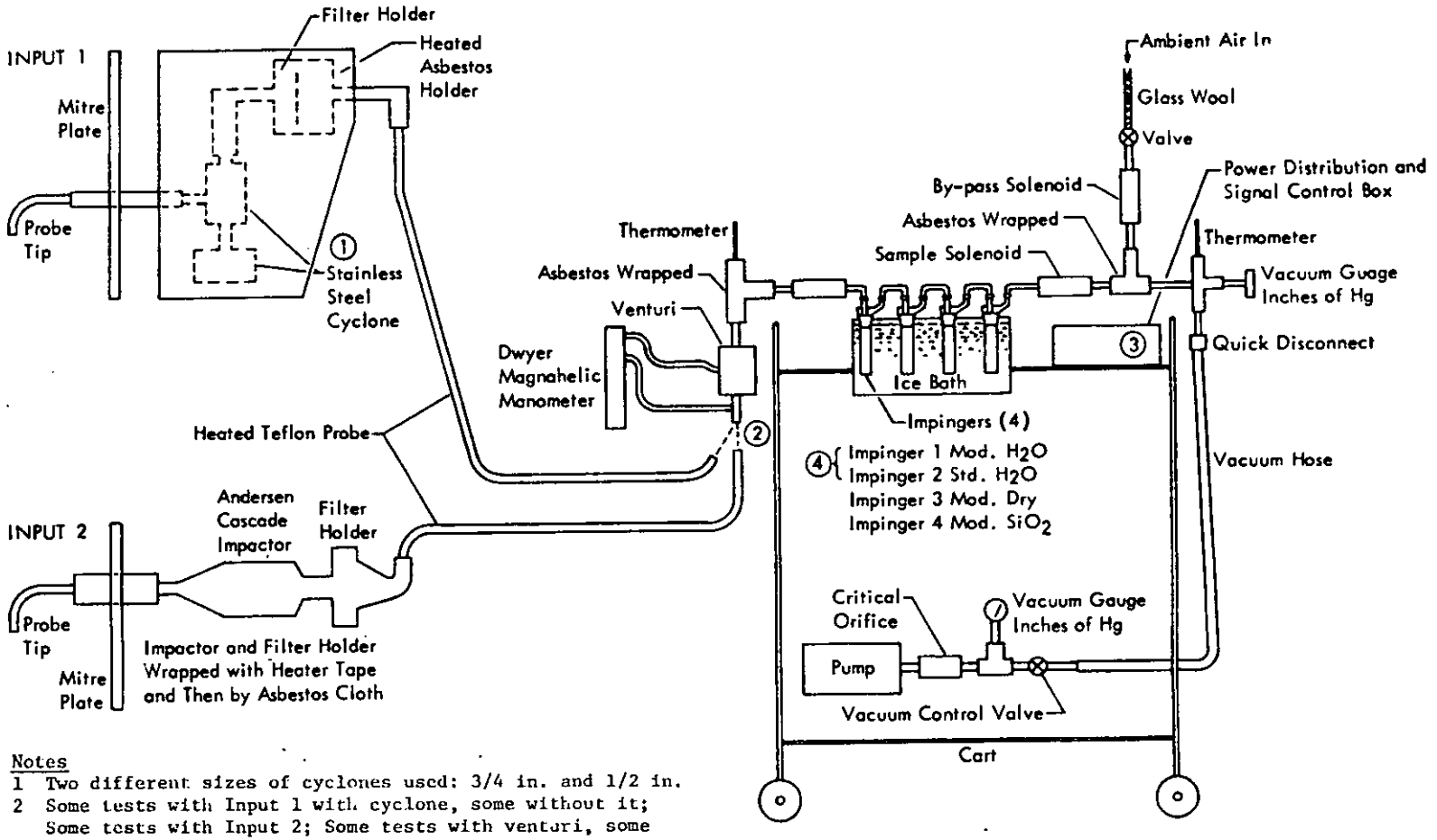
SAMPLING SYSTEMS

There were two principal sampling systems used during this project: the particulate sampling system and the gas sampling system. Each of these are discussed below.

Particulate Sampling System

The samples taken by the particulate sampling system were to be analyzed for benz(a)pyrene (BaP), particle size, particle size distribution by mass, mass loading, tar and 27 elements.

MRI designed the particulate sampling system that is shown in Figure B-1 to achieve the sampling results required. Three units were made from this design and used in sampling at the coke oven. The sampling system comprises two major sections: the input section and the train section. There were two different input sections as shown in Figure B-1. Input 1 comprised a probe tip that fed into a stainless steel cyclone and a filter. These two units were imbedded in a heated-asbestos holder, the temperature of which was controlled from the power distribution and signal control box which was located on the top shelf of the cart. The output of the filter holder fed a flexible heated-Teflon probe, which also was temperature controlled by the power distribution and signal control box. There were two sizes of stainless steel cyclones used - a 1/2 inch size and a 3/4 inch size.



Notes

1 Two different sizes of cyclones used: 3/4 in. and 1/2 in.

2 Some tests with Input 1 with cyclone, some without it; Some tests with Input 2; Some tests with venturi, some without it.

3 This box fed power to heaters, pump, etc. and had temperature control units. It had manual switch that operated control circuitry of the sample and the by-pass solenoids.

4 Generally 100 ml, but 150 and 200 at times.

FIGURE B-1 - THE PARTICULATE SAMPLING SYSTEM

Input 2 is a stainless steel probe followed by an Andersen Cascade Impactor, which in turn was followed by a filter and then a heated-Teflon probe. The impactor and filter holder were wrapped with a heater tape (controlled by the signal distribution and signal-control box) and then this all was covered with asbestos cloth.

The heated-Teflon probe was connected to a venturi, which was the input point of the train section of the sampling system. This train section was housed on a mobile cart. For some runs, the venturi was not used, and in these cases, the input point to the train section was a tee fitting. When the venturi was used, the pressure drop across it was monitored by a Dwyer Magnahelic manometer.

The tee input to the train section was wrapped in asbestos. A thermometer was incased in the tee to provide a measurement of the gas temperature in °F. This was connected to a train (series) of four glass, 500 ml, Smith-Greenburg impingers, which were located in an ice bath. The first, third and fourth impingers were modified; the second was standard. (For most runs, 100 ml deionized water was in the first two impingers; for other runs 150 ml water was used; and still for other runs 200 ml water was used. The third impinger was dry and the fourth impinger contained silica gel.) The fourth impinger fed into a solenoid valve - termed sampler solenoid - which was connected to a tee wrapped with asbestos. The second leg of the tee was connected to what was termed the bypass solenoid. The third leg of the tee led to a cross union. Connected to the other legs of the cross union were a vacuum gauge, a thermometer and a vacuum hose. The other end of the hose was connected to a vacuum pump through a vacuum control valve, then a vacuum gauge and finally a critical orifice.

The sample and bypass solenoids were wired to the power-distribution and signal control box. These solenoids were operated manually by switches that controlled the switching circuitry. In operation, the bypass solenoid was energized just before a run. This closed the sample-solenoid valve, and allowed ambient air to be brought into the system through glass wool and a valve. (The glass wool and valve simulated load

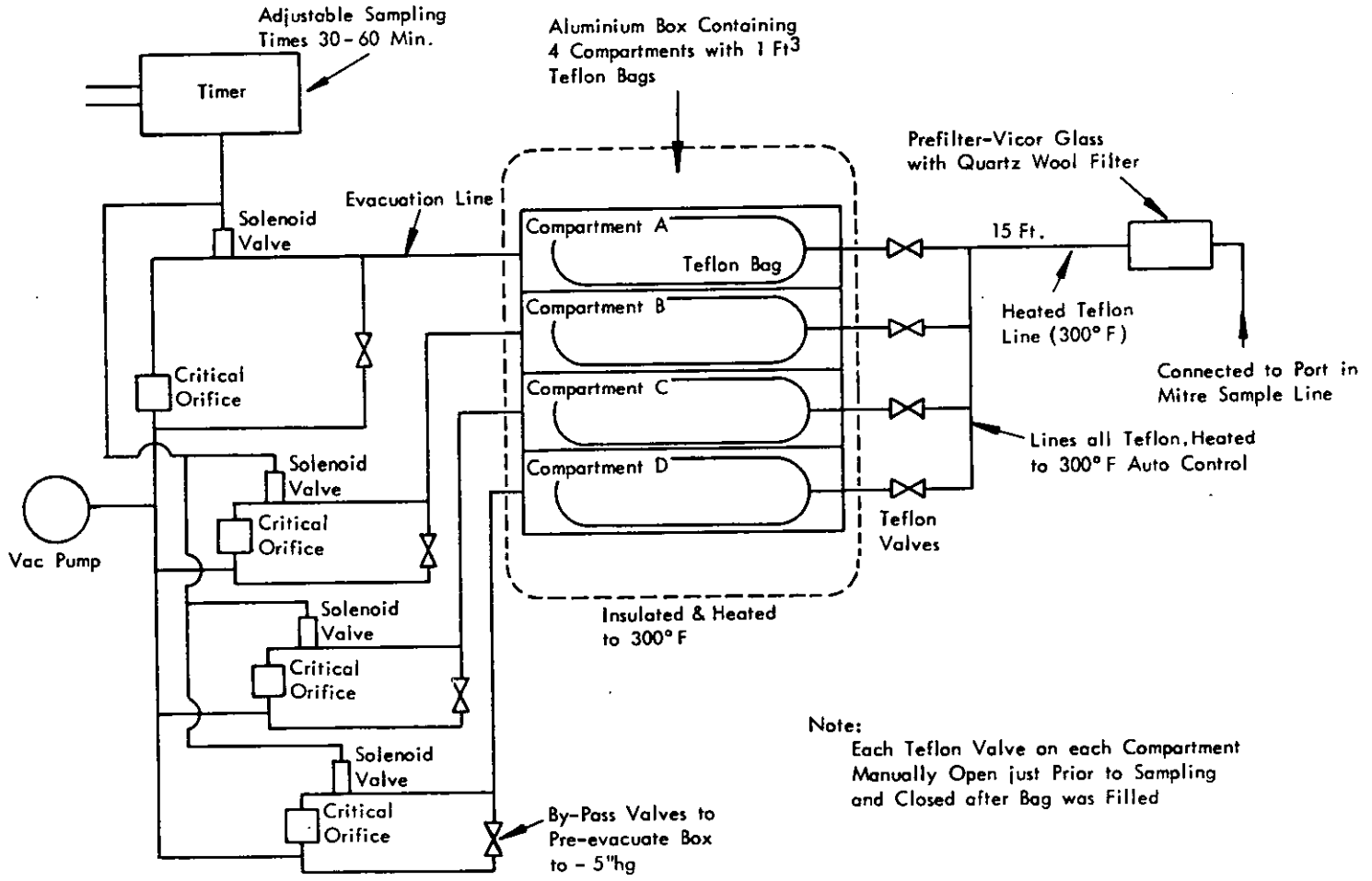
conditions, i.e., the sample solenoid valve open.) The ambient air flowed through the vacuum line, vacuum control valve, vacuum gauge, critical orifice and then to the pump. Adjustments were made with the vacuum control valve - near the pump - to achieve 10 in. Hg. The bypass solenoid valve was closed at the signal for the run to commence. At the same time, the sample solenoid valve was opened to connect the sampling system with one of the cars. The vacuum control valve then was adjusted to maintain 10 in. Hg and achieve a constant sampling rate.

The reason for the bypass solenoid valve and the preadjustment of the vacuum to 10 in. Hg was that the run was of short duration, and there was not time to bring the vacuum to the proper value during the run.

Gas Sampling System

The gas sampling system is shown in Figures B-2, B-3, and B-4. This system can conveniently be divided into three parts for the case of presentation: (1) the bag sampler shown in Figure B-2; (2) the sampling trains shown in Figure B-3; and (3) the total hydrocarbon analyzer set up shown in Figure B-4. The bag sampler was used on site to collect four gas samples in Teflon bags, whereas the other two parts were located in MRI's field laboratory trailer. After a run, the bag sampler was carried to the laboratory where the other parts were attached to prepare the samples to be analyzed.

As shown in Figure B-1, the four-compartment bag sampler was connected to the port in the common duct. This connection was the inlet to the bag sampler. Prior to collection, each of the four compartments was evacuated to -5 in. Hg via the manual valves shown to the left in the vacuum lines of each compartment. The timer was set to sequentially operate the solenoid values for 30 to 60 seconds, which would enable the bags in the aluminum box to be filled. At the end of each sampling period, an audible sound would alert the operator to close one valve and open the next.



Note:
Each Teflon Valve on each Compartment
Manually Open just Prior to Sampling
and Closed after Bag was Filled

FIGURE B-2

THE BAG SAMPLER

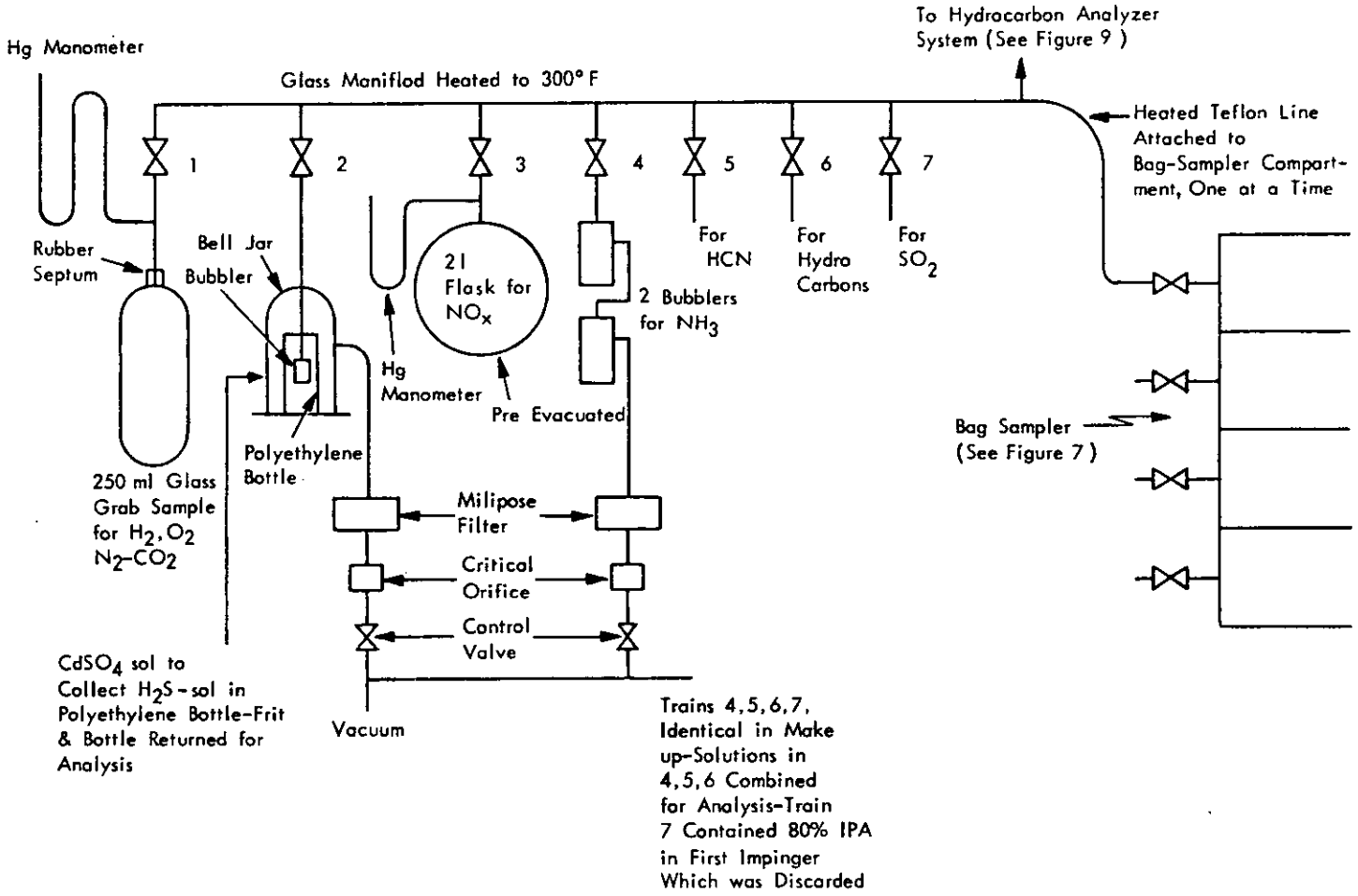


FIGURE B-3

SAMPLING TRAINS

Valve Type & Purpose
1 Needle; Sample Inlet
2 Needle; Shut-off to Bomb
3 Toggle; To Vacuum Pump
4 Micro; Dilution Air
5 Toggle; Dilution Air
6 Toggle; To Analyzer
7 Toggle; Bleed Valve

All Valves Except No.4 are Brass
(No.4 is Stainless Steel)
All Tees are Brass
All Tubing-1/4" Refrig. Grade Copper
Fittings- Swagelock

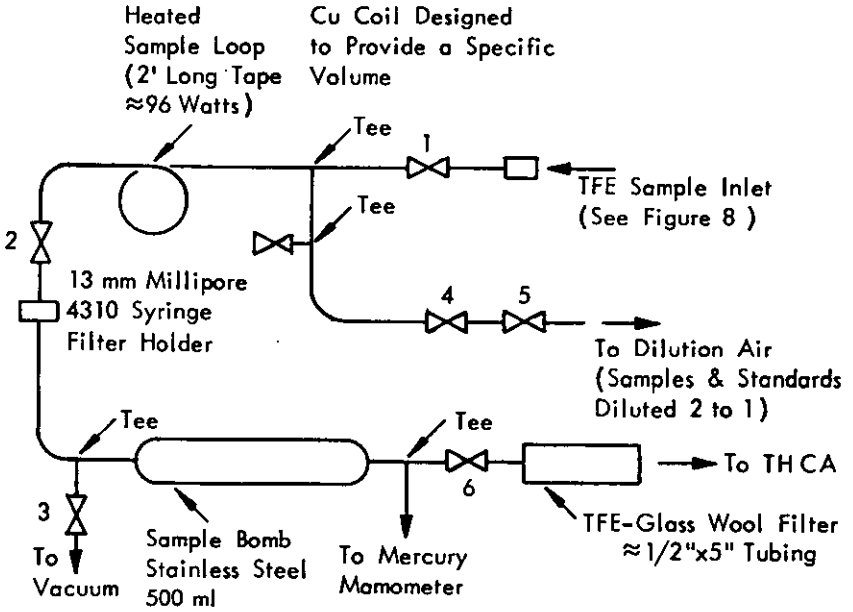


FIGURE B-4

THE TOTAL HYDROCARBON ANALYZER SET-UP

The bag sampler and associated inlet sampling lines were maintained at 300°F during a run. After the completion of this grab bag sampling, the bag sampler was disconnected from the inlet valve manifold, and taken to the field laboratory where the samples were processed.

Next, the bag samples were connected to the sampling trains and the total hydrocarbon analyzer set up. The line was connected to the first bag or compartment, the gas sample was passed into the sampling trains and the Total Hydrocarbon Analyzer Set-Up (THCAS) as described below. When this operation was completed, it was repeated for each respectively.

The gas in a compartment of the bag sampler was processed in the following manner. The valve of a compartment of the bag sampler and valve 1 were opened and the train manifold of Figure B-3 was purged, with each of its other six valves and those inlet valves of the Total Hydrocarbon Analyzer Set-Up (see Figure B-4 closed. Then valve 1 of the sampling train was closed and the THCAS was operated. The Total Hydrocarbon Analyzer (THCA), a Beckman Model 6800, was calibrated first using calibration gases in tanks - 1% CH_4 and 1% CO. Several calibrations were made on the gas chromatograph (the THC), each time using the proper attenuation setting of the analyzer for each gas. Then the gas in a compartment was analyzed with the THCA for total hydrocarbons, CO, and CH_4. After the THC analysis was completed, the calibration was repeated. The calibration readings were averaged for a value for a specific gas - THC, CO and CH_4.

Sampling Procedure

After the sample has been analyzed via the THCA, samples were taken using the seven sampling trains noted in Figure B-3. First values 1 and 3 were open to acquire two grab samples; one was in a 250 ml glass bottle to be analyzed for H_2, O_2, N_2 and CO_2; and a second was in pre-evacuated 2 liter flasks to be analyzed for NO_x. Upon acquiring these two grab samples their valves were closed, and valves 2, 4, 5, 6, and 7 were opened and five additional samples were then obtained via their respective trains.

Train 2, which was used to collect H_2S, consisted of a bell jar on a base. Inside the bell jar was a bubbler, which in turn was inside a polyethylene bottle. The bubbler solution was 15 ml of $CdSO_4$ (140 g $CdSO_4 \cdot 8/3\ H_2O$ in 1 liter of H_2O).

Train 4, which was used to collect NH_3, consisted of two impingers in series, each with 15 ml of 1N H_2SO_4 (27.7 ml con/liter). The solutions from each bubbler were combined to make one sample.

Train 5, which was used to collect HCN, also comprised of two impingers in series, each with 15 ml 0.5 N KOH (28 g/liter). Again, the solutions were combined to make one sample.

Train 6, which was used to collect hydrocarbons, comprised of two impingers in series, each with 15 ml of ethylene glycol. The two solutions were combined to make one sample.

Train 7, which was used to collect SO_2, comprised of a bubbler with 15 ml solution of 80% IPA (800 ml IPA and 200 H_2O) and glass wool packed in the exit tube, followed by an impinger with 15 ml solution of 3% H_2O_2 (100 ml 30%, make to 1 liter). The H_2O_2 solution was prepared each day. After the sample was taken, the solution of the impinger was transferred to another polyethylene bottle. The solution of the bubbler was discarded. The connecting tube and impinger were rinsed and the rinse added to the sample.

Each day a flowmeter was placed in each line to check the flow. If it was not correct, the needle (critical orifice) was replaced with one that provided the proper flow rate. The flow rate was approximately 310 ml/min for Trains 2, 4, 5, 6, and 7.

All samples taken with the seven sampling trains were shipped to MRI in Kansas City where they were analyzed. The samples processed by the Total Hydrocarbon Analyzer Set-Up were analyzed in the field for THC, CO and CH_4.

RESULTS

There were basically two types of samples taken - particulate and gas. These are summarized in chronological order in Table B-1, which provides the dates of the runs, the run numbers, the type of car sampled during a run, the location of the sampling points, type of sample, what the sample was analyzed for, and remarks.

Particulate Analyses

The samples that were taken using the Particulate Sampling System provided three basic types of samples - filter, rinses, and Andersen front, tip-cylcone-Andersen back, impinger water, impinger-water rinse, and probe.

The general scheme used in the laboratory to prepare the field samples for the various analyses is shown in Figure B-5.

The general procedure used in the laboratory processing of the mass particulate samples, including the Andersen plates (Item 9 below) was:

1. Beakers were washed with concentrated nitric acid, carefully washed with deionized water.
2. The beakers were then put in an oven and left for one hour at 100°C.
3. The beakers were desiccated for 48 hours, and then weighed.
4. Filters and rinses (including Andersen front and back catches) were put in separate beakers.
5. Filters were transferred to a desiccator for 48 hours and then weighed.
6. All acetone rinses were transferred to beakers, and their previous containers rinsed and this additional rinse was then added to the transferred solution.
7. These solutions were desiccated for 48 hours and then weighed.
8. Impinger water catches were placed in steam baths to evaporate; the evaporated results were desiccated for 49 hours and then weighed.
9. The Andersen plates were dried in an oven and then weighed.

TABLE B-1

SUMMARY OF SAMPLES TAKEN IN THE FIELD

Date	Run No.	Type of Car	Location	Type of Sample	Analysis	Remarks
19 Jun 73	W-1	Wilputte	3 Guides	Gas Particulate	Mass loading	No gas sample
21 Jun 73	W-2	Wilputte	1 Stack, 1 Guide	Gas Particulate	H_2S, NH_3, CN, Phenol, SO_2, Pyridine, H_2, Mass loading	
22 Jun 73	W-3	Wilputte	1 Stack, 1 Guide	Gas Particulate	H_2S, NH_3, CN, phenol, SO_2, Pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, mass loading	
25 Jun 73	W-4	Wilputte	1 Stack, 1 Guide	Gas Particulate	H_2S, NH_3, CN, phenol, SO_2, Pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, mass loading	
26 Jun 73	W-5	Wilputte	1 Stack, 1 Guide	Gas Particulate	H_2S, NH_3, CN, phenol, SO_2, Pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, mass loading	
28 Jun 73	W-6	Wilputte	3 Stacks	Gas Particulate	H_2S, NO_x, NH_3, CN, phenol, SO_2, pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, Tar, Benzo-alpha-pyridine, mass loading, elemental particle size distribution by mass ranges	

TABLE B-1 (CONTINUED)

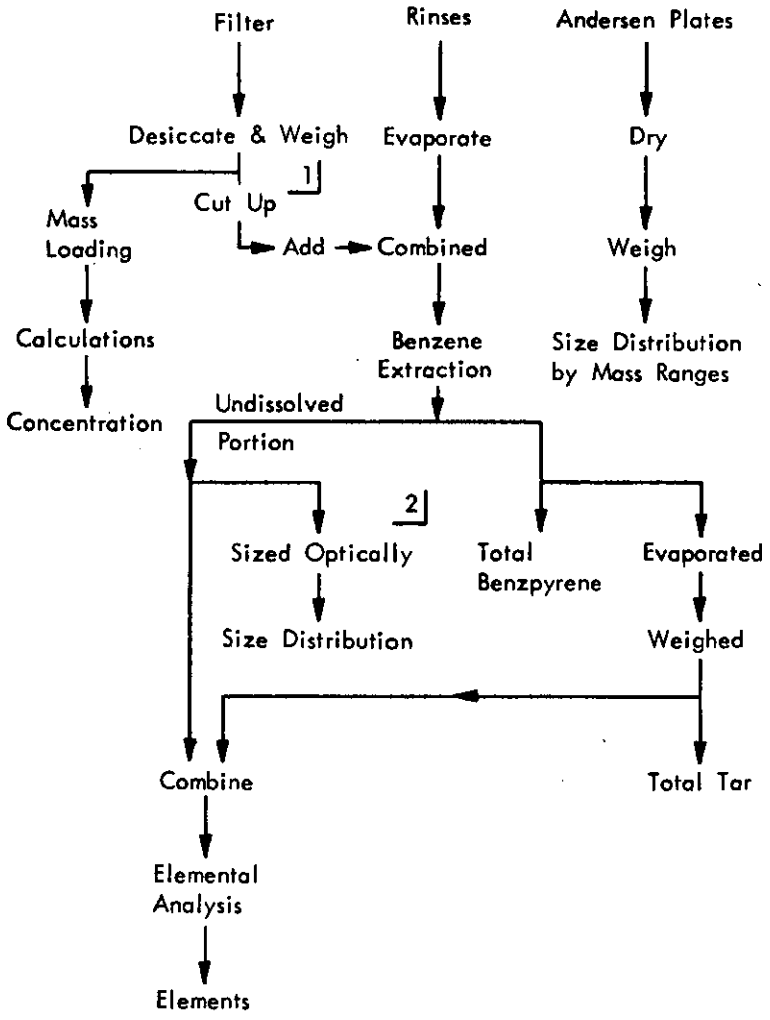
Date	Run No.	Type of Car	Location	Type of Sample	Analysis	Remarks
29 Jun 73	W-7	Wilputte	3 Stacks	Gas Particulate	H_2S, NO_x, NH_3, CN, phenol, SO_2, pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, Tar, Benzo-alpha-pyridine, mass loading, elemental, particle sizing, particle size distribution by mass ranges	
2 Jul 73	W-8	Wilputte	3 Stacks	Gas Particulate Coal	Tar, Benzo-alpha-pyridine, mass loading, elemental, Andersen, ultimate, proximate and size	No gas
3 Jul 73	W-9	Wilputte	3 Stacks	Gas Particulate	O_2, N_2, CO_2, H_2, Tar Benzo-alpha-pyridine, mass loading, elemental, particle size distribution by mass ranges	No gas
4 Jul 73	W-10	Wilputte	3 Guides	Gas Particulate Coal	NH_3, CN, phenol, SO_2, pyridine, O_2, N_2, CO_2, H_2, mass loading, tar, benzo-alpha-pyridine, elemental, particle size distribution by mass ranges, ultimate, proximate and size	

TABLE B-1 (CONTINUED)

Date	Run No.	Type of Car	Location	Type of Sample	Analysis	Remarks
5 Jul 73	W-11	Wilputte	3 Guides	Gas Particulate	H_2S, NO_x, CN, phenol, SO_2, pyridine, NH_3, O_2, N_2, CO_2, H_2, mass loading, tar, benzo-alpha-pyridine, elemental, particle sizing, particle size distribution by mass ranges	
13 Aug 73	K-1		2 Guides	Gas Particulate	H_2S, NH_3, CN, phenol, SO_2, pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, mass loading	
14 Aug 73	K-2		3 Guides	Gas Particulate	Mass loading, particle size distribution by mass ranges	No gas
15 Aug 73	K-3		3 Guides	Gas Particulate	H_2S, NH_3, CN, phenol, SO_2, pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, mass loading, particle size, particle size distribution by mass ranges	
16 Aug 73	W-12	Wilputte	1 Stack	Gas Particulate Coal	H_2S, NO_x, CH, phenol, SO_2, pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2, mass loading, particle size distribution by mass ranges, ultimate, proximate and size	

TABLE B-1 (CONCLUDED)

Date	Run No.	Type of Car	Location	Type of Sample	Analysis	Remarks
16 Aug 73	LD-I	Leaking Door	Door	Gas	H_2S, NH_3, CN, phenol, SO_2, pyridine, O_2, N_2, CO_2, H.C., CH_4, CO, H_2	
17 Aug 73	K-4	AISI/EPA	3 Guides	Gas Particulate Coal	H_2S, NH_3, CN, phenol, SO_2, pyridine, O_2, N_2, CO_2, H.S., CH_4, CO, H_2, mass loading, particle size distribution by mass ranges, ultimate, proximate and size	



1 For those Filter Samples used in the Benzene Extraction
2 Samples without Filters Added

FIGURE B-5

MASS-PARTICULATE SAMPLE PROCESS

The results from this processing of mass-particulate sampler gave mass evaluating data. These data were then processed mathematically to provide mass-concentration results.

Tables B-2 through B-4 provide a summary of mass data. Table B-2 gives field data for each run; Table B-3 gives results of analytical processing of the field samples; and Table B-4 gives mass results

The flow rate, or sample rate in dcfm stack conditions, given in column 12 of Table B-2, was calculated as follows:

$$\text{Flow Rate} = \text{Calibration Rate (cfm)} \times \frac{460 + \text{Stack Temp.}}{460 + \text{Cal. Temp.}} \quad \text{(B-1)}$$

$$\times \frac{29.41 \text{ in. Hg (Cal. Pressure)}}{\text{Static Pressure}} .$$

An example is W1-5 where

$$\text{Flow Rate} = 0.140 \times \frac{460 + 110}{460 + 87} \times \frac{29.41}{29.43} = 0.146 \text{ dcfm} . \quad \text{(B-2)}$$

The tip velocity given in column 13 of Table accordingly.

$$\text{Tip Velocity (FPS)} = \frac{\text{Flow Rate ft}^3/\text{min}}{\text{Tip Area ft}^2} \cdot \frac{1}{60} \frac{\text{sec}}{\text{min}} \quad \text{(B-3)}$$

An example is W1-5 where,

$$\text{Tip Velocity} = \frac{0.146}{0.0008553} \times \frac{1}{60} = 2.84 \text{ fps} . \quad \text{(B-4)}$$

The values of the masses given in columns 2 through 11 of Table B-3 are those obtained from weighing the individual samples processed at MRI laboratories. The weights are given in milligrams. Mass concentrations given in Table B-4 are in grain s per actual cubic foot (gpacf), grains per dry standard cubic foot (gpdscf) and in percentage, where

TABLE B-2

MASS RESULTS - FIELD DATA

Mass Test No.	Cyclone Size L,S	Vacuum Gauge No.	Sample Tip No.	Sample Tip Area (ft^2)	Orifice Size	Calibration Orifice Rate at 10 in. Hg (dcfm)	Calibration 29.41 in. Hg Temp. (°F)	Orifice No.[a]	Stack Temp. Avg. (°F)[b]	MRI Stack Pressure (bar.) in. Hg	Sample Rate at Stack Cond. (dcfm)	Tip Velocity (fps)	Plugging	Emission Point	Sample Time (min)
W1-5	L	5	5	0.0008553	S	0.140	87	T5-1	110	29.43	0.146	2.84		5	2.00
-6	L	6	6	0.0008435	S	0.138	73	T6-1	160	29.43	0.160	3.17		6	2.00
W2-2	S	1	1	0.0008607	S	0.134	69	T1-1	80	29.50	0.137	2.65		2	1.45
-5	L	4	4	0.0008781	S	0.136	94	T4-1	112	29.50	0.140	2.66		5	1.45
W3-3	S	3	3	0.0008564	S	0.141	92	T3-1	120	29.50	0.148	2.87		1	1.93
-6	L	6	6	0.0008435	S	0.138	73	T6-1	114	29.50	0.148	2.93		4	1.93
W4-2	S	1	2	0.0008563	S	0.134	69	T1-1	166	29.38	0.159	3.09		2	2.80
-5	L	4	5	0.0008553	S	0.136	94	T4-1	129	29.38	0.145	2.82		5	2.80
W5-2	S	1	2	0.0008563	S	0.134	69	T1-1	400[c]	29.44	0.218	4.24		3	1.37
-5	L	4	5	0.0008553	S	0.136	94	T4-1	400[c]	29.44	0.211	4.11	25 in.	6	1.37
W6-2	S	3	3	0.0008564	M	0.338	95	T3-2	650	29.15	0.682	13.27		3	1.83
-3	And.	2	1	0.0008607	M	0.322	89	T2-2	180	29.15	0.379	7.33		1	1.83
-6	L	1	2	0.0008563	M	0.328	77	T1-2	500	29.15	0.592	11.52	15 in.	2	1.83
W7-2	S	3	3	0.0008564	M	0.338	95	T3-2	358	29.23	0.495	9.63		3	2.05
-3	S	2	2	0.0008563	M	0.322	89	T2-2	594	29.23	0.646	12.56		1	2.05
-6	And.	1	1	0.0008607	M	0.328	77	T1-2	143	29.23	0.371	7.18	~	2	2.05
W8-2	And.	3	1	0.0008607	M	0.338	95	T3-2	189	29.48	0.394	7.64		3	1.63
-3	S	2	3	0.0008564	M	0.322	89	T2-2	186	29.48	0.378	7.36		1	1.63
-6	L	1	2	0.0008563	M	0.328	77	T1-2	128	29.48	0.358	6.97		2	1.63
W9-2	S	3	2	0.0008563	M	0.338	95	T3-2	290	29.52	0.455	8.86		3	2.53
-3	And.	2	3	0.0008564	M	0.322	89	T2-2	120	29.52	0.339	6.60		1	2.53
-6	L	1	1	0.0008607	M	0.328	77	T1-2	130	29.52	0.359	6.95	~	2	2.53
W10-2	And.	3	3	0.0008564	S	0.141	92	T3-1	760	29.27	0.313	6.09		6	2.03
-3	S	1	1	0.0008607	S	0.134	69	T1-1	135	29.27	0.151	2.93		4	2.03
-6	L	2	2	0.0008563	S	0.134	85	T2-1	120	29.27	0.143	2.79		5	2.03
W11-2	S	3	3	0.0008564	S	0.141	92	T3-1	690	29.34	0.294	5.73		6	2.03
-3	S	1	1	0.0008607	S	0.134	69	T1-1	175	29.34	0.161	3.12		4	2.03
-6	And.	2	2	0.0008563	S	0.134	85	T2-1	190	29.34	0.160	3.12		5	2.03
W-12-2	And.	3	3	0.0008564	L	0.447	98	T3-3[d]	181	29.42	0.513	9.99		2	2.33
K1-3	-	2	2	0.0008563	L	0.434	94	T2-3	128	29.40	0.461	8.97	15 in.	2	4.20
-6	-	1	1	0.0008607	L	0.397	84	T1-3	132	29.40	0.432	8.37		1	4.20
K2-2	-	3	2	0.0008563	L	0.447	98	T3-3	85	29.25	0.439	8.54		3	2.67
-3	And.	2	3	0.0008564	L	0.434	94	T2-3	120	29.25	0.457	8.89		2	2.67
K3-2	And.	3	3	0.0008564	L	0.447	98	T3-3	450	29.25	0.733	14.26	~	3	4.90
-3	-	2	2	0.0008563	L	0.434	94	T2-3	130	29.25	0.441	8.58		2	4.90
-6	-	1	1	0.0008607	L	0.397	84	T1-3	165	29.25	0.459	8.88		1	4.90
K4-2	S	3	3	0.0008564	L	0.447	98	T3-3	249	29.52	0.566	11.01		3	2.47
-3	S	2	2	0.0008563	L	0.397	84	T1-3	114	29.52	0.417	8.12		2	2.47
-6	And.	1	1	0.0008607	L	0.434	94	T2-3	100	29.52	0.437	8.46		1	2.47

Total: 16

a/ The last digit indicates size of orifice: 1 for small; 2 for medium; and 3 for large.
b/ MITRE reported value.
c/ Potentially inaccurate temperature.
d/ Assumed--changed pumps at last minute.

TABLE B-3

MASS ANALYTICAL RESULTS

Mass Test No.	Filter Mass (mg)	Tip, Cyclone, Front Andersen Mass (mg)	Imp. Water Mass (mg)	Imp. Rinse Mass (mg)	Probe Rinse Mass (mg)	Andersen Plates Mass [a] (mg)	Andersen Back Mass (mg)	Total Solid Mass (mg)	Total Condensed Mass (mg)	Combined Total Mass [a] (mg)
W1-5	3.1	42.7	-	-	-	-	-	45.8	-	45.8
-6	2.6	45.0	-	-	-	-	-	47.6	-	47.6
W2-2	4.6	25.7	-	-	-	-	-	30.3	-	30.3
-5	20.5	31.6	-	-	-	-	-	52.1	-	52.1
W3-3	0.9	17.9	6.2	41.9	-	-	-	18.8	48.1	66.9
-6	3.0	18.4	4.3	36.3	-	-	-	21.4	40.6	62.0
W4-2	49.7	202.9	18.8	45.5	-	-	-	252.6	64.3	316.9
-5	22.9	12.8	52.2	23.8	-	-	-	35.7	76.0	111.7
W5-2	3.5	132.1	36.4	41.3	-	-	-	135.6	77.7	213.4
-5	21.5	11.0	13.6	71.5	28.5	-	-	32.5	85.1	117.6
W6-2	11.5	127.9	7.1	73.8	-	-	-	135.6	77.7	213.4
-3	9.3	31.3	126.1	59.5	24.3	149.8	12.7	203.1	209.9	412.9
-6	7.5	176.0	19.2	58.1	25.9	-	-	183.5	103.2	286.6
W7-2	26.1	245.4	177.5	83.0	-	-	-	271.5	260.5	532.0
-3	21.8	124.1	132.4	79.6	-	-	-	145.9	212.0	357.8
-6	5.8	21.0	11.5	35.9	-	87.7	10.1	124.6	47.4	172.1
W8-2	19.7	278.1	72.1	79.3	-	665.3	20.7	983.8	151.4	1,135.1
-3	7.0	58.5	80.1	98.9	11.6	-	-	65.5	190.6	255.9
-6	13.9	69.3	11.7	91.8	20.2	-	-	83.1	123.7	206.7
W9-2	25.7	332.5	48.4	72.7	-	-	-	358.2	121.1	479.2
-3	4.5	6.2	143.9	72.5	9.0	25.2	6.4	42.3	225.4	267.7
-6	49.0	247.6	238.8	80.5	8.6	-	-	296.6	327.9	624.4
W10-2	5.4	22.8	-	-	-	30.6	4.0	62.8	-	62.8
-3	23.1	28.7	-	-	-	-	-	51.8	-	51.8
-6	6.0	78.4	-	-	-	-	-	84.4	-	84.4
W11-2	24.6	35.9	-	-	9.3	-	-	60.5	9.3	69.8
-3	22.5	24.2	-	-	9.2	-	-	46.7	9.2	55.9
-6	4.0	21.3	-	-	15.3	13.8	3.1	42.2	15.3	57.4
W12-2	8.6	70.3	6.3	39.5	11.8	176.0	4.5	259.4	57.6	317.0
K1-3	3.1	28.9	1.3	66.4	-	63.5	13.5	109.0	67.7	176.7
-6	18.1	13.0	2.1	72.1	20.9	-	-	31.1	95.1	126.2
K2-2	103.9	36.0	6.3	42.5	17.3	-	-	139.9	66.1	206.0
-3	1.9	20.2	-	-	-	22.2	5.8	50.1	-	50.1
K3-2	35.2	614.5	27.9	32.3	38.8	2,018.0	7.3	2,675.0	99.0	2,774.0
-3	56.1	7.0	5.9	41.5	16.2	-	-	63.1	63.6	126.7
-6	2.4	7.2	2.1	49.2	-	-	-	9.6	51.3	60.9
K4-2	90.2	118.5	8.0	-	-	-	-	208.7	8.0	216.7
-3	0.0	12.3	0.6	-	-	-	-	12.9	0.6	12.3
-6	0.0	3.3	0.4	-	-	-	-	3.3	0.4	3.7
Total	731.2	3,404.6	1,290.5	1,456.9	238.4	3,252.1	88.1	7,476.0	2,985.8	10,461.1

a/ Mass measurements made at MRI, not in field.

TABLE B-4

MASS CONCENTRATION RESULTS

Mass Test No.	Conc. Solids (gpacf)[a]	Conc. Condens. (gpacf)[a]	Conc. Combined Mass (gpacf)[a]	Sample Volume (acf)	Sample Volume (scf)	Conc. Solids (gpdscf)[b]	Conc. Condens. (gpdscf)[b]	Combined Mass (gpdscf)[b]	Solids-Filter (%)	Solids-Tip-Cyc. (%)	Solids-And. Fl. (%)	Solids-And. Back (%)	Total Filter (%)	Total Tip-Cyc. (%)	Total Imp. H_2O (%)	Total Imp. Rinse (%)	Total Probe (%)	Total And. Fl. (%)	Total And. Back (%)
W1-5	2.420	-	2.420	0.292	0.267	2.647	-	2.647	6.8	93.2	-	-	6.8	93.2	-	-	-	-	-
-6	2.295	-	2.295	0.320	0.269	2.730	-	2.730	5.5	94.5	-	-	5.5	94.5	-	-	-	-	-
W2-2	2.349	-	2.349	0.199	0.193	2.422	-	2.422	15.2	84.8	-	-	15.2	84.8	-	-	-	-	-
-5	3.960	-	3.960	0.203	0.185	4.345	-	4.345	39.3	60.7	-	-	39.3	60.7	-	-	-	-	-
W3-3	1.014	2.595	3.609	0.286	0.258	1.124	2.877	4.001	4.8	95.2	-	-	1.3	26.8	9.3	62.6	-	-	-
-6	1.155	2.190	3.345	0.286	0.261	1.266	2.400	3.665	14.0	86.0	-	-	4.8	29.7	6.9	58.6	-	-	-
W4-2	8.759	2.230	10.988	0.445	0.370	10.534	2.682	13.215	19.7	80.3	-	-	15.7	64.0	5.9	14.4	-	-	-
-5	1.357	2.888	4.245	0.406	0.359	1.535	3.266	4.801	64.1	35.9	-	-	20.5	11.5	46.7	21.3	-	-	-
W5-2	6.988	4.010	11.008	0.299	0.181	11.560	6.624	18.184	2.6	97.4	-	-	1.6	61.9	17.1	19.4	-	-	-
-5	1.735	4.544	6.279	0.289	0.175	2.865	7.504	10.369	66.2	33.8	-	-	18.3	9.3	11.6	60.8	-	-	-
W6-2	1.677	0.961	2.638	1.248	0.581	3.602	2.064	5.666	2.6	97.4	-	-	1.6	61.9	17.1	19.4	-	-	-
-3	4.516	4.667	9.180	0.694	0.560	5.597	5.784	11.377	4.6	15.4	73.7	6.3	2.3	7.6	30.5	14.4	5.9	36.3	3.0
-6	2.614	1.470	4.083	1.083	0.583	4.856	2.731	7.585	4.1	95.9	-	-	2.6	61.4	6.7	20.3	9.0	-	-
W7-2	4.127	3.960	8.087	1.015	0.642	6.525	6.261	12.786	9.6	90.4	-	-	4.9	46.1	33.4	15.6	-	-	-
-3	1.700	2.471	4.170	1.324	0.650	3.463	5.033	8.494	14.9	85.1	-	-	6.1	34.7	37.0	22.2	-	-	-
-6	2.526	0.961	3.489	0.761	0.653	2.944	1.120	4.066	4.7	16.9	70.4	8.0	3.4	12.2	6.7	20.9	-	51.0	5.8
W8-2	23.645	3.639	27.281	0.642	0.517	29.362	4.519	33.877	2.0	28.3	67.6	2.1	1.7	24.5	6.4	7.0	-	58.6	1.8
-3	1.641	4.774	6.415	0.616	0.498	2.030	5.905	7.935	10.7	89.3	-	-	2.7	22.9	31.3	38.6	4.5	-	-
-6	2.196	3.268	5.464	0.584	0.519	2.471	3.677	6.148	16.7	83.3	-	-	6.7	33.5	5.7	44.3	9.8	-	-
W9-2	4.802	1.623	6.424	1.515	0.802	6.892	2.329	9.219	7.2	92.8	-	-	5.4	69.3	10.1	15.2	-	-	-
-3	0.761	4.054	4.814	0.858	0.774	0.844	4.494	5.336	10.6	14.7	59.6	15.1	1.7	2.3	53.7	27.1	3.4	9.4	2.4
-6	5.040	5.572	10.610	0.908	0.805	5.685	6.285	11.968	16.5	83.5	-	-	7.8	39.7	38.2	12.9	1.6	-	-
W10-2	1.526	-	1.526	0.635	0.270	3.589	-	3.589	8.6	36.3	48.7	6.4	8.6	36.3	-	-	-	48.7	6.4
-3	2.603	-	2.603	0.307	0.268	2.982	-	2.982	44.6	55.4	-	-	44.6	55.4	-	-	-	-	-
-6	4.491	-	4.491	0.290	0.259	5.029	-	5.029	7.1	92.9	-	-	7.1	92.9	-	-	-	-	-
W11-2	1.564	0.240	1.804	0.597	0.270	3.458	0.531	3.989	40.7	59.3	-	-	35.2	51.4	-	-	13.3	-	-
-3	2.204	0.434	2.638	0.327	0.268	2.689	0.530	3.219	48.2	51.8	-	-	40.3	43.3	-	-	16.4	-	-
-6	2.004	0.726	2.725	0.325	0.260	2.505	0.908	3.405	9.5	50.5	32.7	7.3	7.0	37.0	-	-	26.6	24.0	5.4
W12-2	3.349	0.744	4.093	1.195	0.972	4.117	0.915	5.032	3.3	27.1	67.9	1.7	2.7	22.2	2.0	12.3	3.7	55.5	1.4
K1-3	0.869	0.540	1.408	1.936	1.715	0.981	0.610	1.589	2.8	26.5	58.3	12.4	1.8	16.4	0.7	37.6	-	35.9	7.6
-6	0.265	0.809	1.073	1.814	1.596	0.301	0.920	1.220	58.2	41.8	-	-	14.3	10.3	1.7	57.1	16.6	-	-
K2-2	1.842	0.870	2.712	1.172	1.114	1.938	0.915	2.853	74.3	25.7	-	-	50.4	17.5	3.1	20.6	8.4	-	-
-3	0.634	-	0.634	1.220	1.090	0.710	-	0.710	3.8	40.3	44.3	11.6	3.8	40.3	-	-	-	44.3	11.6
K3-2	11.491	0.425	11.916	3.592	2.045	20.184	0.747	20.930	1.3	23.0	75.4	0.3	1.3	22.1	1.0	1.2	1.4	72.7	0.3
-3	0.451	0.454	0.905	2.161	1.898	0.513	0.517	1.030	88.9	11.1	-	-	44.3	5.5	4.6	32.8	12.8	-	-
-6	0.066	0.352	0.418	2.249	1.864	0.080	0.425	0.504	25.0	75.0	-	-	3.9	11.8	3.5	80.8	-	-	-
K4-2	2.303	0.088	2.392	1.398	1.031	3.123	0.119	3.243	43.2	56.8	-	-	41.6	54.7	3.7	-	-	-	-
-3	0.184	0.009	0.193	1.030	0.938	0.202	0.010	0.212	0.0	100.0	0.0	0.0	-	95.3	4.7	-	-	-	-
-6	0.047	0.006	0.053	1.080	1.008	0.050	0.006	0.057	0.0	100.0	0.0	0.0	-	89.2	10.8	-	-	-	-

a/ These are in grains per actual cu ft.

b/ These are in grains per dry standard cu ft.

$$1 \text{ grain} = \frac{1 \text{ gram}}{15.4324} .$$

Size Analysis - The results of the Andersen analyses performed in the field are listed in Table B-5 to B-15. These distributions are based on anisokinetic sampling and an assumed density of 1 gm/cc. The final distribution was determined using these values corrected to a 1.2 gm/cc density and applying corrections discussed in the body of this report. The distribution was combined with data from the MITRE Carrousel to produce a distribution over the entire range.

The analyses to follow were performed and reported by sample number. Table B-16 is a cross reference of sample number and test location numbers. The particle size distribution of five samples was determined by photomicrography and statistical analysis. Sample 1222 was from the Andersen plates (K3-2). The other four samples were the probe tip and cyclone particles from runs W7-2 (sample 1051), W8-3 (1072), W8-6 (1076), and W11-2 (1109).

After the tar was removed by benzene extraction and the sample dried, the particles were ultrasonically dispersed in isopropyl alcohol. A glass dropper was used to transfer the dispersion onto a glass microscope slide. After the alcohol had evaporated, the particles and a calibrated optical stage micrometer were photographed at several magnifications. The photographs at each magnification were then calibrated for log-increment particle sizing. Every particle which could be sized was counted and the total area of the field of view was calculated. The particle was measured by using Feret's diameter: the horizontal length between two vertical tangents on the particle's outline.

The values from the photographs are ΣN (the total number of the particles sized at each size increment) and A (the total area in the field of view in mm^2). The log increments used for the sizing are coded:

No. 0 = 2.3 - 4.6 μ
No. 1 = 4.6 - 9.2 μ
No. 2 = 9.2 - 18.4 μ
No. 3 = 18.4 - 36.8 μ

TABLE B-5

ANDERSEN ANALYSIS SUMMARY

Run Number W6-3 Assumed Density = 1.000 Sampling Rate = .37900 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.03132	18.18	18.18		
/0	.01713	9.94	28.13		
0/1	.01775	10.31	38.44	29.18	15.81
1/2	.00667	3.87	42.31	54.42	9.88
2/3	.00287	1.67	43.98	90.79	6.70
3/4	.00341	1.98	45.96	150.09	4.57
4/5	.01113	6.46	52.42	266.82	2.94
5/6	.02804	16.28	68.60	645.64	1.48
6/7	.02115	12.28	80.98	1176.68	.92
7/8	.01079	6.26	87.24	2353.35	.63
Throughput	.02197	12.76	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.03132
2.	Plates (and Rings)	.11894
3.	Andersen Outlet and Filter Holder Inlet	.01270
4.	Filter Backup	.00927
	TOTAL	.17223

TABLE B-6

ANDERSEN ANALYSIS SUMMARY

Run Number W7-6 Assumed Density = 1.000 Sampling Rate = .37100 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.02103	20.11	20.11		
/0	.00301	2.88	22.98		
0/1	.00373	3.57	26.44	28.57	15.98
1/2	.00099	.95	27.50	53.27	9.98
2/3	.00160	1.53	29.02	88.88	6.78
3/4	.00081	.77	29.80	146.92	4.62
4/5	.01437	13.74	43.54	261.19	2.98
5/6	.02717	25.98	69.51	632.01	1.50
6/7	.01106	10.57	80.09	1151.84	.93
7/8	.00488	4.67	84.75	2303.68	.63
Throughput	.01595	15.25	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.02103
2.	Plates (and Rings)	.06762
3.	Andersen Outlet and Filter Holder Inlet	.01014
4.	Filter Backup	.00581
	TOTAL	.10460

TABLE B-7

ANDERSEN ANALYSIS SUMMARY

Run Number W8-2 Assumed Density = 1.000 Sampling Rate = .39400 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.27806	30.99	30.99		
/0	.13738	15.31	46.31		
0/1	.09878	11.01	57.32	30.34	15.51
1/2	.05430	6.05	63.37	56.57	9.69
2/3	.12221	13.62	76.99	94.39	6.57
3/4	.03954	4.41	81.40	156.03	4.48
4/5	.00665	.74	82.14	277.38	2.89
5/6	.00217	.24	82.38	671.19	1.45
6/7	.01607	1.79	84.17	1223.25	.90
7/8	.10160	11.32	95.50	2446.49	.61
Throughput	.04038	4.50	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.27806
2.	Plates (and Rings)	.57870
3.	Andersen Outlet and Filter Holder Inlet	.02073
4.	Filter Backup	.01965
	TOTAL	.89714

TABLE B-8

ANDERSEN ANALYSIS SUMMARY

Run Number W9-3 Assumed Density = 1.000 Sampling Rate = .33900 CFM
Imp. Eff. C .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.00616	28.48	28.48		
/0	.00025	1.16	29.63		
0/1	.00037	1.71	31.35	26.10	16.72
1/2	.00023	1.06	32.41	48.68	10.45
2/3	.00016	.74	33.15	81.21	7.09
3/4	.00022	1.02	34.17	134.25	4.84
4/5	.00019	.88	35.04	238.66	3.12
5/6	.00026	1.20	36.25	577.50	1.57
6/7	.00106	4.90	41.15	1052.49	.97
7/8	.00183	8.46	49.61	2104.98	.67
Throughput	.01090	50.39	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.00616
2.	Plates (and Rings)	.00457
3.	Andersen Outlet and Filter Holder Inlet	.00644
4.	Filter Backup	.00446
	TOTAL	.02163

TABLE B-9

ANDERSEN ANALYSIS SUMMARY

Run Number W10-2 Assumed Density = 1.000 Sampling Rate = 3.1100 CFM
Imp. Eff. C .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.02274	53.06	53.06		
/0	.00224	5.22	58.28		
0/1	.00124	2.89	61.17	23.95	17.46
1/2	.00045	1.05	62.22	44.66	10.91
2/3	.00074	1.73	63.95	74.50	7.41
3/4	.00081	1.89	65.83	123.16	5.06
4/5	.00150	3.50	69.33	218.95	3.26
5/6	.00117	2.73	72.06	529.80	1.64
6/7	.00123	2.87	74.93	965.56	1.02
7/8	.00133	3.10	78.03	1931.11	.70
Throughput	.00942	21.97	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.02275
2.	Plates (and Rings)	.01071
3.	Andersen Outlet and Filter Holder Inlet	.00401
4.	Filter Backup	.00541
	TOTAL	.04288

TABLE B-10

ANDERSEN ANALYSIS SUMMARY

Run Number W11-6 Assumed Density = 1.000 Sampling Rate = .16000 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.02130	55.67	55.67		
/0	.00138	3.61	59.28		
0/1	.00092	2.40	61.68	12.32	24.38
1/2	.00059	1.54	63.23	22.97	15.25
2/3	.00028	.73	63.96	38.33	10.36
3/4	.00033	.86	64.82	63.36	7.08
4/5	.00052	1.36	66.18	112.64	4.57
5/6	.00317	8.29	74.46	272.56	2.32
6/7	.00083	2.17	76.63	496.75	1.45
7/8	.00188	4.91	81.55	993.50	1.00
Throughput	.00706	18.45	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.02130
2.	Plates (and Rings)	.00990
3.	Andersen Outlet and Filter Holder Inlet	.00306
4.	Filter Backup	.00400
	TOTAL	.03826

TABLE B-11

ANDERSEN ANALYSIS SUMMARY

Run Number W12-2 Assumed Density = 1.000 Sampling Rate = .51300 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.07030	28.66	28.66		
/0	.03081	12.56	41.21		
0/1	.01589	6.48	47.69	39.50	13.58
1/2	.00494	2.01	49.70	73.66	8.48
2/3	.00279	1.14	50.84	122.89	5.75
3/4	.00666	2.71	53.56	203.15	3.92
4/5	.02686	10.95	64.50	361.15	2.52
5/6	.04880	19.89	84.40	873.91	1.26
6/7	.01579	6.44	90.83	1592.70	.78
7/8	.00939	3.83	94.66	3185.41	.53
Throughput	.01310	5.34	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.07030
2.	Plates (and Rings)	.16193
3.	Andersen Outlet and Filter Holder Inlet	.00450
4.	Filter Backup	.00860
	TOTAL	.24533

TABLE B-12

ANDERSEN ANALYSIS SUMMARY

Run Number K2-3 Assumed Density = 1.000 Sampling Rate = .40800 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.02020	53.34	53.34		
/0	.00082	2.17	55.51		
0/1	.00118	3.12	58.62	31.41	15.24
1/2	.00135	3.56	62.19	58.58	9.52
2/3	.00105	2.77	64.96	97.74	6.46
3/4	.00079	2.09	67.05	161.57	4.41
4/5	.00057	1.51	68.55	287.24	2.83
5/6	.00058	1.53	70.08	695.04	1.42
6/7	.00110	2.90	72.99	1266.71	.88
7/8	.00253	6.68	79.67	2533.42	.60
Throughput	.00770	20.33	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.02020
2.	Plates (and Rings)	.00997
3.	Andersen Outlet and Filter Holder Inlet	.00580
4.	Filter Backup	.00190
	TOTAL	.03787

TABLE B-13

ANDERSEN ANALYSIS SUMMARY

Run Number K3 Assumed Density = 1.000 Sampling Rate = .73700 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.61450	27.25	27.25		
/0	.14283	6.33	33.58		
0/1	.06389	2.83	36.41	56.75	11.32
1/2	.02960	1.31	37.73	105.82	7.06
2/3	.03133	1.39	39.12	176.55	4.79
3/4	.04349	1.93	41.04	291.04	3.26
4/5	.42756	18.96	60.00	518.86	2.09
5/6	.59124	26.22	86.22	1255.50	1.04
6/7	.20889	9.26	95.48	2288.15	.64
7/8	.05940	2.63	98.12	4576.30	.43
Throughput	.04250	1.88	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.61450
2.	Plates (and Rings)	1.59823
3.	Andersen Outlet and Filter Holder Inlet	.00730
4.	Filter Backup	.03520
	TOTAL	2.25523

TABLE B-14

ANDERSEN ANALYSIS SUMMARY

Run Number K3-R Assumed Density = 1.000 Sampling Rate = .73700 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.61450	21.63	21.63		
/0	.15378	5.41	27.04		
0/1	.07244	2.55	29.60	56.74	11.32
1/2	.09818	3.46	33.05	105.82	7.06
2/3	.24013	8.45	41.51	176.55	4.70
3/4	.07001	2.46	43.97	291.86	3.26
4/5	.44770	15.76	59.73	518.86	2.09
5/6	.70969	24.98	84.72	1255.50	1.04
6/7	.22477	7.91	92.63	2288.15	.64
7/8	.16680	5.87	98.50	4576.30	.43
Throughput	.04250	1.50	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.61450
2.	Plates (and Rings)	2.18350
3.	Andersen Outlet and Filter Holder Inlet	.00730
4.	Filter Backup	.03520
	TOTAL	2.84050

TABLE B-15

ANDERSEN ANALYSIS SUMMARY

Run Number K4 Assumed Density = 1.000 Sampling Rate = .44800 CFM
Imp. Eff. C = .140

Stage/Plate	Sample Weight (GM)	PLATES, T-P AND CONE-TIP Wt. %	Cum. %	Jet Vel. (CM/S)	Partic. Diam. (MICR)
Cone-Tip	.00330	61.57	61.57		
/0	.00145	27.05	88.62		
0/1	.00004	.75	89.37	34.49	14.54
1/2	.00008	1.49	90.86	64.33	9.08
2/3	.00002	.37	91.23	107.32	6.16
3/4	.00002	.37	91.60	177.41	4.20
4/5	.00002	.37	91.98	315.40	2.70
5/6	.00031	5.78	97.76	763.18	1.35
6/7	.00006	1.12	98.88	1390.90	.84
7/8	.00006	1.12	100.00	2781.80	.57
Throughput	0.00000	0.00	100.00		

Weights (GM)

1.	Tip and Inlet Cone	.00330
2.	Plates (and Rings)	.00206
3.	Andersen Outlet and Filter Holder Inlet	0.00000
4.	Filter Backup	0.00000
	TOTAL	.00536

TABLE B-16
CROSS REFERENCE INFORMATION
AISI/EPA LARRY CAR

Sample No.	Run No.	Description
1207	K1-6	F
1208	K1-6	P (tip), F (holder)
1209	K1-6	P
1210	K1-6	I (H_2O)
1211	K1-6	I
1213	K2-3	A (plates)
1214	K2-3	A (body), P (tip), F holder (front)
1215	K2-3	F holder (back)
1222	K3-2	A (plates)
1223	K3-2	A (front)
1225	K3-2	P (tip), F holder (front)
1224	K3-2	P, F holder (back)
1226	K3-2	I (H_2O)
1227	K3-2	I
1239	K3-2	P (H_2O)
1221	K3-2	F (And.)
1229	K3-2	A (back)
1230	K3-6	P (tip), F holder (front)

WILPUTTE LARRY CAR

Sample No.	Run No.	Description
1044	W6-3	A (plates)
1045	W6-3	A (front), P (tip)
1046	W6-3	A (back and filter holder)
1064	W6-3	F
1058	W7-6	F (And. #127)
1059	W7-6	A (plates)
1060	W7-6	A (front), P (tip)
1061	W7-6	A (back and filter holder)
1049	W8-2	F
1067	W8-2	A (front), P (tip)
1068	W8-2	A (back of #195)
1092	W9-3	F
1093	W9-3	A (plates)
1094	W9-3	A (back)
1095	W9-3	A (front), P (tip)
1100	W10-2	F
1101	W10-2	A (plates)
1102	W10-2	A (front), P (tip)
1103	W10-2	A (back)
1112	W11-6	F
1113	W11-6	A (plates)
1114	W11-6	A (front), P (tip)
1115	W11-6	A (back)
1066	W8-2	A (plates)
1041	W6-3	I (H_2O)
1042	W6-3	I
1048	W6-3	P
1069	W8-2	I (H_2O)
1070	W8-2	I
1105	W10-3	P (tip), C
1110	W11-3	F
1111	W11-3	P (tip), C
1240	W12-2	F (And.)
1241	W12-2	A (plates)
1242	W12-2	A (front), P (tip)
1243	W12-2	A (back), F holder (front)
1244	W12-2	P, F holder (back)
1245	W12-2	I (H_2O)
1246	W12-2	I

No. 4 = 36.8 - 73.6 μ

No. 5 = 73.6 - 147.2 μ

No. 6 = 147.2 - 294.4 μ

No. 7 = 294.4 - 588.8 μ

No. 8 = 588.8 - 1177.6 μ

The values of N and A were then used to calculate N/A and $\sqrt{N/A}$ (the statistical error). These values were plotted on log-log graph paper versus the diameter. By curvefitting (matching the slopes at each magnification) a final curve was made and the average density (<N/A>) was estimated. The average density (<N/A>) with the statistical error $\sqrt{<N/A>}$ was plotted on log-log graph paper versus the particle diameter (see Figure B-6 through B-10). The original data and the calculations for these curves are shown in Tables B-17 through B-21. Cumulative percent data are given in Table B-22.

The values of N/A were used to find the percentage of particles in each size range. The cumulative percent (Σ%) less than a certain micron diameter (d) is shown in Figure B-11. If the data were lognormally distributed, the plots shown in Figure B-11 would be linear and distribution by diameter could have been converted to a volume distribution by simple graphical methods. The volume percent versus particle diameter for the five samples is shown in Figure B-12.

Since we did not have a simple lognormal distribution, the following calculations were made to convert the diameter into volume.

The arithmetic average volume for each size range was calculated by:

$$V = \frac{V_2 - V_1}{2} \qquad \text{(B-5)}$$

and the average diameter for that volume:

$$d_v = \frac{6V}{\pi} . \qquad \text{(B-6)}$$

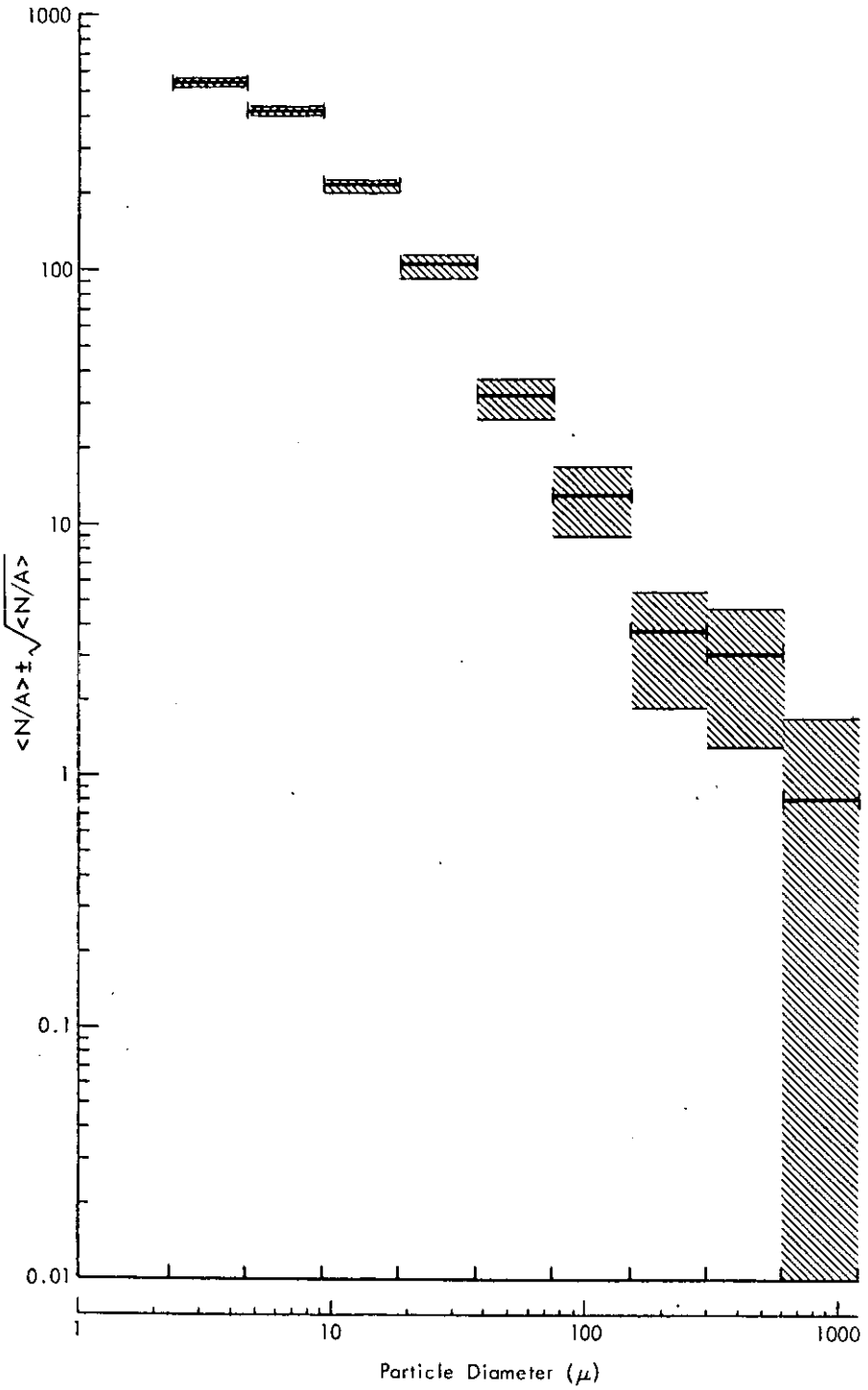


FIGURE B-6
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1051

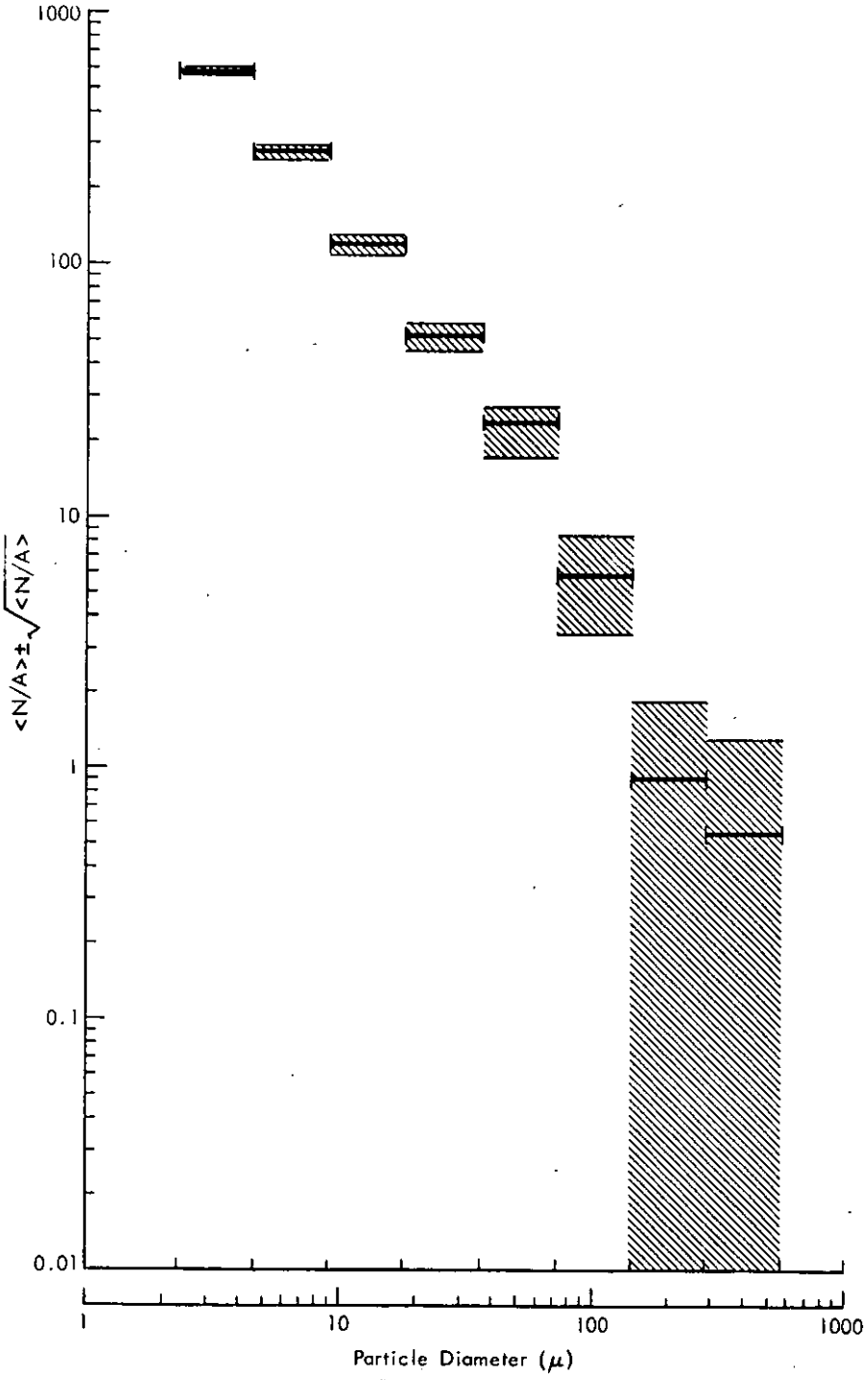


FIGURE B-7
FIGURE (NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1072

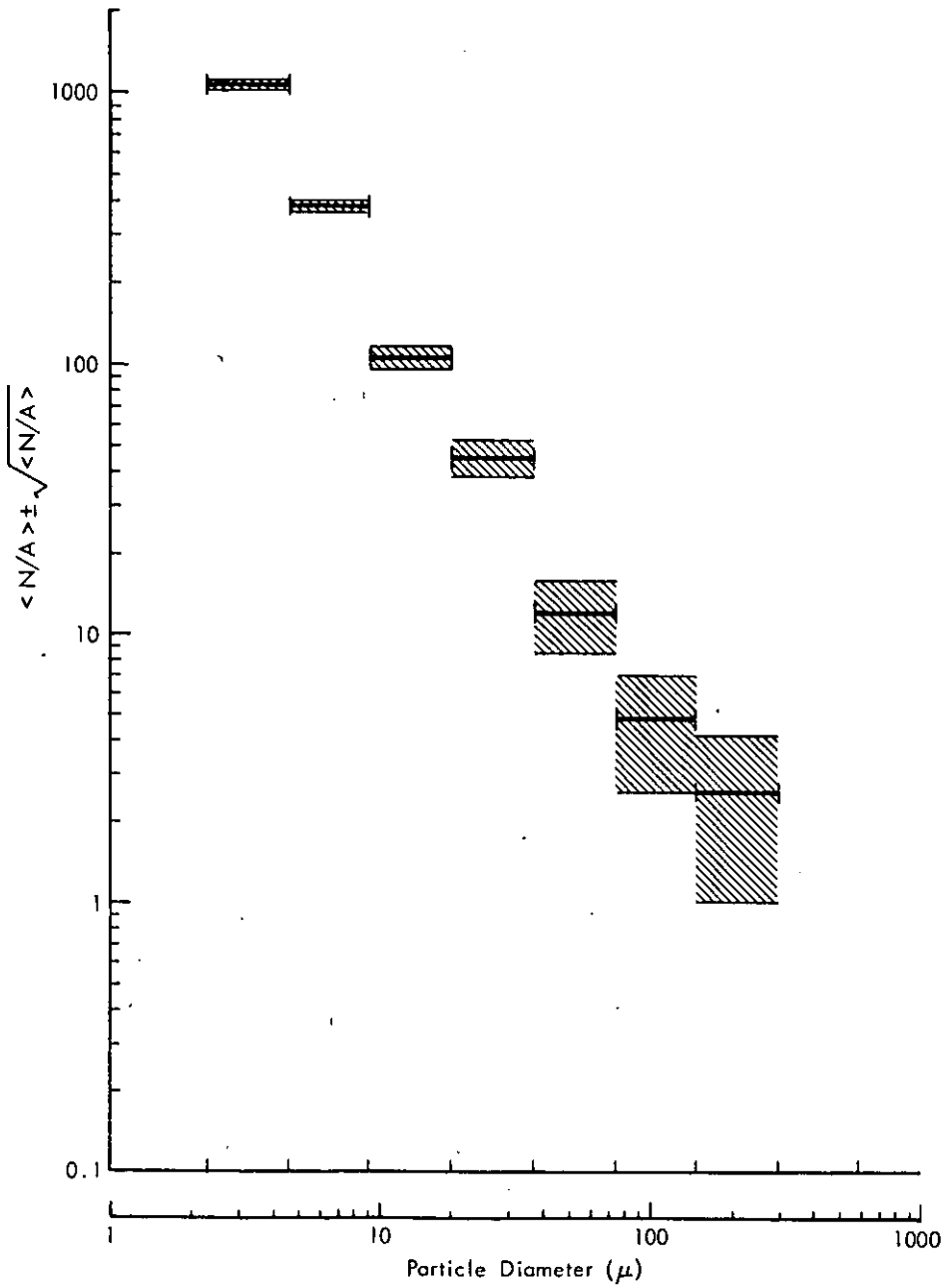


FIGURE B-8
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1076

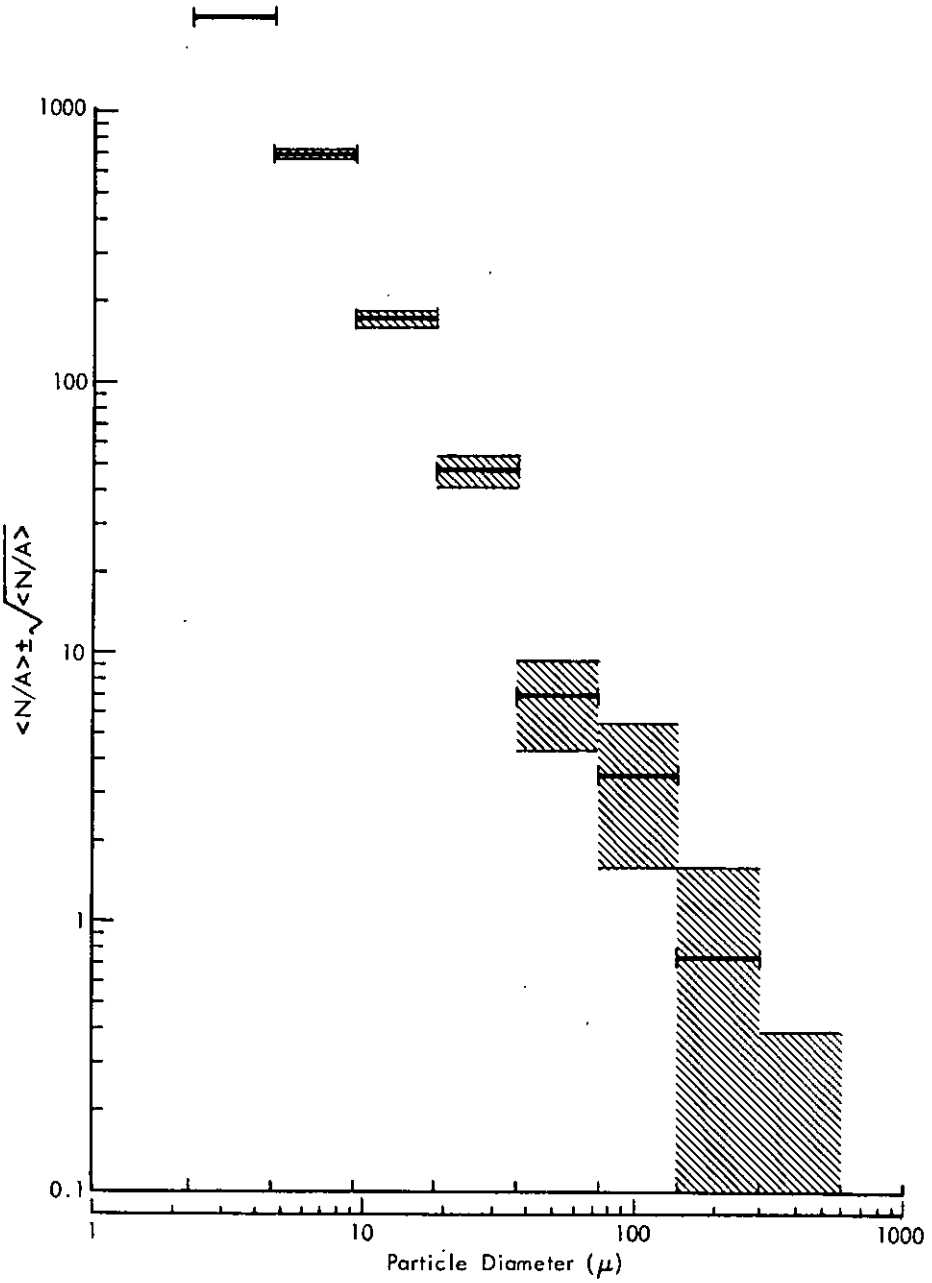


FIGURE B-9
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1109

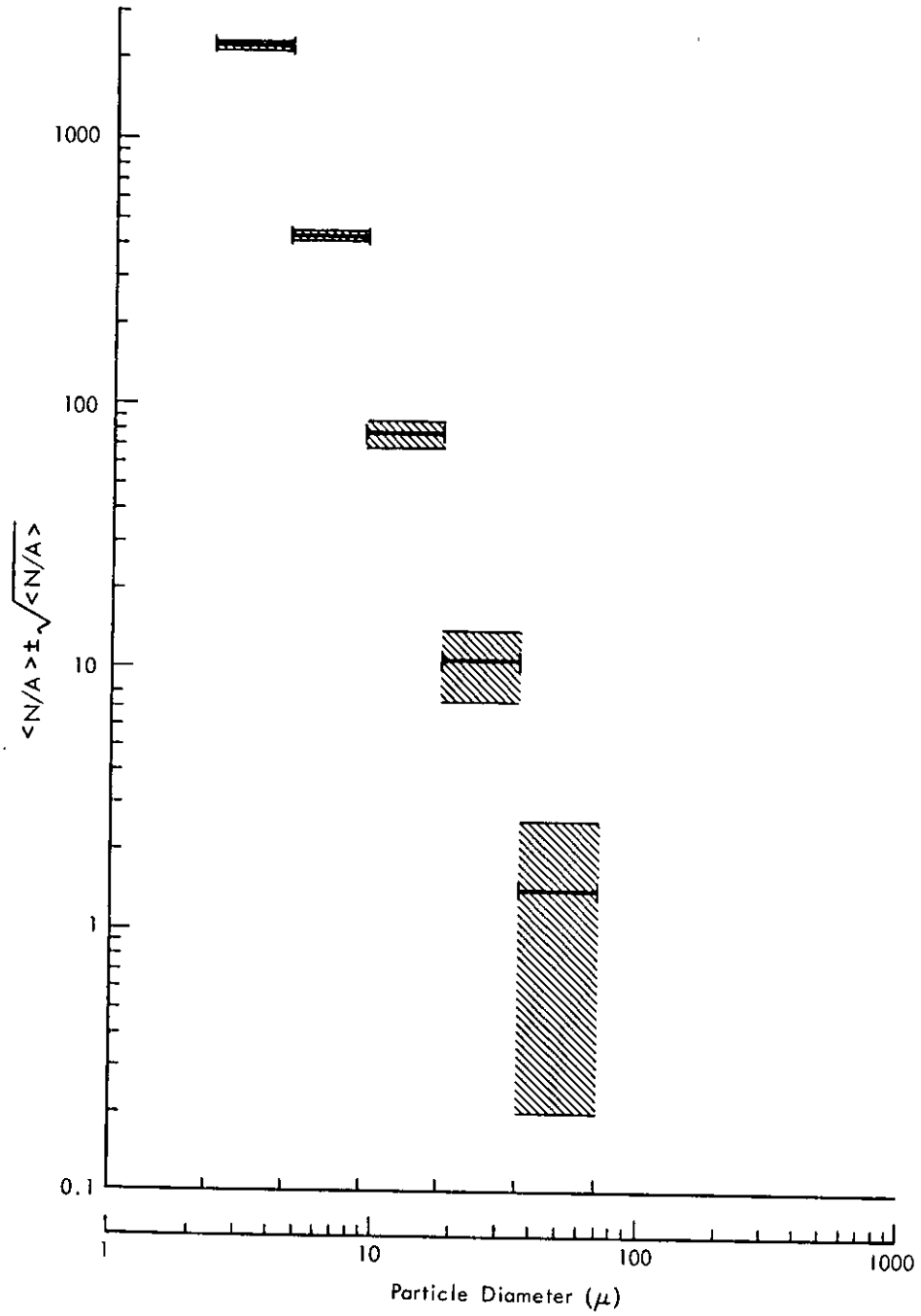


FIGURE B-10
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1222

TABLE B-17

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1051

Mag.	Number	ΣN	A(mm^2)	Original $N/A \pm \sqrt{N/A}$	Estimated $\langle N/A \rangle \pm \sqrt{\langle N/A \rangle}$	Percent
800	0	156	0.2896	538 ± 23.2	538.7 ± 23.2	40.60
800	1	121	0.2896	417.8 ± 20.4	417.8 ± 20.4	31.48
360	1	206	0.7158	287.8 ± 17.0	--	--
800	2	62	0.2896	214.1 ± 14.6	214.1 ± 14.6	16.13
360	2	152	0.7158	212.4 ± 14.6	212.4 ± 14.6	--
186.7	2	374	2.6616	140.5 ± 11.9	208.3 ± 14.4	--
800	3	30	0.2896	103.6 ± 10.2	103.6 ± 10.2	7.81
360	3	112	0.7158	156.5 ± 12.5	--	--
186.7	3	186	2.6616	69.9 ± 8.4	103.6 ± 10.2	--
800	4	4	0.2896	13.8 ± 3.7	--	--
360	4	23	0.7158	32.1 ± 5.7	32.1 ± 5.7	2.42
186.7	4	43	2.6616	16.2 ± 4.0	--	--
186.7	5	6	2.6616	2.25 ± 1.50	--	--
27.5	5	160	122.69	1.31 ± 1.14	13.1 ± 3.6	0.99
27.5	6	46	122.69	0.375 ± 0.612	3.75 ± 1.9	0.29
27.5	7	37	122.69	0.302 ± 0.550	3.02 ± 1.7	0.23
27.5	8	10	122.69	0.082 ± 0.286	0.82 ± 0.9	0.06

TABLE B-18

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1072

Mag.	Number	ΣN	A(mm^2)	Original $N/A \pm \sqrt{N/A}$	Estimated $\langle N/A \rangle \pm \sqrt{\langle N/A \rangle}$	Percent
800	0	156	0.2896	583.6 ± 24.2	583.6 ± 24.2	54.99
800	1	100	0.2896	345.3 ± 18.6	275 ± 16.6	25.91
360	1	306	1.4316	213.8 ± 14.6	275 ± 16.6	--
800	2	35	0.2896	120.9 ± 11.0	120.9 ± 11.0	11.39
360	2	169	1.4316	118.1 ± 10.9	--	--
800	3	11	0.2896	38.0 ± 6.2	52 ± 7.2	4.90
360	3	105	1.4316	73.3 ± 8.6	52 ± 7.2	--
800	4	2	0.2896	6.91 ± 2.63	--	--
360	4	32	1.4316	22.4 ± 4.7	22.4 ± 4.7	2.11
360	5	2	1.4316	1.40 ± 1.18	--	--
27.5	5	32	122.69	0.261 ± 0.511	5.84 ± 2.41	0.55
27.5	6	5	122.69	0.041 ± 0.202	0.91 ± 0.95	0.09
27.5	7	3	122.69	0.025 ± 0.157	0.55 ± 0.74	0.05

TABLE B-19

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1076

Mag.	Number	ΣN	A(mm^2)	Original N/A ± $\sqrt{N/A}$	Estimated ⟨N/A⟩ ± $\sqrt{\langle N/A \rangle}$	Percent
800	0	313	0.2896	1080.8 ● 32.9	1080.8 ± 32.9	66.26
800	1	137	0.2896	473.1 ± 21.8	--	--
360	1	272	0.7158	380.0 ± 19.5	380.0 ± 19.5	23.30
800	2	37	0.2896	127.8 ± 11.3	--	--
360	2	76	0.7158	106.2 ± 10.3	106.2 ± 10.3	6.50
186.7	2	139	1.3308	104.4 ± 10.2	--	--
800	3	13	0.2896	44.9 ± 6.7	44.9 ● 6.7	2.75
360	3	35	0.7158	48.9 ± 7.0	--	--
186.7	3	51	1.3308	38.3 ± 6.2	--	--
800	4	2	0.2896	6.91 ● 2.63	--	--
360	4	16	0.7158	22.4 ± 4.7	--	--
186.7	4	16	1.3308	12.02 ± 3.47	12.0 ● 3.5	0.74
186.7	5	4	1.3308	3.01 ± 1.73	--	--
27.5	5	66	61.3452	1.076 ● 1.037	4.8 ± 2.2	0.29
186.7	6	1	1.3308	0.751 ± 0.867	--	--
27.5	6	36	61.3452	0.587 ± 0.766	2.6 ± 1.6	0.16
186.7	7	2	1.3308	1.503 ● 1.226	--	--

TABLE B-20

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1009

Mag.	Number	ΣN	A(mm^2)	Original N/A ± $\sqrt{N/A}$	Estimated ⟨N/A⟩ ● $\sqrt{\langle N/A \rangle}$	Percent
800	0	327	0.1448	2258.3 ● 47.5	2258.3 ± 47.5	70.68
800	1	102	0.1448	704.4 ± 26.6	704.4 ± 26.6	22.05
360	1	368	0.7158	514.1 ± 22.7	611.8 ● 24.7	--
800	2	25	0.1448	172.7 ± 13.1	172.7 ± 13.1	5.41
360	2	104	0.7158	145.3 ± 12.1	172.9 ± 13.1	--
800	3	7	0.1448	48.3 ± 7.0	48.3 ● 7.0	1.51
360	3	39	0.7158	54.5 ± 7.4	64.8 ● 8.0	--
800	4	1	0.1448	6.91 ± 2.63	6.91 ± 7.0	0.22
360	4	5	0.7158	6.99 ± 2.64	8.3 ± 2.64	--
360	5	4	0.7158	5.59 ± 2.36	--	--
27.5	5	113	122.69	0.921 ± 0.960	3.50 ± 1.87	0.11
27.5	6	24	122.69	0.196 ± 0.442	0.74 ± 0.86	0.02
27.5	7	3	122.69	0.025 ± 0.157	0.09 ± 0.30	0.003

TABLE B-21

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1222

Mag.	Number	ΣN	A(mm^2)	Original $N/A \pm \sqrt{N/A}$	Estimated $\langle N/A \rangle \pm \sqrt{\langle N/A \rangle}$	Percent
800	0	483	0.2172	2223.8 ± 47.2	2223.8 ± 47.2	81.04
800	1	127	0.2172	584.7 ± 24.2	430 ± 20.7	15.67
360	1	452	1.4316	315.7 ± 17.8	--	--
800	2	17	0.2172	78.3 ± 8.85	78.3 ± 8.8	2.85
360	2	118	1.4316	82.4 ± 9.1	--	--
800	3	1	0.2172	4.8 ± 2.2	--	--
360	3	15	1.4316	10.5 ± 3.2	10.5 ± 3.2	0.38
360	4	2	1.4316	1.4 ± 1.2	1.4 ± 1.2	0.05

TABLE B-22

CUMULATIVE PERCENT OPTICAL SIZE-DISTRIBUTION DATA

No.	Diameter Less Than	1051	1072	1076	1109	1222
0	4.6 μ	40.60	54.99	66.26	70.68	81.04
1	18.4	72.08	80.90	89.56	92.73	96.71
2	18.4	88.21	92.29	96.06	98.14	99.56
3	36.8	96.02	97.19	98.81	99.65	99.94
4	73.6	98.44	99.30	99.55	99.87	99.99
5	147.2	99.43	99.85	99.84	99.98	
6	294.4	99.72	99.95	100.00	100.00	
7	588.8	99.95	99.99		100.003	
8	1,177.6	100.01				
$\bar{d}$	geometric mean	5.4 μ	4.1 μ	3.4 μ	3.0 μ	3.0 μ

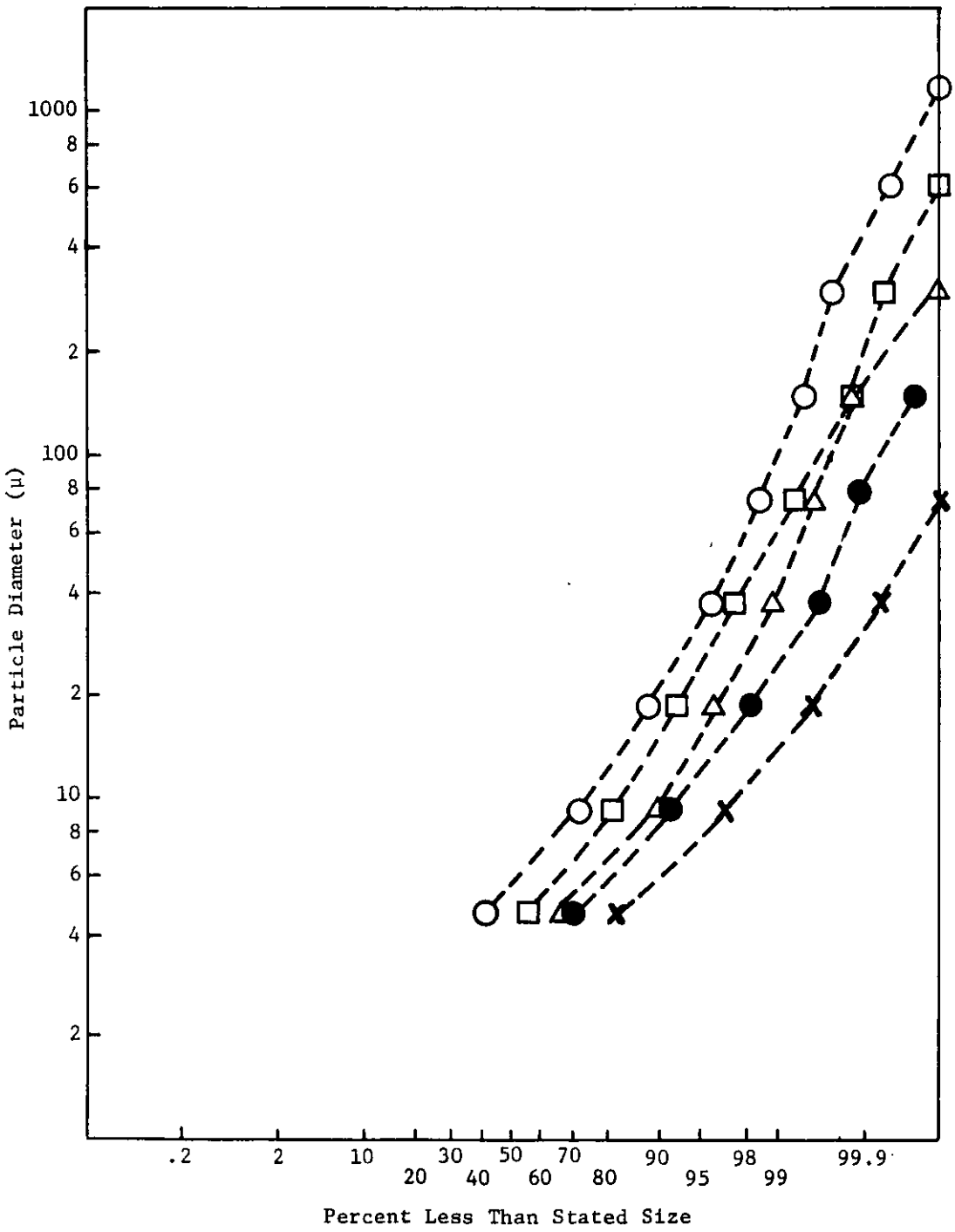


FIGURE B-11
SIZE DISTRIBUTION BY PARTICLE DIAMETER FOR SAMPLES

1051 ○ 1072 □ 1076 △ 1109 ● 1222 X

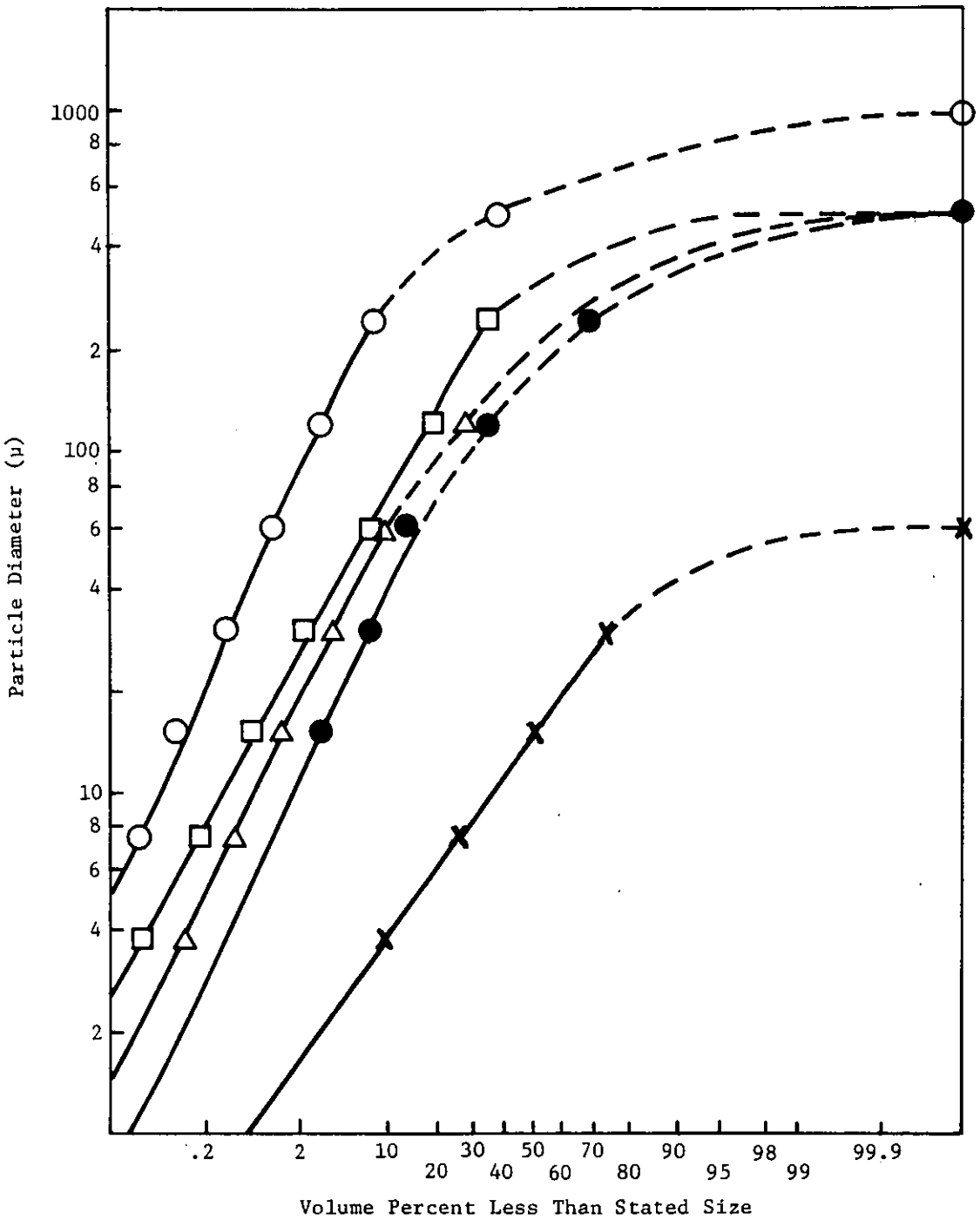


FIGURE B-12
VOLUME PERCENT VERSUS PARTICLE DIAMETER FOR SAMPLES
1051 ○ 1072 □ 1076 △ 1109 ● 1222 ✕

The percent (by volume) in each size range:

$$\% = V \langle N/A \rangle \frac{100}{\Sigma V \langle N/A \rangle} . \qquad (B-7)$$

The cumulative percent by volume (less than d_v) for each sample is listed in Table B-23 and plotted in Figure B-12.

The percent by volume obtained in each size range can be converted to a weight-size distribution by multiplying by an assumed constant density. The weight size distribution data can then be compared to data obtained from Andersen Samplers.

Tar/Benzpyrene/Elemental/Coal Analyses - The procedure used for the Tar/Benzpyrene/Elemental/Coal Analyses of samples of rinses and filters is given below:

a. Ten ml of benzene was added to sample repeatedly until benzene extraction was clean.
b. Each sample was ultrasonically vibrated for 5 min and then centrifuged.
c. Benzene was transferred to a tarred, clean empty beaker, using a disposable pipette.
d. Solution was evaporated in hood until dry.
e. Sample was desiccated for 48 hr and then weighed.

The results of the tar analysis are given in Table B-24.

A 5 μ liter sample was taken from each solution sample of benzene (step three of the tar analysis) to provide samples to be analyzed for benzpyrene. These samples were first run on a 4 ft Dexsil 300, 3% Supelcoport 800/100 mesh. The 5 μ liter samples were injected and compared to standard BaP response at 280°C, 45 ml/min. Samples were then run via flame-ionization gas chromatography on a 6 ft 3% OV-17 on Gas Chrom Q, 80/10 Mesh at 240° 50 ml/min.

The concentration of benz(a)pyrene in each sample was calculated from a calibration curve. A standard solution containing phenenthrene, perylene and benz(a)pyrene was used for calibration purposes; the above compounds were completely resolved on both the Dexsil 300 and OV-17

TABLE B-23

PARTICLE DIAMETER VS CUMULATIVE PERCENT (BY VOLUME)

Number	$V(\mu^3)$	$d_v(\mu)$	1051 Σ	1072 Σ	1076 Σ	1109 Σ	1222 Σ
0	28.7	3.8	0.002	0.034	0.117	0.397	10.267
1	229	7.6	0.017	0.162	0.446	1.384	26.118
2	1840	15.2	0.080	0.615	1.184	3.333	49.308
3	14400	30.2	0.320	2.137	3.632	7.593	73.640
4	117000	61.0	0.921	7.465	8.948	12.545	100.000
5	939000	121.5	2.889	18.612	26.014	32.673	
6	7515000	243.1	7.398	32.514	99.996	66.731	
7	60360000	486.6	36.564	99.999		99.999	
8	482500000	973.9	99.999				

TABLE B-24

RESULTS OF TAR ANALYSIS

Sample No.[a]	Total Weight (g)	Tar (%)
1114 (1112, 1113, 1115)	0.0421	80.0
1102 (1100, 1101, 1103)	0.0628	86.2
1095 (1092, 1093, 1094)	0.0423	75.0
1067 (1049, 1068)	0.3184	23.8
1060 (1058, 1059, 1061)	0.1247	56.1
1045 (1044, 1046, 1064)	0.2031	29.2
1066	0.6653	26.9
1048 (1041, 1042)	0.2098	38.5
1069 (1070)	0.1514	54.8
1105	0.0287	54.9
1111 (1110)	0.0467	42.1
1241 (1240, 1242, 1243, 1244, 1245, 1246)	0.3170	39.4
1208 (1207)	0.0311	64.8
1209 (1210, 1211)	0.0951	97.4
1232 (1233)	0.0513	93.0
1213 (1214, 1215)	0.0482	29.5
1224 (1226, 1227, 1239)	0.0990	48.4
1229 (1221)	0.0425	77.2
1222	2.018	62.1
1223 (1225)	0.6145	27.9

[a] See cross reference information

columns. Benz(e)pyrene and benz(a)pyrene were not completely resolved on either column.

The results of the chromatographic analysis for benz(a)pyrene are given in Table B-25.

A Varian Model AA-5 atomic absorption spectrophotometer was used to analyze samples for Elemental content, which included samples from rinses and filter as well as coal samples. The AA-5 was equipped with air acetylene and nitrous oxide acetylene burners. The wavelengths and flame gases used to analyze the samples for each of the elements of interest are listed in Table B-26. The samples were digested in a Parr 4745 Acid Digestion Bomb equipped with a 25 ml teflon cup.

Prior to digestion, the samples were combined by rinsing the previously evaporated impinger, probe, Andersen, and Cyclone washes into the 25 ml teflon cup with a minimum of acetone. The acetone was then evaporated. Glass fiber filters were cut into small pieces and added directly to the teflon cup. The components of each sampling train that were combined for elemental analysis are listed in Table B-27. The digestion procedure[1/] varied slightly depending on the number of elements to be determined and the sample size available.

After evaporation of the acetone rinse 0.5 ml aqua regia was added to the sample residue as a wetting agent. Then, 2.5 ml concentrated HF (48%) were added, the vessel was closed by hand tightening the stainless-steel screw cap, and the acid bomb was placed in an oven for 2 hr at 105°C. After sample decomposition and cooling, ∿ 5 ml of distilled water and 1.4 g of boric acid were added. The solution was quantitatively transferred to a 50 ml volumetric flask and diluted to volume with distilled water. The diluted solutions were stored in polyethelene screw cap bottles.

1/ B. Bernas, Anal. Chem., 40, 1682 (1968).

TABLE B-25

BENZPYRENE ANALYSIS

Sample No.	Total Benzpyrene(mg)	Total Tar (g)	Benzpyrene Conc.(ppm)[a/]
1045	30	0.0541	510
1048	N.D.[b/]	0.0808	250
1060	70	0.0699	1000
1066	100	0.1791	560
1067	N.D.	0.0758	260
1069	N.D.	0.0830	240
1095	N.D.	0.0317	630
1102	30	0.0541	560
1105	N.D.	0.0158	1300
1111	N.D.	0.0197	1000
1114	N.D.	0.0337	590
1208	N.D.	0.0205	980
1209	N.D.	0.0926	220
1213	N.D.	0.0142	1400
1222	22,000	1.2524	18,000
1223	520	0.1711	3,000
1224	N.D.	0.0479	420
1229	N.D.	0.0328	610
1232	N.D.	0.0477	420
1241	220	0.1247	1700

a/ Micrograms of Benzpyrene per gram of tar.

b/ Not detected, minimum detectable quantity was 20µg of benzpyrene per sample.

TABLE B-26

WAVELENGTHS AND FLAME GASES USED IN THE ELEMENTAL ANALYSIS

Element	Analytical Line (A)	Flame Gases[a/]
Al	3093	NA
Ba	5535	NA
Be	2349	NA
Ca	4227	AA
Cd	2288	AA
Co	2407	AA
Cr	3579	AA
Cu	3248	AA
Fe	2483	AA
Ga	2944	AA
Ge	2652	NA
Hg	2537	None[b/]
K	7665	AA
Mg	2852	AA
Mn	2795	AA
Mo	3133	AA
Na	5890	AA
Ni	2320	AA
Pb	2170	AA
Sb	2176	AA
Se	1960	AA
Su	2246	AA
Sr	4607	AA
Ti	3643	NA
Tl	2768	AA
V	3185	NA
Zn	2139	AA

a/ AA = Air Acetylene, NA =
b/ Cold Vapor Technique

Samples of 0.5 g or less were digested in 0.2 ml aqua regia and 1.0 ml HF. After decomposition, 0.3 g boric acid and distilled water were added to a final volume of 10 ml. Samples greater than 0.5 g (or those containing a filter) were digested in 0.5 ml aqua regia, 2.5 ml HF and diluted to 25 ml after the addition of 0.75 g boric acid.

Standard solutions used for obtaining standard curves for each element were prepared in a diluting solution composed of 2% aqua regia (v/v), 10% HF (v/v), and 3% boric acid (w/v).

The results of the analyses are given as total µg per sample, net µg per sample, and as a concentration in ppm (wt/wt) or percent (wt/wt) of the total sample. Total µg and net µg values differ by the contribution of each element in the glass fiber filter to the total µg detected. Total and net µg values are the same for samples that do not contain a filter. The correction factor listed in Table B-27 is the ratio of the total sample weight to the sample weight used for analysis.

The results presented in Tables B-28 through B-56 were calculated as follows:

Total µg = concentration[a/] (µg/ml) x dilution factor (ml) x correction factor

Net µg = Total µg − µg in filter

Concentration (ppm) = Net µg / Total Sample Weight (g)

Concentration (%) = ppm x 10^{-4}

Filter No. 1 was used for the determination of the net µg values of Group 1 samples containing filters; Filter No. 2 was used for the Group 2 samples. When the detection limit was too high to quantify a particular element in Filter No. 1 because of the high dilution factor (50), the value determined for Filter No. 2 was used to determine the net µg of that particular element in the Group 1 samples.

The detection limit for each element was determined as follows:

Detection Limit (ppm) = Concentration[b/] (µg/ml) x dilution factor (50 ml) − sample weight used (g) x correction factor

a/ Determined from standard curve.

b/ Solution concentration that had an absorbance of 2x the noise level as determined from the standard curve obtained for each element.

TABLE B-27

SAMPLE COMBINATIONS USED IN ELEMENTAL ANALYSIS

Sample No.	Dilution	Total Sample Weight (g)	Sample Weight Used (g)	Correction Factor	Sample Combination
Filter No. 1	50	0.13998	0.13998	--	
1045[a/]	50	0.2031	0.1401	1.45	1045, 1046, 1064F, 1044
1060[a/]	50	0.1247	0.1099	1.135	1060, 1061, 1058F, 1059
1067[a/]	50	0.3184	0.2853	1.116	1067, 1068, 1049F
1095[a/]	50	0.0423	0.0324	1.304	1095, 1094, 1092F, 1093
1102[a/]	50	0.0628	0.0511	1.23	1102, 1103, 1100F, 1101
1114[a/]	50	0.0421	0.0342	1.23	1114, 1115, 1112F, 1113
1066	50	0.6653	0.1650	4.032	1066
W8	50	0.10134	0.10134	1.0	
W10	50	0.14392	0.14392	1.0	
Filter No. 2	10	0.15100	0.15100	--	
1048	10	0.20977	0.16661	1.259	1048, 1041, 1042
1069	10	0.15143	0.09427	1.606	1069, 1070
1105	10	0.02873	0.02142	1.341	1105
1111[a/]	10	0.04674	0.03841	1.217	1111, 1110F
1208[a/]	10	0.03110	0.03158	1.0	1208, 1207F
1209	10	0.0951	0.07958	1.195	1209, 1210, 1211
1213	10	0.0482	0.03986	1.21	1213, 1214, 1215
1222	25	2.0180	0.45479	4.437	1222
1223	25	0.6145	0.59353	1.035	1223, 1225
1224	10	0.0990	0.07905	1.252	1224, 1226, 1227, 1239
1229[a/]	25	0.0425	0.03074	1.383	1229, 1221F
1230	10	0.0072	0.0072	1.0	1230
1241[a/]	25	0.3170	0.29182	1.086	1241, 1240F, 1245, 1242 1246, 1244, 1243
W8	25	0.46942	0.46942	1.0	
W10	25	0.53300	0.53300	1.0	
W12	25	0.47460	0.47460	1.0	
K4	25	0.46609	0.46609	1.0	

a/ Contains a filter as part of the composite sample

TABLE B-28
FILTER NUMBER 1

Elements	Total (µg)	ppm or %
Aluminum	4,450	3.18%
Antimony	< 75	< 540
Barium	< 5,000	< 3.6%
Beryllium	< 1	< 7.1
Cadmium	< 1.3	< 9.3
Calcium	1,160	0.83%
Chromium	1.5	11
Cobalt	< 8	< 57
Copper	< 3	< 21
Gallium	< 50	< 360
Germanium	< 20	< 140
Iron	80	570
Lead	< 4	< 29
Magnesium	260	0.19%
Manganese	11	79
Mercury	2.6	19
Molybdenum	< 50	< 360
Nickel	2.5	18
Potassium	2,900	2.1%
Selenium	< 25	< 180
Sodium	10,000	7.1%
Strontium	190	0.14%
Thallium	< 10	< 71
Tin	< 250	< 0.18%
Titanium	25	180
Vanadium	< 10	< 71
Zinc	4,200	3.0%

TABLE B-29
FILTER NUMBER 2

Element	Total (µg)	ppm or %
Barium	345	0.23%
Beryllium	< 0.03	< 0.20
Cadmium	< 0.35	< 2.3
Chromium	< 1.2	< 8
Copper	2.3	15
Lead	8.3	55
Manganese	5.8	38
Mercury	3.6	24
Nickel	< 1.5	< 10
Selenium	< 21	< 140
Tin	< 22	< 150
Vanadium	< 15	< 99
Zinc	8,000	5.3%

TABLE B-30
ALUMINUM

Sample No.	Total (µg)	Net (µg)	%
Filter No. 1	4,450	--	3.18
1045	9,060	4,610	2.27
1060	4,940	490	0.39
1067	7,810	3,360	1.06
1095	6,030	1,580	3.74
1102	5,540	1,090	1.73
1114	5,630	1,180	2.80
1066	3,620	3,620	0.54
W8	1,080	1,080	1.06
W10	1,350	1,350	0.94

TABLE B-31
ANTIMONY

Sample No.	Total (µg)	Net (µg)	ppm or %
Filter No. 1	< 75	--	< 540
1045	< 110	< 110	< 540
1060	< 85	< 85	< 680
1067	< 84	< 84	< 260
1095	< 98	< 98	< 0.23%
1102	120	120	0.19%
1114	< 92	< 92	< 0.22%
1066	< 300	< 300	< 450
W8	< 75	< 75	< 740
W10	< 75	< 75	< 520

TABLE B-32
BARIUM

Sample No.	Total (µg)	Net (µg)	ppm or %
1045	8,700	8,400	4.1%
1060	6,200	5,900	4.7%
1067	< 5,600	< 5,300	< 1.7%
1095	6,500	6,200	15%
1102	7,400	7,100	11%
1114	6,800	6,400	15%
1066	< 2,000	< 2,000	< 0.3%
Filter No. 2	345	--	0.23%
1048	< 87	< 87	< 410
1069	< 110	< 110	< 730
1105	< 93	< 93	< 0.32%
1111	2,400	2,100	4.5%
1208	1,900	1,600	5.1%
1209	< 82	< 82	< 860
1213	< 83	< 83	< 0.17%
1222	< 770	< 770	< 380
1223	< 180	< 180	< 290
1224	< 86	< 86	< 870
1229	5,100	4,800	11.0%
1230	< 69	< 69	< 0.96%
1241	1,600	1,300	0.41%
W8	< 170	< 170	< 362
W10	< 170	< 170	< 320
W12	< 170	< 170	< 360
K4	< 170	< 170	< 360

TABLE B-33
BERYLLIUM

Sample No.	Total (µg)	Net (µg)	ppm
1045	< 1.5	< 1.5	< 7.4
1060	< 1.1	< 1.1	< 8.8
1067	< 1.1	< 1.1	< 3.5
1095	< 1.3	< 1.3	< 31
1102	< 1.2	< 1.2	< 19
1114	< 1.2	< 1.2	< 29
1066	< 4.0	< 4.0	< 6.0
Filter No. 2	< 0.03	--	< 0.20
1048	< 0.04	< 0.04	< 0.19
1069	< 0.05	< 0.05	< 0.33
1105	< 0.04	< 0.04	< 1.4
1111	< 0.04	< 0.04	< 0.86
1208	< 0.03	< 0.03	< 0.96
1209	< 0.04	< 0.04	< 0.42
1213	< 0.04	< 0.04	< 0.83
1222	< 0.33	< 0.33	< 0.16
1223	0.26	0.26	0.42
1224	< 0.04	< 0.04	< 0.40
1229	< 0.10	< 0.10	< 2.4
1230	< 0.03	< 0.03	< 4.2
1241	0.27	0.27	0.85
W8	0.50	0.50	1.1
W10	< 0.075	< 0.075	< 0.14
W12	< 0.075	< 0.075	< 0.16
K4	0.25	0.25	0.54

TABLE B-34
CADMIUM

Sample No.	Total (µg)	Net (µg)	ppm
1045	< 1.9	< 1.9	< 9.4
1060	< 1.5	< 1.5	< 12
1067	< 1.5	< 1.5	< 4.7
1095	< 1.7	< 1.7	< 40
1102	< 1.6	< 1.6	< 25
1114	< 1.6	< 1.6	< 38
1066	< 5.2	< 5.2	< 7.8
Filter No. 2	< 0.35	--	< 2.3
1048	31	31	150
1069	9.8	9.8	64
1105	1.3	1.3	45
1111	22	22	470
1208	< 0.35	< 0.35	< 11
1209	1.6	1.6	16
1213	5.7	5.7	110
1222	< 3.9	< 3.9	< 1.9
1223	160	160	260
1224	2.5	2.5	25
1229	17	17	400
1230	0.2	0.2	28
1241	5.2	5.2	16
W8	< 0.88	< 0.88	< 1.9
W10	< 0.88	< 0.88	< 1.7
W12	< 0.88	< 0.88	< 1.9
K4	< 0.88	< 0.88	< 1.9

TABLE B-35
CALCIUM

Sample No.	Total (µg)	Net (µg)	ppm or %
Filter No. 1	1,160	--	0.83%
1045	2,470	1,310	0.65%
1060	2,580	1,420	1.14%
1067	3,560	2,400	0.75%
1095	1,820	660	1.56%
1102	1,890	730	1.16%
1114	1,750	590	1.40%
1066	< 40	< 40	< 60
W8	< 10	< 10	< 99
W10	35	35	243

TABLE B-36
COBALT

Sample No.	Total (µg)	Net (µg)	ppm
Filter No. 1	< 8.0	--	< 57
1045	< 12	< 12	< 59
1060	< 9.1	< 9.1	< 73
1067	< 8.8	< 8.8	< 28
1095	< 10	< 10	< 240
1102	< 9.6	< 9.6	< 150
1114	< 9.6	< 9.6	< 230
1066	< 32	< 32	< 48
W8	< 8.0	< 8	< 79
W10	< 8.0	< 8	< 56

TABLE B-37
CHROMIUM

Sample No.	Total (µg)	Net (µg)	ppm or %
Filter No. 1	1.5	--	11
1045	280	280	0.14%
1060	140	140	0.11%
1067	360	360	0.11%
1095	20	19	450
1102	83	82	0.13%
1114	120	120	0.29%
1066	24	24	36
1048	61	61	290
1069	< 1.9	< 1.9	< 13
1105	47	47	0.16%
1111	230	230	0.49%
1208	38	37	0.12%
1209	6.6	6.6	69
1213	36	36	750
1222	30	30	15
1223	100	100	160
1224	18	18	180
1229	8.6	7.1	170
1230	6.2	6.2	860
1241	76	75	240
W8	5	5	49
W10	6	6	42
W12	31	31	65
K4	22	22	47

TABLE B-38
COPPER

Sample No.	Total (µg)	Net (µg)	ppm or %
1045	58	56	280
1060	16	14	110
1067	18	16	50
1095	7.8	5.5	130
1102	6.2	3.9	62
1114	7.4	5.1	120
1066	< 12	< 12	< 18
Filter No. 2	2.3	--	15
1048	22	22	100
1069	9.2	9.2	61
1105	21	21	730
1111	20	18	390
1208	5.1	2.8	90
1209	24	24	250
1213	36	36	750
1222	< 14	< 14	< 6.9
1223	49	49	80
1224	310	310	0.31%
1229	10	7.7	180
1230	41	41	0.57%
1241	120	120	380
W8	4.3	4.3	9.2
W10	< 3.1	< 3.1	< 5.8
W12	3.8	3.8	8.0
K4	< 3.1	< 3.1	< 6.7

TABLE B-39
CALLIUM

Sample No.	Total (µg)	Net (µg)	ppm or %
Filter No. 1	< 50	--	< 360
1045	< 73	< 73	< 360
1060	< 57	< 57	< 460
1067	< 56	< 56	< 180
1095	< 65	< 65	< 0.15%
1102	< 62	< 62	< 990
1114	< 62	< 62	< 0.15%
1066	< 200	< 200	< 300
W8	< 50	< 50	< 490
W10	< 50	< 50	< 350

TABLE B-40
GERMANIUM

Sample No.	Total (µg)	Net (µg)	ppm
Filter No. 1	< 20	--	< 140
1045	< 29	< 29	< 140
1060	< 23	< 23	< 180
1067	< 22	< 22	< 69
1095	< 26	< 26	< 610
1102	< 25	< 25	< 400
1114	< 25	< 25	< 590
1066	< 81	< 81	< 120
W8	< 20	< 20	< 200
W10	< 20	< 20	< 140

TABLE B-41
LEAD

Sample No.	Total (µg)	Net (µg)	ppm or %
1045	36	28	140
1060	9.1	0.8	6.4
1067	17	8.7	27
1095	29	21	500
1102	20	12	190
1114	< 4.9	0	0[a/]
1066	< 16	< 16	< 24
Filter No. 2	8.3	--	55
1048	43	43	200
1069	37	37	240
1105	14	14	490
1111	24	16	340
1208	16	7.7	250
1209	19	19	200
1213	190	190	0.39%
1222	70	70	35
1223	2,300	2,300	0.37%
1224	33	33	330
1229	260	250	0.59%
1230	< 6.0	< 6.0	< 830
1241	140	130	410
W8	< 15	< 15	< 32
W10	< 15	< 15	< 28
W12	21	21	44
K4	< 15	< 15	< 32

TABLE B-42
IRON

Sample No.	Total (µg)	Net (µg)	%
Filter No. 1	80	--	0.06
1045	1,780	1,700	0.84
1060	710	630	0.51
1067	2,850	2,770	0.87
1095	230	150	0.36
1102	680	600	0.96
1114	770	690	1.64
1066	1,450	1,450	0.22
W8	510	510	0.50
W10	700	700	0.49

TABLE B-43
MAGNESIUM

	Total (µg)	Net (µg)	µgm or %
Filter No. 1	260	--	0.19%
1045	400	140	690
1060	320	60	480
1067	1,500	1,200	0.38%
1095	390	130	0.31%
1102	340	80	0.13%
1114	280	20	480
1066	20	20	30
W8	18	18	180
W10	30	30	210

TABLE B-44
MANGANESE

	Total (µg)	Net (µg)	ppm
1045	80	69	340
1060	23	12	96
1067	33	22	69
1095	19	8	190
1102	27	16	250
1114	30	19	450
1066	24	24	36
Filter No. 2	5.8	--	38
1048	36	36	170
1069	16	16	110
1105	8.5	8.5	300
1111	58	52	1,100
1208	10	4.2	140
1209	1.7	1.7	18
1213	20	20	410
1222	< 5.6	< 5.6	< 2.6
1223	16	16	26
1224	9.6	9.6	97
1229	13	7.2	170
1230	1.9	1.9	260
1241	20	14	44
W8	4.3	4.3	9.2
W10	3.5	3.5	6.6
W12	1.8	1.8	3.8
K4	5.8	5.8	12

TABLE B-45
MERCURY

	Total (µg)	Net (µg)	ppm
Filter No. 1	2.6	--	19
1045	12	9.4	46
1060	15	12	96
1067	6.4	3.8	12
1095	5.1	2.5	59
1102	12	9.4	150
1114	4.1	1.5	36
1066	13	13	20
Filter No. 2	3.6	--	24
1048	0.38	0.38	1.8
1069	0.64	0.64	4.2
1105	0.54	0.54	19
1111	2.7	0	0[a/]
1208	2.6	0	0[a/]
1209	5.6	5.6	59
1213	4.0	4.0	83
1222	0.55	0.55	0.27
1223	2.1	2.1	3.4
1224	7.9	7.9	80
1229	6.2	2.6	61
1230	0.2	0.2	28
1241	7.6	4.0	13
W8	< 0.03	< 0.03	< 0.06
W10	0.13	0.13	0.24
W12	0.13	0.13	0.27
K4	0.25	0.25	0.54

a/ Less than filter blank.

TABLE B-46
MOLYBDENUM

	Total (µg)	Net (µg)	ppm or %
Filter No. 1	< 50	--	< 360
1045	< 73	< 73	< 360
1060	< 57	< 57	< 460
1067	< 56	< 56	< 180
1095	< 65	< 65	< 0.15%
1102	< 62	< 62	< 990
1114	< 62	< 62	< 0.15%
1066	< 200	< 200	< 300
W8	< 50	< 50	< 490
W10	< 50	< 50	< 350

TABLE B-47
POTASSIUM

	Total (µg)	Net (µg)	%
Filter No. 1	2,900	--	2.1%
1045	5,100	2,200	1.1%
1060	3,900	1,000	0.8%
1067	4,000	1,100	0.35%
1095	4,600	1,700	4.0%
1102	3,900	1,000	1.6%
1114	2,800	0	0[a/]
1066	400	400	0.06%
W8	120	120	0.12%
W10	130	130	0.09%

a/ Less than filter blank.

TABLE B-48
NICKEL

	Total (µg)	Net (µg)	ppm or %
Filter No. 1	2.5	--	18
1045	240	240	0.12%
1060	130	130	0.10%
1067	280	280	880
1095	24	21	500
1102	68	65	0.10%
1114	92	89	0.21%
1066	40	40	61
Filter No. 2	< 1.5	--	< 10
1048	41	41	200
1069	8.2	8.2	54
1105	48	48	0.17%
1111	410	410	0.88%
1208	27	24	770
1209	14	14	150
1213	73	73	0.15%
1222	23	23	11
1223	66	66	110
1224	27	27	270
1229	79	76	0.18%
1230	96	96	1.30%
1241	110	110	350
W8	31	31	66
W10	6.3	6.3	12
W12	27	27	57
K4	9.5	9.5	20

TABLE B-49
SELENIUM

	Total (µg)	Net (µg)	ppm
Filter No. 1	< 25	--	< 180
1045	< 36	< 36	< 180
1060	< 28	< 28	< 230
1067	< 28	< 28	< 88
1095	< 33	< 33	< 780
1102	< 31	< 31	< 490
1114	< 31	< 31	< 740
1066	< 100	< 100	< 150
W8	< 25	< 25	< 250
W10	< 25	< 25	< 170
Filter No. 2	< 21	--	< 140
1048	< 26	< 26	< 120
1069	< 34	< 34	< 220
1105	< 28	< 28	< 970
1111	< 26	< 26	< 560
1208	< 21	< 21	< 680
1209	< 25	< 25	< 260
1213	< 25	< 25	< 520
1222	< 430	< 430	< 210
1223	< 100	< 100	< 160
1224	< 26	< 26	< 260
1229	< 140	< 140	< 3,300
1230	< 21	< 21	< 2,900
1241	< 110	< 110	< 350
W8	< 98	< 98	< 210
W10	< 98	< 98	< 180
W12	< 98	< 98	< 210
K4	< 98	< 98	< 210

TABLE B-50
SODIUM

	Total (µg)	Net (µg)	ppm or %
Filter No. 1	10,000	--	7.1%
1045	15,000	5,000	2.5%
1060	11,000	1,000	0.8%
1067	15,000	5,000	1.57%
1095	14,000	4,000	9.5%
1102	12,000	2,000	3.2%
1114	12,000	2,000	4.8%
1066	< 200	< 200	< 300
W8	< 50	< 50	< 490
W10	< 50	< 50	< 350

TABLE B-51
STRONTIUM

	Total (µg)	Net (µg)	ppm or %
Filter No. 1	190	--	0.14%
1045	280	90	440
1060	260	70	560
1067	200	10	31
1095	260	70	0.17%
1102	230	40	640
1114	210	20	480
1066	< 20	< 20	< 30
W8	< 5.0	< 5.0	< 49
W10	< 5.0	< 5.0	< 35

TABLE B-52
THALLIUM

	Total (µg)	Net (µg)	ppm
Filter No. 1	< 10	--	< 71
1045	< 15	< 15	< 74
1060	< 11	< 11	< 88
1067	< 11	< 11	< 35
1095	< 13	< 13	< 310
1102	< 12	< 12	< 190
1114	< 12	< 12	< 290
1066	< 40	< 40	< 60
W8	< 10	< 10	< 99
W10	< 10	< 10	< 69

TABLE B-53
TITANIUM

	Total (µg)	Net (µg)	ppm
Filter No. 1	25	--	180
1045	130	110	540
1060	74	49	390
1067	280	260	820
1095	65	40	950
1102	62	37	590
1114	62	37	880
1066	260	260	390
W8	90	90	890
W10	100	100	690

TABLE B-54
TIN

	Total (µg)	Net (µg)	ppm or %
1045	< 360	< 360	< 0.18%
1060	< 280	< 280	< 0.22%
1067	< 280	< 280	< 880
1095	< 330	< 330	< 0.78%
1102	< 310	< 310	< 0.49%
1114	< 310	< 310	< 0.74%
1066	< 1,000	< 1,000	< 0.15%
Filter No. 2	< 22	--	< 150
1048	< 28	< 28	< 133
1069	56	56	370
1105	< 30	< 30	< 0.16%
1111	< 27	< 27	< 580
1208	< 22	< 22	< 710
1209	< 26	< 26	< 270
1213	< 27	< 27	< 560
1222	< 170	< 170	< 84
1223	< 39	< 39	< 63
1224	< 28	< 28	< 280
1229	< 53	< 53	< 0.13%
1230	< 22	< 22	< 0.31%
1241	< 41	< 41	< 130
W8	< 38	< 38	< 81
W10	< 38	< 38	< 71
W12	< 38	< 38	< 80
W4	< 38	< 38	< 82

TABLE B-55
VANADIUM

	Total (µg)	Net (µg)	ppm
Filter No. 1	< 10	--	< 71
1045	< 15	< 15	< 74
1060	< 11	< 11	< 88
1067	< 11	< 11	< 35
1095	< 13	< 13	< 310
1102	< 12	< 12	< 190
1114	< 12	< 12	< 290
1066	< 40	< 40	< 60
Filter No. 2	< 15	--	< 99
1048	< 19	< 19	< 91
1069	< 24	< 24	< 160
1105	< 20	< 20	< 700
1111	< 18	< 18	< 390
1208	< 15	< 15	< 480
1209	< 17	< 17	< 180
1213	< 18	< 18	< 370
1222	< 73	< 73	< 36
1223	< 17	< 17	< 28
1224	< 19	< 19	< 190
1229	< 23	< 23	< 540
1230	< 15	< 15	< 2,100
1241	< 18	< 18	< 57
W8	< 17	< 17	< 36
W10	< 17	< 17	< 32
W12	< 17	< 17	< 36
K4	< 17	< 17	< 36

TABLE B-56
ZINC

	Total (µg)	Net (µg)	ppm or %
Filter No. 1	4,200	--	3.0%
1045	6,400	2,200	1.1%
1060	5,000	800	0.64%
1067	4,500	300	940
1095	5,600	1,400	3.3%
1102	5,000	800	1.3%
1114	5,000	800	1.9%
1066	20	20	30
Filter No. 2	8,000	--	5.3%
1048	29,000	29,000	14.0%
1069	24,000	24,000	16.0%
1105	420	420	1.5%
1111	8,400	400	0.86%
1208	8,000	0	0%[a/]
1209	220	220	0.23%
1213	1,600	1,600	3.3%
1222	38	38	19
1223	670	670	0.11%
1224	22[illegible]	220	0.22%
1229	5,100	0	0[a/]
1230	14	14	0.19%
1241	4,300	0	0%[a/]
W8	5.0	5.0	11
W10	4.5	4.5	8.4
W12	7.8	7.8	16
K4	4.0	4.0	8.6

a/ Less than filter blank.

The coal samples were analyzed by the Industrial Testing Laboratories of Kansas City, Missouri by standard procedures. The analyses runs were ultimate, proximate, and sizing. These results are given in Tables B-57 and B-58.

In addition, MRI analyzed samples of coal used during runs W8, W10, W12 and K-4 for 27 different elements. These results are given in the elemental analysis tables.

Two sizes of cyclones were used to extend the length of sampling time by removing part of the particulate before it reaches the 52 mm diameter filters. The purpose of this series of laboratory tests was to calibrate the 50% cutoff of these cyclones. During actual field tests, the cyclones were operated at flow rates from 0.25 cfm to 0.65 cfm.

At the end of this Appendix are six graphs that provide results of the calibration of the two stainless-steel cyclones used with the Andersen Cascade Impactor. Figures B-13 through B-16 are background curves in which the Andersen Cascade Impactor was used with a filter backup. These background runs were made with two different particulates--limestone and iron oxide--in an attempt to simulate the particle sized of the particulate matter at the Coke oven. The flow rates used were 0.247 and 0.260 cfm. Figures B-17 and B-18 are calibration data for the two sizes of cyclones used, and provides efficiency vs particle size at a flow rate of 0.25 cfm for both the small and large cyclones, and similar information on the small cyclone for an average cfm of 0.65. Figure B-17 presents two efficiency curves for the two different cfm's noted. These curves are averaged for both the limestone and the iron oxide challenge.

Gas Analyses

The gas samples taken in the field with the Bag Sampler were analyzed in the field for total hydrocarbons, CH_4, and CO using the total hydrocarbon Analyzer Set Up. All other gas samples taken in the field were transported to MRI where they were analyzed by the procedures given subsequently.

TABLE B-57

COAL ANALYSIS (ULTIMATE AND PROXIMATE)

TEST	AS RECEIVED				DRY			
	8A	10	23	24	8A	10	23	24
% Carbon	72.94	73.23	73.89	72.91	78.28	79.01	78.16	77.77
% Hydrogen	5.34	5.29	5.13	5.11	4.92	4.83	4.78	4.71
% Nitrogen	1.16	1.13	1.27	1.35	1.25	1.22	1.34	1.44
% Sulfur	1.12	1.13	1.13	1.27	1.20	1.22	1.19	1.35
% Ash	6.90	6.56	7.36	7.40	7.40	7.08	7.78	7.89
% Oxygen	12.54	12.66	11.22	11.96	6.95	6.64	6.75	6.84
% Moisture	6.82	7.32	5.46	6.25	-	-	-	-
% Volatile Matter	30.34	30.50	31.90	30.59	32.56	32.91	33.74	32.63
% Fixed Carbon	55.94	55.62	55.28	55.76	60.04	60.01	58.48	59.48
(BTU/lb) Heat of Combustion	13.142	13.121	13.140	13.162	14.103	14.157	13.905	14.039

TABLE B-58
SIEVE ANALYSIS

SAMPLE MARKED: W-12 PORT 2

Sieve Sizes	Percent Retained	Percent Passing
Round 1"	0.0	100.0
" 3/4"	0.83	99.17
" 1/2"	3.14	96.03
" 3/8"	4.37	91.66
Square No. 4	11.49	80.17
" No. 8	19.14	61.03
" No. 16	20.49	40.54
" No. 30	14.57	25.97
" No. 50	10.06	15.91
" No. 100	9.49	6.42
" No. 200	3.89	2.53

SAMPLE MARKED: W-8 PORT 3

Sieve Size	Percent Retained	Percent Passing
Round 1"	0.0	100.0
" 3/4"	1.93	98.07
" 1/2"	2.01	96.06
" 3/8"	3.12	92.94
Square No. 4	9.23	83.71
" No. 8	15.89	67.82
" No. 16	17.64	50.18
" No. 30	16.30	33.88
" No. 50	12.91	20.97
" No. 100	10.19	10.78
" No. 200	5.37	5.41

SAMPLE MARKED: K #4

Sieve Sizes	Percent Retained	Percent Passing
Round 1"	0.0	100.0
" 3/4"	0.0	100.0
" 1/2"	2.07	97.93
" 3/8"	3.94	93.99
Square No. 4	10.05	83.94
" No. 8	16.21	67.73
" No. 16	18.96	48.77
" No. 30	16.78	31.99
" No. 50	13.52	18.47
" No. 100	9.27	9.20
" No. 200	4.80	4.40

SAMPLE MARKED: W-10

Sieve Size	Percent Retained	Percent Passing
Round 1"	0.0	100.0
" 3/4"	1.39	98.61
" 1/2"	4.15	94.46
" 3/8"	2.80	91.66
Square No. 4	9.56	82.10
" No. 8	15.68	66.42
" No. 16	18.10	48.32
" No. 30	16.65	31.67
" No. 50	14.40	17.27
" No. 100	10.41	6.86
" No. 200	3.55	3.31

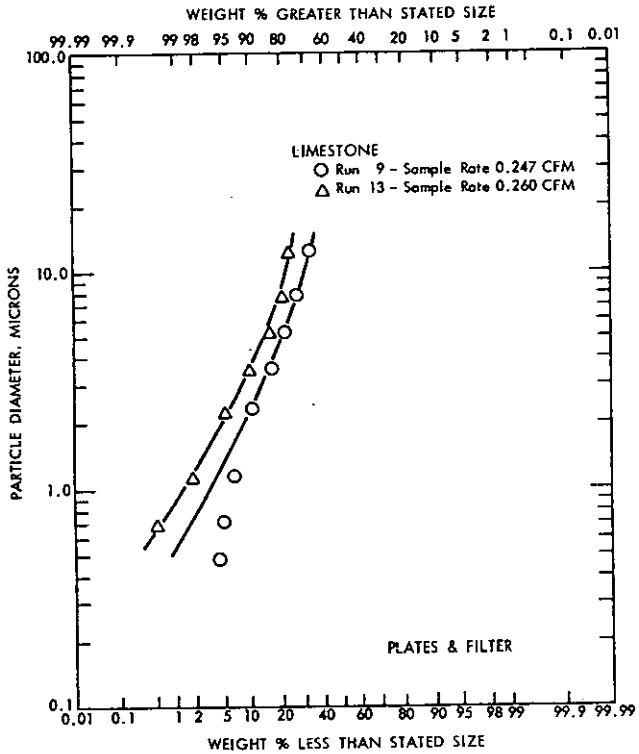


FIGURE B-13
BACKGROUND CURVES FOR ANDERSON CASCADE
IMPACTOR–LIMESTONE AT 0.25 CFM

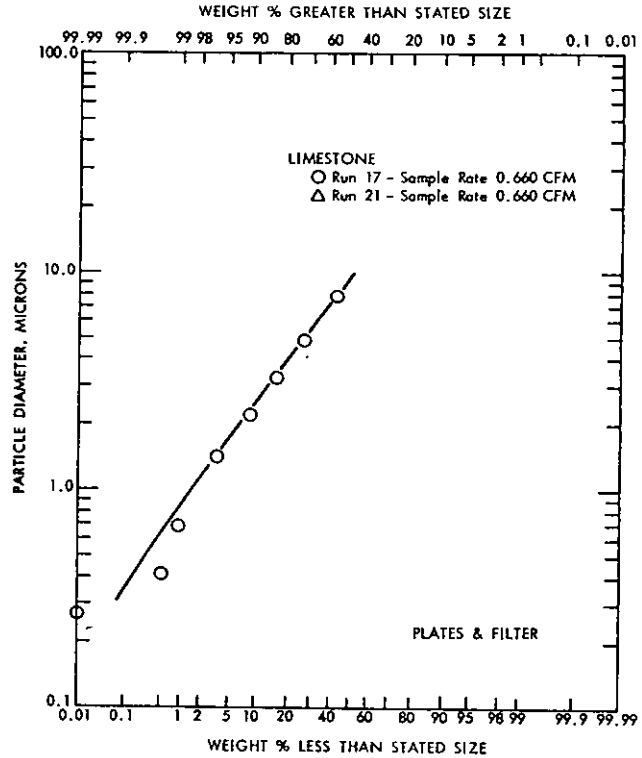


FIGURE B-14
BACKGROUND CURVES FOR ANDERSON CASCADE
IMPACTOR–LIMESTONE AT 0.66 CFM

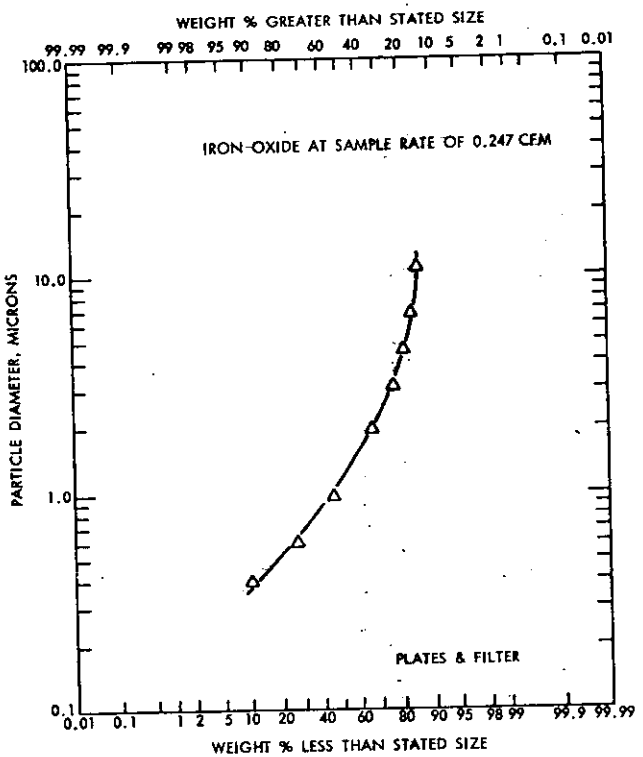


FIGURE B-15
BACKGROUND CURVES FOR ANDERSON CASCADE IMPACTOR—IRON OXIDE AT 0.247 CFM

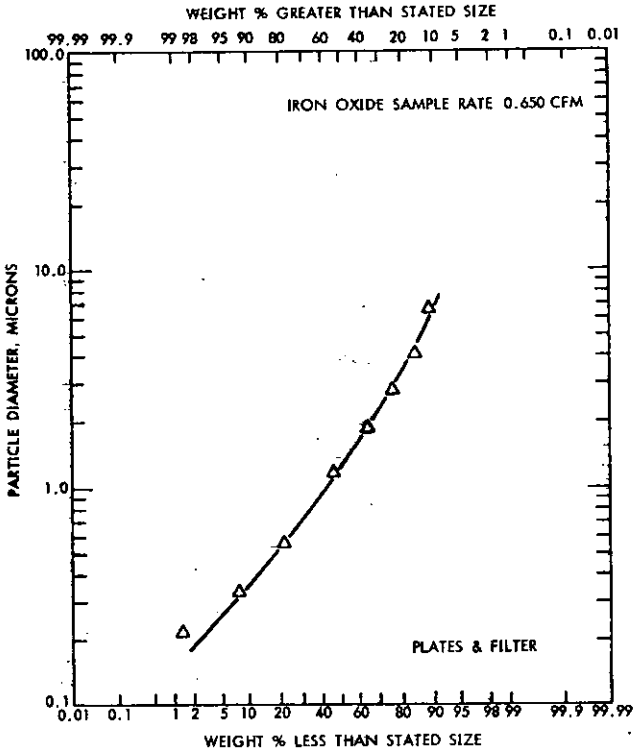


FIGURE B-16
BACKGROUND CURVES FOR ANDERSON CASCADE IMPACTOR—IRON OXIDE AT 0.65 CFM

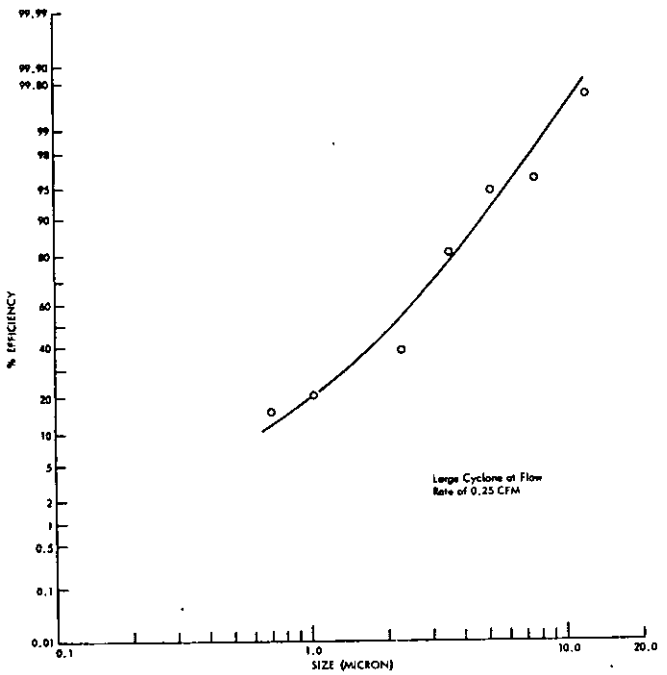


FIGURE B-17
CALIBRATION CURVE FOR LARGE CYCLONE USING LIMESTONE

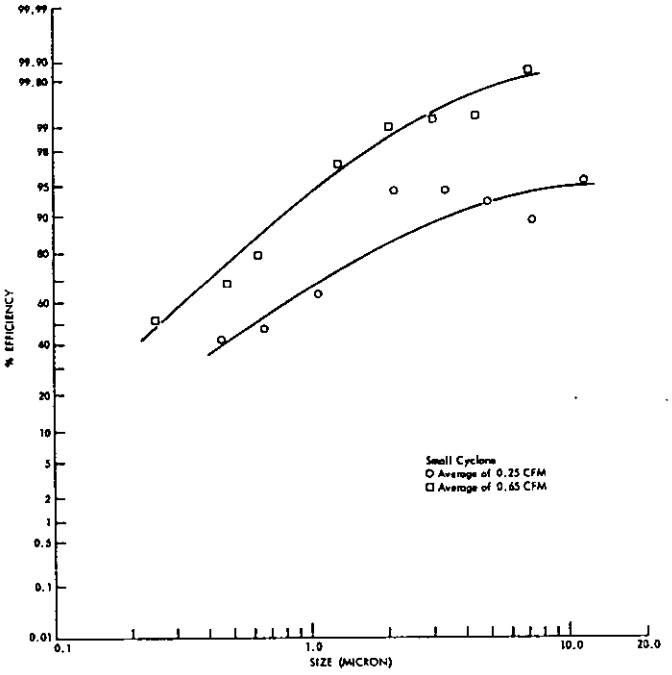


FIGURE B-18
CALIBRATION CURVE FOR SMALL CYCLONE

The methods used to quantify the gases are summarized below:

H_2S ASTM D 2725-70 "Methylene Blue Method;" exceptions to method - Neutral $CdSO_4$ solution (140 g/liter) used in place of zinc acetate absorbing solution.

NO_x: Federal Register Method 7 (Vol. 36, No. 247) Determination of Nitrogen Oxide Emissions from Stationary Sources"

NH_4: Anal. Chem., 39, 971 (1967) "Catalyzed Berthelot Reaction"

CN: ASTM D 2036-72, Method C Colorimetric (chloramine-T/Pyridine-Barbituric Acid)

Phenol: ASTM D 1783-70 Aminoantipyrine-Ferricyanide Method

SO_2: Federal Register Method 6 (Vol. 36, No. 247) "Determination of Sulfur Dioxide Emissions from Stationary Sources"

Pyridine: Gas Chromatographic Analysis
Instrument - MicroTek Gas Chromatograph, Model 220, equipped with a flame ionization detector
Column - 5% Theed on Chromasorb G, 80/100 Mesh, 9 ft x 1/4 cu in
Column Temperature - Isothermal at 85°C
Carrier Gas - N_2
Carrier Gas Flow Rate - 20 ml/min

The results of these analyses along with field appropriate field data were procured via computer programs to provide calculated results of ppm of these gases. These results along with other data are given in Tables B-59 through B-65.

A Varian Aerograph Gas Chromatograph, Model 1420-10, equipped with a 5 ml gas sample loop and a high sensitivity thermal conductivity detector, was used throughout for analysis of O_2, N_2, CO_2, H_2, THC, CH_4, and CO. The sample loop system was evacuated to as low a pressure possible with a Welch Duo-seal vacuum pump. For calculation purposes, this pressure drop was considered to be atmospheric pressure. The sample was passed

TABLE B-59

H2S ANALYTICAL RESULTS

SAMPLE NUMBER	AMBIENT TEMP(F)	BAROMETRIC PRESSURE (IN. HG) INIT.	BAROMETRIC PRESSURE (IN. HG) FINAL	FLASK PRESSURE (IN. HG) INIT.	FLASK PRESSURE (IN. HG) FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO-GRAMS	PPM OF H2S
K1A	79.00	29.40				.34	6.77	2.20	D.L. 1.10	D.L. .33
K1B	79.00	29.40				.34	5.65	1.84	D.L. 1.10	D.L. .39
K1C	79.00	29.40				.34	5.83	1.90	D.L. 1.10	D.L. .38
K1D	79.00	29.40				.34	6.12	1.99	D.L. 1.10	D.L. .36
K3A	80.00	29.25				.34	5.47	1.77	D.L. 1.10	D.L. .41
K3B	80.00	29.25				.34	13.00	4.20	D.L. 1.10	D.L. .17
K3C	80.00	29.25				.34	2.18	.71	18.00	16.76
K3D	80.00	29.25				.34	4.50	1.46	160.00	72.27
K4B	84.00	29.52				.34	12.98	4.21	D.L. 1.10	D.L. .17
W2A	72.00	29.35				.34	8.37	2.76	2.00	.48
W2B	72.00	29.35				.34	13.00	4.28	22.00	3.38
W3A	70.00	29.49				.34	3.80	1.26	D.L. 1.10	D.L. .57
W3C	70.00	29.49				.34	2.92	.97	D.L. 1.10	D.L. .75
W3D	70.00	29.49				.34	2.48	.82	D.L. 1.10	D.L. .88
W4A	75.00	29.35				.34	13.00	4.26	3.00	.46
W4B	75.00	29.35				.34	10.07	3.30	55.00	10.97
W4C	75.00	29.35				.34	11.30	3.70	51.00	9.06
W5A	79.00	29.42				.34	13.00	4.24	35.00	5.43
W5B	79.00	29.42				.34	6.23	2.03	16.00	5.18
W5C	79.00	29.42				.34	13.00	4.24	1.00	.16
W6A	73.00	29.15				.34	13.00	4.24	15.00	2.32
W6B	73.00	29.15				.34	3.22	1.05	D.L. 1.10	D.L. .69
W6C	73.00	29.15				.34	13.00	4.24	5.00	.77
W6D	73.00	29.15				.34	2.37	.77	50.00	42.53
W7A	74.00	29.22				.34	.60	.20	D.L. 1.10	D.L. 3.69
W7B	74.00	29.22				.34	.70	.23	D.L. 1.10	D.L. 3.16
LD1C	88.00	29.42				.34	3.37	1.08	D.L. 1.10	D.L. .67
LD1D	88.00	29.42				.34	2.52	.81	D.L. 1.10	D.L. .90
W11A	78.00	29.34				.34	11.63	3.79	90.00	15.62
W11B	78.00	29.34				.34	13.00	4.23	23.00	3.57
W11C	78.00	29.34				.34	13.00	4.23	D.L. 1.10	D.L. .17
W11D	78.00	29.34				.34	3.05	.99	15.00	9.93
W12A	88.00	29.42				.34	2.38	.76	D.L. 1.10	D.L. .95
W12B	88.00	29.42				.34	13.00	4.17	D.L. 1.10	D.L. .17

TABLE B-60

NOx(NO2) ANALYTICAL RESULTS

SAMPLE NUMBER	AMBIENT TEMP(F)	BAROMETRIC PRESSURE (IN. HG) INIT.	BAROMETRIC PRESSURE (IN. HG) FINAL	FLASK PRESSURE (IN. HG) INIT.	FLASK PRESSURE (IN. HG) FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO-GRAMS	PPM OF NOX(NO2)
K1A	79.00	29.40	29.25	26.27	.49			1.74	D.L. 7.00	D.L. 1.96
K1B	79.00	29.40	29.25	26.38	.49			1.73	D.L. 7.00	D.L. 1.97
K1C	79.00	29.40	29.25	26.46	.49			1.75	D.L. 7.00	D.L. 1.94
K1D	79.00	29.40	29.25	26.35	.49			1.74	D.L. 7.00	D.L. 1.96
K3A	80.00	29.25	29.42	26.36	.49			1.74	D.L. 7.00	D.L. 1.96
K3B	80.00	29.25	29.42	26.29	.49			1.73	40.00	11.26
K3C	80.00	29.25	29.42	26.44	.49			1.74	10.00	2.80
K3D	80.00	29.25	29.42	26.52	.49			1.75	10.00	2.78
K4B	84.00	29.52	29.52	26.76	.49			1.75	D.L. 7.00	D.L. 1.95
K4D	84.00	29.52	29.52	26.76	.49			1.76	D.L. 7.00	D.L. 1.93
W2A	72.00	29.35	29.50	23.83	.49			1.58	30.00	9.26
W2B	72.00	29.35	29.50	23.67	.49			1.58	D.L. 7.00	D.L. 2.16
W3A	70.00	29.49	29.38	23.90	.49			1.59	D.L. 7.00	D.L. 2.14
W3C	70.00	29.49	29.38	23.83	.49			1.60	D.L. 7.00	D.L. 2.13
W3D	70.00	29.49	29.38	23.86	.49			1.60	D.L. 7.00	D.L. 2.14
W4A	75.00	29.35	29.44	23.67	.49			1.57	D.L. 7.00	D.L. 2.16
W4B	75.00	29.35	29.44	23.67	.49			1.57	20.00	6.20
W4C	75.00	29.35	29.44	23.67	.49			1.57	D.L. 7.00	D.L. 2.17
W5A	79.00	29.42	29.32	23.81	.49			1.56	40.00	12.48
W5B	79.00	29.42	29.32	23.58	.49			1.55	180.00	56.59
W5C	79.00	29.42	29.32	23.50	.49			1.55	120.00	37.58
W6A	73.00	29.15	29.23	23.36	.49			1.56	D.L. 7.00	D.L. 2.19
W6B	73.00	29.15	29.23	23.40	.49			1.55	20.00	6.30
W6C	73.00	29.15	29.23	23.40	.49			1.56	D.L. 7.00	D.L. 2.19
W6D	73.00	29.15	29.23	23.44	.49			1.56	1560.00	488.41
W7A	74.00	29.22	29.48	23.49	.49			1.57	D.L. 7.00	D.L. 2.17
W7B	74.00	29.22	29.48	23.57	.49			1.56	D.L. 7.00	D.L. 2.18
W7C	74.00	29.22	29.48	23.34	.49			1.55	960.00	301.28
W7D	74.00	29.22	.00	23.07	.00			.02	10.00	301.28
LD1C	88.00	29.42	29.52	26.79	.49			1.74	D.L. 7.00	D.L. 1.96
LD1D	88.00	29.42	29.52	26.75	.49			1.74	20.00	5.58
W10A	79.00	29.27	29.34	23.80	.49			1.57	D.L. 7.00	D.L. 2.17
W10B	79.00	29.27	29.34	23.76	.49			1.56	D.L. 7.00	D.L. 2.18
W10C	79.00	29.27	29.34	23.65	.49			1.56	D.L. 7.00	D.L. 2.18
W11A	78.00	29.34	29.34	23.97	.49			1.58	D.L. 7.00	D.L. 2.16
W11B	78.00	29.34	29.34	23.86	.49			1.58	D.L. 7.00	D.L. 2.15
W11C	78.00	29.34	29.34	23.94	.49			1.57	10.00	3.09
W11D	78.00	29.34	29.34	23.97	.49			1.58	360.00	110.95
W12A	88.00	29.42	29.52	26.83	.49			1.74	10.00	2.79
W12B	88.00	29.42	29.52	26.67	.49			1.73	D.L. 7.00	D.L. 1.97

TABLE B-61

NH4 ANALYTICAL RESULTS

SAMPLE NUMBER	AMBIENT TEMP(F)	BAROMETRIC PRESSURE (IN. HG) INIT.	BAROMETRIC PRESSURE (IN. HG) FINAL	FLASK PRESSURE (IN. HG) INIT.	FLASK PRESSURE (IN. HG) FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO-GRAMS		PPM OF NH3	
K1A	79.00	29.40				.34	7.27	2.39	D.L.	7.00	D.L.	3.86
K1B	79.00	29.40				.34	6.15	2.02		19.00		12.37
K1C	79.00	29.40				.34	6.33	2.08	D.L.	7.00	D.L.	4.43
K1D	79.00	29.40				.34	6.62	2.17	D.L.	7.00	D.L.	4.24
K3A	80.00	29.25				.34	5.97	1.95	D.L.	7.00	D.L.	4.73
K3B	80.00	29.25				.34	13.00	4.24		7.00		2.17
K3C	80.00	29.25				.34	2.68	.88	D.L.	7.00	D.L.	10.52
K3D	80.00	29.25				.34	5.00	1.63	D.L.	7.00	D.L.	5.64
K4B	84.00	29.52				.34	13.00	4.25	D.L.	7.00	D.L.	2.17
K4D	84.00	29.52				.34	.50	.16	D.L.	7.00	D.L.	56.35
W2A	72.00	29.35				.34	8.87	2.95	D.L.	7.00	D.L.	3.13
W2B	72.00	29.35				.34	13.00	4.32		10.00		3.05
W3A	70.00	29.49				.34	4.30	1.44	D.L.	7.00	D.L.	6.39
W3C	70.00	29.49				.34	3.42	1.14	D.L.	7.00	D.L.	8.04
W3D	70.00	29.49				.34	2.98	1.00		8.00		10.53
W4A	75.00	29.35				.34	13.00	4.30		4.00		1.22
W4B	75.00	29.35				.34	10.57	3.49	D.L.	7.00	D.L.	2.64
W4C	75.00	29.35				.34	12.05	3.98		10.00		3.30
W5A	79.00	29.42				.34	13.00	4.27		3.00		.92
W5B	79.00	29.42				.34	6.73	2.21	D.L.	7.00	D.L.	4.16
W5C	79.00	29.42				.34	13.00	4.27	D.L.	7.00	D.L.	2.15
W6A	73.00	29.15				.34	13.00	4.28		83.00		25.50
W6B	73.00	29.15				.34	3.72	1.22		13.00		13.97
W6C	73.00	29.15				.34	13.00	4.26		15.00		4.61
W6D	73.00	29.15				.34	3.03	1.00		13.00		17.11
W7A	74.00	29.22				.34	1.10	.36		36.00		130.62
W7B	74.00	29.22				.34	1.20	.40		13.00		43.24
W7C	74.00	29.22				.34	.75	.25		10.00		53.22
LD1C	88.00	29.42				.34	4.20	1.36	D.L.	7.00	D.L.	6.78
LD1D	88.00	29.42				.34	1.02	.33	D.L.	7.00	D.L.	28.01
W10A	79.00	29.27				.34	8.78	2.87		15.00		6.87
W11A	78.00	29.34				.34	12.13	3.99		11.00		3.63
W11B	78.00	29.34				.34	13.00	4.27		13.00		4.00
W11C	78.00	29.34				.34	13.00	4.27		13.00		4.00
W11D	78.00	29.34				.34	3.55	1.17		17.00		19.18
W12A	88.00	29.42				.34	2.88	.93	D.L.	7.00	D.L.	9.88
W12B	88.00	29.42				.34	13.00	4.20	D.L.	7.00	D.L.	2.19

TABLE B-62

CN ANALYTICAL RESULTS

SAMPLE NUMBER	AMBIENT TEMP(F)	BAROMETRIC PRESSURE (IN. HG)	FLASK PRESSURE (IN. HG)	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO-GRAMS		PPM OF CN	
		INIT. FINAL	INIT. FINAL							
K1A	79.00	29.40		.36	7.77	2.68	D.L.	1.50	D.L.	.48
K1B	79.00	29.40		.36	6.65	2.29	D.L.	1.50	D.L.	.56
K1C	79.00	29.40		.36	6.83	2.36	D.L.	1.50	D.L.	.55
K1D	79.00	29.40		.36	7.12	2.45	D.L.	1.50	D.L.	.53
K3A	80.00	29.25		.36	6.47	2.22	D.L.	1.50	D.L.	.58
K3B	80.00	29.25		.36	13.00	4.45	D.L.	1.50	D.L.	.29
K3C	80.00	29.25		.36	3.18	1.09	D.L.	1.50	D.L.	1.18
K3D	80.00	29.25		.36	5.50	1.88		12.00		5.48
K4B	84.00	29.52		.36	13.00	4.46	D.L.	1.50	D.L.	.29
K4D	84.00	29.52		.36	1.00	.34	D.L.	1.50	D.L.	3.76
W2A	72.00	29.35		.36	9.37	3.27	D.L.	1.50	D.L.	.40
W2B	72.00	29.35		.36	13.00	4.54	D.L.	1.50	D.L.	.28
W3A	70.00	29.49		.36	4.80	1.69	D.L.	1.50	D.L.	.76
W3C	70.00	29.49		.36	3.92	1.38	D.L.	1.50	D.L.	.94
W3D	70.00	29.49		.36	3.48	1.23	D.L.	1.50	D.L.	1.05
W4A	75.00	29.35		.36	13.00	4.51	D.L.	1.50	D.L.	.29
W4B	75.00	29.35		.36	11.07	3.84	D.L.	1.50	D.L.	.34
W4C	75.00	29.35		.36	12.55	4.35	D.L.	1.50	D.L.	.30
W5A	79.00	29.42		.36	13.00	4.49		86.00		16.50
W5B	79.00	29.42		.36	7.23	2.50		30.00		10.34
W5C	79.00	29.42		.36	13.00	4.49		5.00		.96
W6A	73.00	29.15		.36	13.00	4.50		3.00		.57
W6B	73.00	29.15		.36	4.22	1.46	D.L.	1.50	D.L.	.89
W6C	73.00	29.15		.36	13.00	4.50	D.L.	1.50	D.L.	.29
W6D	73.00	29.15		.36	3.53	1.22	D.L.	1.50	D.L.	1.06
W7A	74.00	29.22		.36	1.60	.55	D.L.	1.50	D.L.	2.33
W7B	74.00	29.22		.36	1.70	.59	D.L.	1.50	D.L.	2.20
W7C	74.00	29.22		.36	1.25	.43	D.L.	1.50	D.L.	2.99
LD1C	88.00	29.42		.36	4.70	1.60	D.L.	1.50	D.L.	.81
LD1D	88.00	29.42		.36	1.52	.51	D.L.	1.50	D.L.	2.51
W10A	79.00	29.27		.36	9.28	3.19		20.00		5.40
W11A	78.00	29.34		.36	12.63	4.36		396.00		78.25
W11B	78.00	29.34		.36	13.00	4.48		47.00		9.02
W11C	78.00	29.34		.36	13.00	4.48		6.00		1.15
W11D	78.00	29.34		.36	4.05	1.40	D.L.	1.50	D.L.	.92
W12A	88.00	29.42		.36	3.38	1.15	D.L.	1.50	D.L.	1.12
W12B	88.00	29.42		.36	13.00	4.41	D.L.	1.50	D.L.	.29

TABLE B-63

PHENOL ANALYTICAL RESULTS

SAMPLE NUMBER	AMBIENT TEMP(F)	BAROMETRIC PRESSURE (IN. HG) INIT.	BAROMETRIC PRESSURE (IN. HG) FINAL	FLASK PRESSURE (IN. HG) INIT.	FLASK PRESSURE (IN. HG) FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO-GRAMS	PPM OF PHENOL
K1A	79.00	29.40				.36	8.27	2.91	D.L. 50.00	D.L. 4.09
K1B	79.00	29.40				.36	7.15	2.51	D.L. 50.00	D.L. 4.73
K1C	79.00	29.40				.36	7.33	2.58	D.L. 50.00	D.L. 4.61
K1D	79.00	29.40				.36	7.62	2.68	D.L. 50.00	D.L. 4.44
K3A	80.00	29.25				.36	6.97	2.43	D.L. 50.00	D.L. 4.89
K3B	80.00	29.25				.36	13.00	4.54	D.L. 50.00	D.L. 2.62
K3C	80.00	29.25				.36	3.68	1.29	D.L. 50.00	D.L. 9.25
K3D	80.00	29.25				.36	6.00	2.10	156.00	17.72
K4B	84.00	29.52				.36	6.50	2.27	D.L. 50.00	D.L. 5.23
K4D	84.00	29.52				.36	1.50	.52	D.L. 50.00	D.L. 22.68
W2A	72.00	29.35				.36	9.87	3.51	D.L. 50.00	D.L. 3.39
W2B	72.00	29.35				.36	13.00	4.62	D.L. 50.00	D.L. 2.57
W3A	70.00	29.49				.36	5.30	1.90	D.L. 50.00	D.L. 6.26
W3C	70.00	29.49				.36	4.42	1.58	D.L. 50.00	D.L. 7.51
W3D	70.00	29.49				.36	3.98	1.43	D.L. 50.00	D.L. 8.33
W4A	75.00	29.35				.36	13.00	4.60	80.00	4.14
W4B	75.00	29.35				.36	11.57	4.09	310.00	18.03
W4C	75.00	29.35				.36	13.00	4.60	600.00	31.06
W5A	79.00	29.42				.36	13.00	4.58	150.00	7.80
W5B	79.00	29.42				.36	7.73	2.72	90.00	7.87
W5C	79.00	29.42				.36	13.00	4.58	D.L. 50.00	D.L. 2.60
W6A	73.00	29.15				.36	13.00	4.58	D.L. 50.00	D.L. 2.60
W6B	73.00	29.15				.36	4.72	1.66	D.L. 50.00	D.L. 7.16
W6C	73.00	29.15				.36	13.00	4.58	D.L. 50.00	D.L. 2.60
W6D	73.00	29.15				.36	4.03	1.42	D.L. 50.00	D.L. 8.37
W7A	74.00	29.22				.36	2.10	.74	D.L. 50.00	D.L. 16.06
W7B	74.00	29.22				.36	2.20	.78	D.L. 50.00	D.L. 15.33
W7C	74.00	29.22				.36	1.75	.62	D.L. 50.00	D.L. 19.27
LD1C	88.00	29.42				.36	5.20	1.80	D.L. 50.00	D.L. 6.61
LD1D	88.00	29.42				.36	2.02	.70	D.L. 50.00	D.L. 17.05
W10A	79.00	29.27				.36	9.78	3.43	D.L. 50.00	D.L. 3.47
W11A	78.00	29.34				.36	13.00	4.57	290.00	15.10
W11B	78.00	29.34				.36	13.00	4.57	90.00	4.69
W11C	78.00	29.34				.36	13.00	4.57	100.00	5.21
W11D	78.00	29.34				.36	4.55	1.60	D.L. 50.00	D.L. 7.44
W12A	88.00	29.42				.36	3.88	1.34	D.L. 50.00	D.L. 8.85
W12B	88.00	29.42				.36	13.00	4.50	D.L. 50.00	D.L. 2.64

TABLE B-64

SO2 ANALYTICAL RESULTS

SAMPLE NUMBER	AMBIENT TEMP(F)	BAROMETRIC PRESSURE (IN. HG) INIT.	BAROMETRIC PRESSURE (IN. HG) FINAL	FLASK PRESSURE (IN. HG) INIT.	FLASK PRESSURE (IN. HG) FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO-GRAMS	PPM OF SO2
K1A	79.00	29.40				.33	8.77	2.75	200.00	25.40
K1B	79.00	29.40				.33	7.65	2.40	170.00	24.75
K1C	79.00	29.40				.33	7.83	2.46	150.00	21.32
K1D	79.00	29.40				.33	8.12	2.55	130.00	17.84
K3A	80.00	29.25				.33	7.47	2.33	140.00	21.03
K3B	80.00	29.25				.33	15.00	4.68	130.00	9.72
K3C	80.00	29.25				.33	4.18	1.30	180.00	48.25
K3D	80.00	29.25				.33	6.50	2.03	D.L. 90.00	D.L. 15.53
K4B	84.00	29.52				.33	16.00	5.00	D.L. 90.00	D.L. 6.30
K4D	84.00	29.52				.33	2.00	.62	D.L. 90.00	D.L. 50.37
W2A	72.00	29.35				.33	10.37	3.29	D.L. 90.00	D.L. 9.56
W2B	72.00	29.35				.33	22.00	6.99	D.L. 90.00	D.L. 4.50
W3A	70.00	29.49				.33	2.30	.74	D.L. 90.00	D.L. 42.71
W3C	70.00	29.49				.33	4.92	1.57	D.L. 90.00	D.L. 19.98
W3D	70.00	29.49				.33	4.48	1.44	D.L. 90.00	D.L. 21.91
W4A	75.00	29.35				.33	22.00	6.95	D.L. 90.00	D.L. 4.53
W4B	75.00	29.35				.33	12.07	3.81	100.00	9.18
W4C	75.00	29.35				.33	13.55	4.28	D.L. 90.00	D.L. 7.35
W5A	79.00	29.42				.33	22.00	6.91	1730.00	87.51
W5B	79.00	29.42				.33	8.23	2.59	1720.00	232.47
W5C	79.00	29.42				.33	22.00	6.91	1400.00	70.81
W6A	73.00	29.15				.33	22.00	6.93	D.L. 90.00	D.L. 4.54
W6B	73.00	29.15				.33	5.22	1.64	D.L. 90.00	D.L. 19.16
W6C	73.00	29.15				.33	22.00	6.93	1370.00	69.16
W6D	73.00	29.15				.33	4.53	1.43	D.L. 90.00	D.L. 22.05
W7A	74.00	29.22				.33	2.60	.82	D.L. 90.00	D.L. 38.42
W7B	74.00	29.22				.33	2.70	.85	D.L. 90.00	D.L. 37.00
W7C	74.00	29.22				.33	2.25	.71	D.L. 90.00	D.L. 44.40
LD1C	88.00	29.42				.33	5.70	1.76	D.L. 90.00	D.L. 17.86
LD1D	88.00	29.42				.33	2.52	.78	D.L. 90.00	D.L. 40.46
W10A	79.00	29.27				.33	10.28	3.21	D.L. 90.00	D.L. 9.79
W11A	78.00	29.34				.33	13.63	4.28	D.L. 90.00	D.L. 7.35
W11B	78.00	29.34				.33	15.05	4.73	D.L. 90.00	D.L. 6.66
W11C	78.00	29.34				.33	22.00	6.91	D.L. 90.00	D.L. 4.56
W11D	78.00	29.34				.33	5.05	1.59	D.L. 90.00	D.L. 19.85
W12A	88.00	29.42				.33	4.38	1.35	D.L. 90.00	D.L. 23.23
W12B	88.00	29.42				.33	15.50	4.79	D.L. 90.00	D.L. 6.57

TABLE B-65

PYRIDINE ANALYTICAL RESULTS

SAMPLE NUMBER	AMBIENT TEMP(F)	BAROMETRIC PRESSURE (IN. HG) INIT.	BAROMETRIC PRESSURE (IN. HG) FINAL	FLASK PRESSURE (IN. HG) INIT.	FLASK PRESSURE (IN. HG) FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO-GRAMS	PPM OF PYRIDINE
K1A	79.00	29.40				.36	8.27	2.91	D.L.500.00	D.L. 48.70
K1B	79.00	29.40				.36	7.15	2.51	D.L.500.00	D.L. 56.31
K1C	79.00	29.40				.36	7.33	2.58	D.L.500.00	D.L. 54.90
K1D	79.00	29.40				.36	7.62	2.68	D.L.500.00	D.L. 52.86
K3A	80.00	29.25				.36	6.97	2.43	D.L.500.00	D.L. 58.19
K3B	80.00	29.25				.36	13.00	4.54	D.L.500.00	D.L. 31.19
K3C	80.00	29.25				.36	3.68	1.29	D.L.500.00	D.L.110.07
K3D	80.00	29.25				.36	6.00	2.10	D.L.500.00	D.L. 67.57
K4B	84.00	29.52				.36	6.50	2.27	D.L.500.00	D.L. 62.26
K4D	84.00	29.52				.36	1.50	.52	D.L.500.00	D.L.269.79
W2A	72.00	29.35				.36	9.87	3.51	D.L.500.00	D.L. 40.34
W2B	72.00	29.35				.36	13.00	4.62	D.L.500.00	D.L. 30.62
W3A	70.00	29.49				.36	5.30	1.90	D.L.500.00	D.L. 74.46
W3C	70.00	29.49				.36	4.42	1.58	D.L.500.00	D.L. 89.36
W3D	70.00	29.49				.36	3.98	1.43	D.L.500.00	D.L. 99.08
W4A	75.00	29.35				.36	13.00	4.60	D.L.500.00	D.L. 30.79
W4B	75.00	29.35				.36	11.57	4.09	D.L.500.00	D.L. 34.61
W4C	75.00	29.35				.36	13.00	4.60	D.L.500.00	D.L. 30.79
W5A	79.00	29.42				.36	13.00	4.58	D.L.500.00	D.L. 30.95
W5B	79.00	29.42				.36	7.73	2.72	D.L.500.00	D.L. 52.02
W5C	79.00	29.42				.36	13.00	4.58	D.L.500.00	D.L. 30.95
W6A	73.00	29.15				.36	13.00	4.58	D.L.500.00	D.L. 30.89
W6B	73.00	29.15				.36	4.72	1.66	D.L.500.00	D.L. 85.13
W6C	73.00	29.15				.36	13.00	4.58	D.L.500.00	D.L. 30.89
W6D	73.00	29.15				.36	4.03	1.42	D.L.500.00	D.L. 99.55
W7A	74.00	29.22				.36	2.10	.74	D.L.500.00	D.L.191.10
W7B	74.00	29.22				.36	2.20	.78	D.L.500.00	D.L.182.42
W7C	74.00	29.22				.36	1.75	.62	D.L.500.00	D.L.229.32
LD1C	88.00	29.42				.36	5.20	1.80	D.L.500.00	D.L. 78.66
LD1D	88.00	29.42				.36	2.02	.70	D.L.500.00	D.L.202.83
W10A	79.00	29.27				.36	9.78	3.43	D.L.500.00	D.L. 41.33
W11A	78.00	29.34				.36	13.00	4.57	D.L.500.00	D.L. 30.97
W11B	78.00	29.34				.36	13.00	4.57	D.L.500.00	D.L. 30.97
W11C	78.00	29.34				.36	13.00	4.57	D.L.500.00	D.L. 30.97
W11D	78.00	29.34				.36	4.55	1.60	D.L.500.00	D.L. 88.50
W12A	88.00	29.42				.36	3.88	1.34	D.L.500.00	D.L.105.33
W12B	88.00	29.42				.36	13.00	4.50	D.L.500.00	D.L. 31.47

into the sample loop and the sample pressure measured. Using a molecular sieve 5A column, the gases were separated under the instrument conditions listed in Table B-66.

The calculations for quantitation of the gas concentration are shown in Table B-67. Briefly, the volume percent of each gas was calculated, as follows: The volume of the unknown gas was calculated from the instrument response in peak area or height and the response ratio of the instrument per volume of each standard gas. The volume of unknown gas was divided by the total volume of sample introduced into the chromatograph after both were corrected to atmospheric pressure. The response ratios were calculated from at least four different levels of each standard gas.

The results of these analyses are given in Table B-68, along with results of THC, CH_4, and CO obtained in the field.

TABLE B-66

GAS CHROMATOGRAPH PARAMETERS FOR GAS ANALYSIS

Gas	O_2	N_2	CO_2	H_2
Column	(a)	(a)	(a)	(b)
Column Temperature, °C	60	60	250	25
Detector Temperature, °C	195	195	195	140
Carrier Gas	He	He	He	N_2
Carrier Gas Flow Rate, ml/min	100	100	100	60
Bridge Current, ma	200	200	200	150

(a) Molecular Sieve 5A, 5 ft x 1/8 in., s.s.

(b) Molecular Sieve 5A, 15 ft x 1/8 in. s.s.

TABLE B-67

CALCULATIONS FOR GAS ANALYSIS

(1) Volume of standard gas calculated to atmospheric pressure =

$V_{sa} = (5)(Ps/Pa)\ (s)$, where
V_{sa} = Volume of standard gas at atm. press.
5 = Gas sample loop volume
P_s = Standard pressure, mmHg
P_a = Atmospheric pressure, mmHg
S = Volume % of gas in standard

(2) Ratio of standard gas at atmospheric pressure per instrument response unit =

$R = V_{sa}/IRU_s$, where
R = Ratio, volume of standard gas per instrument response unit
IRU_s = Instrument response units (either peak area or height) for standard gas

(3) Volume of unknown gas at atmospheric pressure =

$V_{ua} = (R)(IRU_u)$, where
V_{ua} = Volume of unknown gas at atmospheric pressure
IRU_u = Instrument response units for unknown gas

(4) Total sample volume at atmospheric pressure =

$V_{ts} = (5)(P_v/P_a)$, where
V_{ts} = Total sample volume
P_u = Pressure of sample, mmHg

(5) Concentration of unknown gas, volume percent =

Volume percent of unknown = $(V_{ua}/V_{ts})\ 100$

TABLE B-68
O_2, N_2, CO_2, THC, CH_4, CO AND H_2 RESULTS
(Volume %)

Sample Number	Sample Date	O_2	N_2	CO_2	Total H.C.	CH_4	CO	H_2	Total
W2A1	21 June 1973							0.35	
W2B1	No Date							0.42	
W3A1	22 June 1973	17.80	80.02	0.03	0.03	0.01	0.02	0.00	97.91
W3C1	22 June 1973	16.61	80.37	0.13	0.28	0.21	0.13	0.01	97.74
W3D1	22 June 1973	16.72	79.55	0.04	0.08	0.05	0.03	0.00	96.47
W4A1	25 June 1973	16.56	79.29	0.06	0.06	0.01	0.01	0.00	95.93
W4B1	25 June 1973	15.71	78.05	0.28	0.30	0.16	0.04	0.28	94.82
W4C1	25 June 1973	16.60	82.39	0.29	0.02	0.02	0.01	0.00	99.33
W5A1	26 June 1973	15.75	75.85	2.33	0.68	0.47	0.77	0.17	96.02
W5B1	26 June 1973	11.29	81.38	3.06	1.18	0.06	1.22	0.46	98.65
W5C1	26 June 1973	14.90	81.58	1.01	0.33	0.20	0.49	0.04	98.55
W6A1	28 June 1973	15.23	80.27	0.96	0.80	0.56	1.53	1.80	101.15
W6B1	28 June 1973	16.59	80.41	2.14	0.15	0.09	0.12	0.01	99.51
W6C1	28 June 1973	12.99	80.55	2.77	2.08	1.44	1.41	0.43	101.67
W6D1	28 June 1973	14.06	73.54	1.84	2.72	4.29	1.53	4.39	102.37
W7A1	29 June 1973	15.58	79.31	0.74	0.26	0.19	0.34	0.48	96.90
W7B1	29 June 1973	16.33	75.94	0.27	0.24	0.19	0.17	0.13	93.27
W7C1	29 June 1973	15.96	77.69	1.40	2.66	2.82	1.34	1.23	103.10
W7D1	29 June 1973	15.60	77.85	1.30	1.88	1.17	0.68	0.32	96.92
W9A1	3 July 1973	17.41	81.62	0.30				0.00	99.33
W9C1	No Date	17.25	82.22	0.12				0.13	99.72
W10A1	4 July 1973	16.10	81.19	0.29				0.21	97.79
W10B1	4 July 1973	16.27	80.35	0.56				0.51	97.69
W10C1	4 July 1973	14.70	75.89	1.20				0.42	92.21
W11A1	5 July 1973	15.33	76.56	0.86				2.13	94.88
W11B1	5 July 1973	16.01	78.46	0.07				0.30	94.84
W11D1	5 July 1973	15.00	71.83	1.39				1.42	89.64
W11C1	5 July 1973	16.22	74.47	0.15				0.06	90.90
K1A1	13 August 1973	16.03	81.13	0.07	0.11	0.02	0.02	0.01	97.39
K1B1	13 August 1973	16.42	76.32	0.14	0.09	0.03	0.02	0.03	93.05
K1C1	13 August 1973	15.96	76.97	0.12	0.10	0.04	0.03	0.02	93.24
K1D1	13 August 1973	16.11	76.33	0.11	0.06	0.01	0.01	0.01	92.64
K3A1	15 August 1973	14.85	73.45	0.22	7.41	6.76	0.50	0.41	103.60
K3B1	15 August 1973	16.41	78.98	0.16	0.52	0.42	0.15	0.36	97.00
K3C1	15 August 1973	14.20	76.60	1.24	8.10	7.79	1.96	3.54	113.43
K3D1	15 August 1973	14.84	66.28	1.14	7.05	4.94	1.11	3.84	99.20
W12A1	16 August 1973	16.05	75.81	0.42	0.26	0.17	0.20	0.19	93.10
W12B1	16 August 1973	16.34	75.53	0.40	1.48	0.95	0.33	1.56	96.59
LD1C1	16 August 1973	15.97	74.07	0.10	0.18	0.08	0.03	0.05	90.48
LD1D1	16 August 1973	16.56	73.36	0.10	0.13	0.04	0.02	0.05	90.26
K4B1	17 August 1973	15.76	80.95	0.15	0.44	0.31	0.10	0.48	98.19
K4D1	17 August 1973	15.02	71.01	0.95	2.59	1.77	0.43	3.32	95.09

APPENDIX C

COMPUTER PROGRAMMING DOCUMENTATION

This appendix documents the data processing steps involved in the reduction of data obtained during the charging of J&L P4 battery during the course the coke oven charging emissions test program. The specific areas that are discussed are as follows: gas flow, volume flow, particulate, and optical measurement data. The computer programs to convert these data and generate the final results are covered in detail in this appendix.

Continuous Gas Flow Data

The coke oven monitoring program conducted by MITRE included monitoring of twenty-seven coke oven charges in the summer of 1973. After an equipment check (Test 1), each charge monitored was labelled as a separate test (Test 2 through Test 28.) Each test generated strip charts and a magnetic tape which contained binary values representing instrument voltages for each second of time. This process is illustrated in Figure C-1. An edit program processed these tapes to strip off the comment records and any defective records. Typically, the first data record after starting the system was defective because the data were shifted to the right and created a data record in excess of the standard five hundred seventy two (572) bytes. Since the beginning of each data set contained only preliminary background data, these records were simply printed and discarded. All non-defective data records were simply copied to a new data-set. The maximum number of defective records for any charge monitored was three(3). Since each record consisted of one seconds observation, these defective records were also simply discarded. Subsequent analysis of these data revealed that all were from the preliminary background monitoring phase. Since this preliminary edit program basically created a copy of the original data, it is not included in this appendix.

An overview of the processing of these data is presented in Figure C-2. This flow chart depicts the man-machine interaction required to prepare the data reports and final data tape. The first two data sets on the

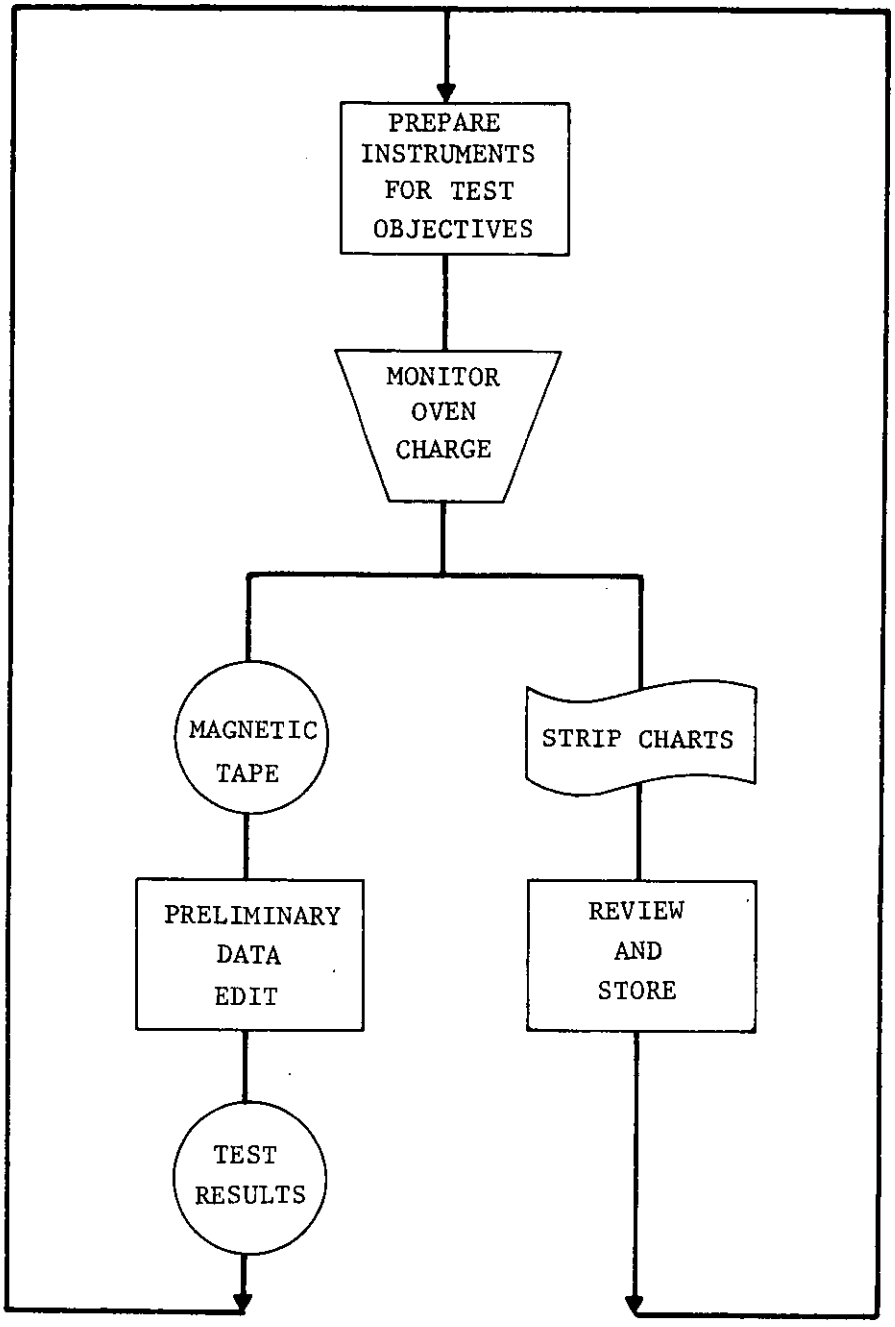


FIGURE C-1
COKE OVEN CHARGE DATA RECORDING OVERVIEW

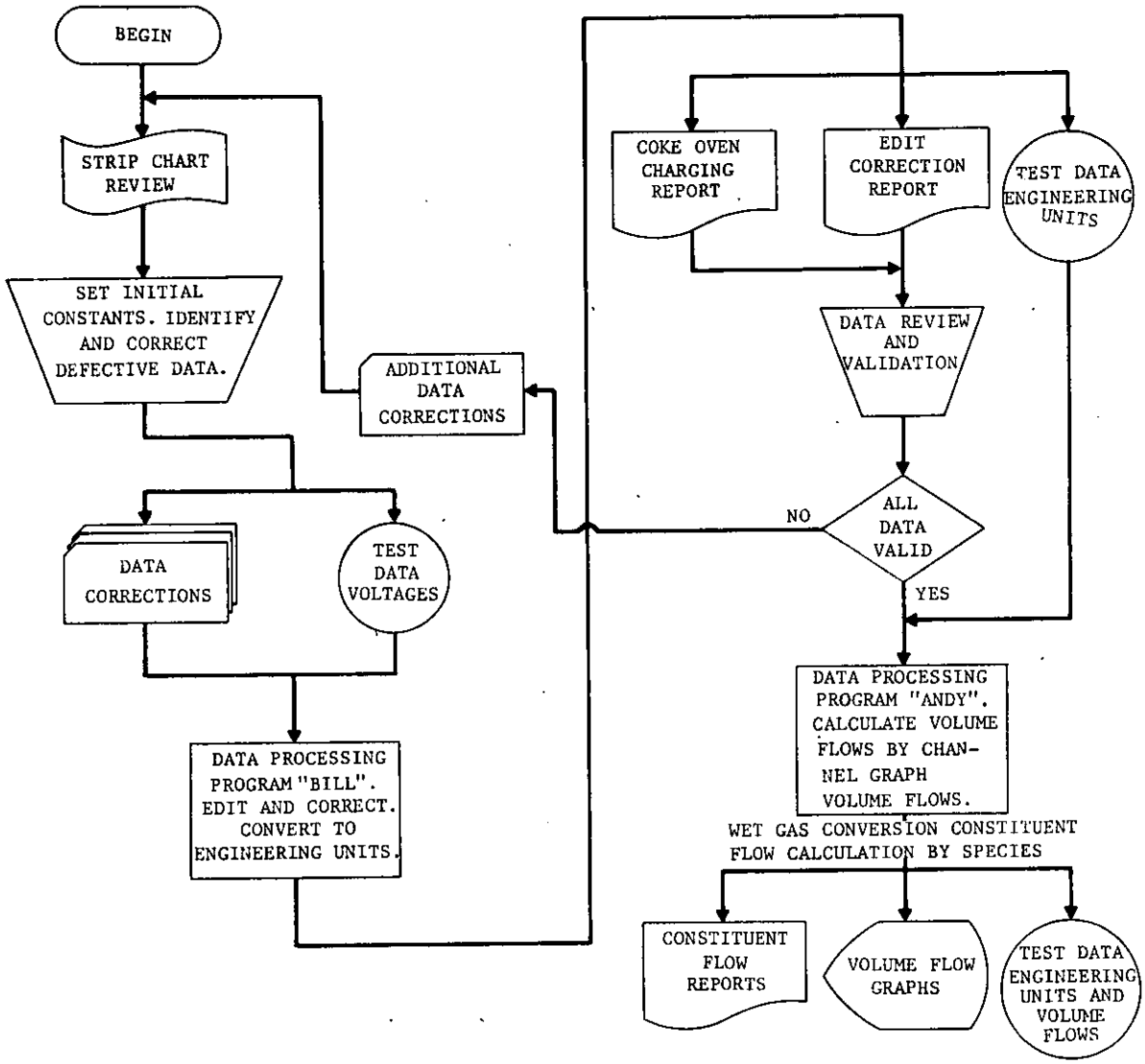


FIGURE C-2
COKE OVEN DATA PROCESSING OVERVIEW

final data tape provided EPA represent the output of the programs labelled "Bill" and "Andy" respectively. Detailed descriptions of the record structure for each data set appear with the description of each program. The data output from both programs have been restricted to exclude some of the background data. While the second data set record structure contains the complete data record from the first data set, more restrictive time limits used for a number of the tests result in fewer data records.

The first major processing program ("Bill") converted the voltages monitored during any test into engineering units. In addition, defective data identified from known equipment failures or comparison of data with strip charts were corrected. Time lags resulting from gas flowing from the point of emission to the monitoring equipment were calculated and used to time shift these observations so that all observations now have the same time reference. The output from the program includes a detailed print-out of all observations for each second of time.

A second program labelled "Andy" calculated volume flows for channels monitored as well as reporting the various gas constituents. Also dry gas measurements were converted to wet gas values for all tests where the relative humidity was known. Since the flow results were accumulated for each test, a more restrictive time period was utilized. The output of this program included volume flow graphs, constituent flow reports and an additional data set. The remainder of this section will present a description of these two programs, including the output record structures and the program listings. The output record structures include detailed information on accessing these data sets on the tape provided EPA.

Conversion of Recorded Voltages to Engineering Units

Conversion of recorded voltages to engineering units was the first step in analysis of the machine readable data. A single PL1 program converted these instrument voltage data from all twenty-seven recorded tests into a new record format containing these data in a more useful form. This program named "Bill" is depicted in Figure C-2 as the first

program in the Data Processing Overview. The remainder of this section will describe the input record structure, the output record structure, and the functions of the processing program. Included with the output record structure are the details necessary to access these data which were provided as a machine readable data set to EPA. This data set also served as input to a subsequent program ("Andy") described in the next section.

A single format 572 byte fixed length record was used for recording instrument readings on each test. The record consisted of a twelve (12) byte header followed by seventy (70) groups of eight bytes of data from a channel. The record structure and field descriptions are depicted in Figure C-3. The seventy data channels of the input record structure were not all used. While the number of channels utilized varied by test, a total of thirty-nine (39) channels were used during one or more tests. These thirty-nine (39) channels were converted and written to an output record structure. Channel identifier used in this program referenced the position of the data channel in the seventy channel input record.

The output record differs considerably from the input record. A fixed length 1928 byte record has been generated under two alternative formats. One format contains all the descriptive data for the coke oven charge being monitored (Test 2 through Test 28). This format describes a test header record which physically separates the data records associated with different tests by appearing before the data records for that test. The second format contains all the data recorded during a quarter minute. This is a heirachial record structure with an identifier on the first and second levels followed by the data for all channels in sequence on the second level. These record structures will now be described in greater detail beginning with the data record.

Data records contain one quarter minute of data. This format is depicted in detail in Figure C-4. Data are identified by an eight byte header which indicates the time of the observations. If the last byte of this header contains a quarter identifier of "1", the data are from the first quarter of the minute (seconds 0 through 14.) Subsequent

All Data in EBCDIC Character Form

	FIELD NAME	NUMBER OF BYTES	FIELD DESCRIPTION
Header	JD	3	Julian Day in 1973
	HR	2	Hour of Observation
	MIN	2	Minute of Observation
	SEC	2	Second of Observation
	SECHUN	2	Hundredth of Second at Recording
	BLANK	1	Not Used
Data*	CHAN	2	Channel Identifier ØØ - 69 in sequence
	VOLT	6	Instrument Voltage recorded with a leading sign (+ or -) and an implied decimal point between the second and third character e.g. + 0∧0923 where ∧ represents the implied decimal location.

* Repeats to provide a total of seventy data items

FIGURE C-3
INPUT DATA RECORD FORMAT PROGRAM "BILL"

Level	Field Name	Field Type and Length in Bytes	Field Description
1	REC_ID	7 CHAR	Record Identifier Julian Day 3 characters, hour 2 characters, minute 2 characters
1	QTR CHAR	1 CHAR	Quarter minute identifier 1, 2, 3, or 4
2*	SEC	2 CHAR	Second of observation, i.e., ØØ, Ø1, etc. A blank denotes no observation for that second.
2	CHØØ	4 FIXED DECIMAL	Channel ØØ, Picture 999999.9
2	CHØ1	4 FIXED DECIMAL	Channel Ø1, Picture 999999.9
2	CHØ2	4 FIXED DECIMAL	Channel Ø2, Picture 999999.9
2	CHØ3	4 FIXED DECIMAL	Channel Ø3, Picture 9999.999
2	CHØ4	4 FIXED DECIMAL	Channel Ø4, Picture 99999.99
2	CHØ5	4 FIXED DECIMAL	Channel Ø5, Picture 999999.9
2	CHØ6	4 FIXED DECIMAL	Channel Ø6, Picture 9999.999
2	CHØ7	4 FIXED DECIMAL	Channel Ø7, Picture 99999.99
2	CHØ8	4 FIXED DECIMAL	Channel Ø8, Picture 999.9999
2	CHØ9	4 FIXED DECIMAL	Channel Ø9, Picture 999999.9
2	CH1Ø	4 FIXED DECIMAL	Channel 1Ø, Picture 99999.99
2	CH11	4 FIXED DECIMAL	Channel 11, Picture 9999999.
2	CH13	4 FIXED DECIMAL	Channel 13, Picture 999999.9
2	CH14	4 FIXED DECIMAL	Channel 14, Picture 99999.99
2	CH16	4 FIXED DECIMAL	Channel 16, Picture 999.9999
2	CH3Ø	4 FIXED DECIMAL	Channel 3Ø, Picture 9999.999
2	CH31	4 FIXED DECIMAL	Channel 31, Picture 999999.9
2	CH33	4 FIXED DECIMAL	Channel 33, Picture 9999.999
2	CH34	4 FIXED DECIMAL	Channel 34, Picture 999999.9
2	CH36	4 FIXED DECIMAL	Channel 36, Picture 9999.999
2	CH4Ø	4 FIXED DECIMAL	Channel 4Ø, Picture 999999.9
2	CH41	4 FIXED DECIMAL	Channel 41, Picture 9999.999

* The second level contains 15 repetitions of the data observations. Each second is in positional sequence, i.e., 'ØØ', ' ', 'Ø2', ... denotes a second Ø, no observations for second 1, second 2, etc.

FIGURE C-4
OUTPUT DATA RECORD FORMAT—PROGRAM "BILL"

Level	Field Name	Field Type and Length in Bytes	Field Description
2	CH42	4 FIXED DECIMAL	Channel 42, Picture 999999.9
2	CH43	4 FIXED DECIMAL	Channel 43, Picture 999999.9
2	CH44	4 FIXED DECIMAL	Channel 44, Picture 9999.999
2	CH45	4 FIXED DECIMAL	Channel 45, Picture 9999.999
2	CH37	4 FIXED DECIMAL	Channel 37, Picture 999999.9
2	CH39	4 FIXED DECIMAL	Channel 39, Picture 999999.9
2	CH53	4 FIXED DECIMAL	Channel 53, Picture 999999.9
2	CH17	1 CHAR	Switch**
2	CH18	1 CHAR	Switch
2	CH19	1 CHAR	Switch
2	CH2Ø	1 CHAR	Switch
2	CH21	1 CHAR	Switch
2	CH22	1 CHAR	Switch
2	CH23	1 CHAR	Switch
2	CH24	1 CHAR	Switch
2	CH25	1 CHAR	Switch
2	CH48	1 CHAR	Switch

**Ø - off
1 - on
( ) - not used

FIGURE C-4 (CONTINUED)
OUTPUT DATA RECORD FORMAT–PROGRAM "BILL"

quarters are identified in a similar manner. This eight byte header contains character data and does not contain any blanks.

The second level of the data record identifies the record of the observation by a two digit number stored in character form. If data were not recorded during a second this field contains two blanks and the related channel data are meaningless. The fifteen seconds of data are stored in the record in ascending time order. If one second of data were not recorded, the corresponding position in the quarter minute will be blank. Other than the first or last quarter minute of monitoring during any test, almost every second of data read are available.

Associated with each data second in the record are thirty-nine (39) data fields. The first twenty-nine (29) data fields contain packed decimal data and the last ten (10) data fields contain a single character flag. The data field identifiers in Figure C-4 all contain a two digit suffix denoting the channel on which the data were originally recorded (ØØ, Ø1, etc.). A second number associated with these data fields is the positional index within the data group, i.e. a number from 1 to 39. This number may be associated with an array of labels stored in the test header record to determine the contents of that data field during that test. If a data channel was not used during a test the associated label is blank, i.e. filled with hexadecimal 40 in every byte. Since the interpretation of the field contents varies by test, a description of the field contents requires an association with the header record which immediately precedes the first test data record.

Test header records are identified by the characters KEY in the first three bytes of the record. While these records are also 1928 bytes in length only the first three-hundred-twenty-four (324) bytes contain information. A description of the field locations and contents for this record are provided in Figure C-5.

The test header record format and the data record format describe the record contents of the first output file provided EPA. This file is organized in chronological sequence. Tests were numbered as they were conducted and data were recorded in time sequence. A description of

Field Name	Field Type and Length in Bytes	Field Description
KEYIZ	3 CHAR	"KEY" identifies the record as a header record.
MONTHA	12 CHAR	Name of the month, i.e., JUNE.
DAYA	2 CHAR	Day of the test, i.e., 12.
LABCH	7 CHAR	An array of 39 elements containing a label describing the contents of each channel during a test. Related by a 1 to 1 positional correspondence with the 39 channels described in the output data record.
OVKC	4 CHAR	Coke oven identifier.
MRICH	3 CHAR	Corresponding MRI test, if applicable
REMCH	34 CHAR	Remarks pertaining to the test.
KKKREC	7 CHAR	Key of the first data record for this test.
NNN	2 FIXED BINARY	Test Number.
JUNK	1588 CHAR	Not used.

FIGURE C-5
OUTPUT TEST HEADER RECORD FORMAT--PROGRAM "BILL"

file characteristics, tape numbers, etc., necessary to access these data appears in Figure C-8.

A brief description of the program "Bill" which translated these data from the input to the output structures described follows. An outline of program functions appears in Figure C-6. The program will be described in logical sequence with respect to these functions.

The test identification by test number and data were accomplished by arranging the input data in chronological sequence and testing for a time difference greater than two hours. The Julian day was also converted to a month and day. The occurrence of a new test also resulted in a branch to "NUTEST". In this section of the program all test related data were initialized. This included the labels identified with each of the thirty-nine (39) channels associated with the output record. This seven character label identifies both the gas constituent or other parameter measured and the unit of measure. Those channels used to indicate only a switch position, that is the last ten channels in the output record, contain only a brief description of the switch. All switch data are the character 1, Ø, or blank denoting on, off, or not used, respectively. These types of descriptive data concerning the test were printed in the data analysis report and output as a part of the data header record.

In addition to setting label variables which also served as control variables in the processing phase each new test required setting of calibration constants for data conversion. Based on analysis of ambient conditions and equipment calibration checks prior to each test, parameters necessary for conversion to engineering units were determined. These parameters were changed when required between tests.

Time shifting of data to reflect lags caused by transport and analysis of data were applied to eleven channels if they were used. These channels were ØØ to Ø9 for all tests and channel 53 for tests two and three only. These time lags were evaluated by system tests and resulted in data shifts of between sixteen (16) and thirty (30) seconds. These data were

- Identify the test and oven monitored
- Identify and label channels utilized during the test
- Eliminate instrument data recorded during equipment checks prior to the test
- Generate test header record
- Shift gaseous data to time of occurrence (eliminate delays caused by gas movement and analysis)
- Convert recorded equipment voltages to engineering units
- Correct data errors caused by recording equipment failures
- Print data correction report
- Print data analysis report in engineering units
- Create a data set of all test records

FUNCTIONS OF COMPUTER PROGRAM "BILL"

FIGURE C-6

shifted by calculating a cumulative second from the beginning of the day and then shifting the observation to the correct earlier time of occurrence.

Data were converted to engineering units by a unique linear transformation for each required channel. Some channels became non-linear beyond a threshold voltage. When this occurred the voltages were converted using a linear transformation and a leading asterisk was used to flag these engineering values on the printed report. Since the calibration of the instruments varied slightly by test the threshold value in engineering units also varies by test. These threshold values (in engineering units), and the number of recorded values in excess of threshold appears in Figure C-7, for the three channels involved. These values are not flagged in any way within the record.

The data correction function was begun in the procedure "TRSETUP" and "ENDSEC". After reading a correction data card containing the channel, start time and other identifiers, these procedures determined the ending time for the corrected values and set flags so that these values would be corrected.

The output data from this program has been provided EPA. All details concerning access of these data and the output of a subsequent program appear in Figure C-8.

CALCULATION OF VOLUME FLOWS

After review of the data monitored during the coke oven tests, a second computer program was written to determine both total volume flows by emission channel and the constituent parts of these flows. These calculations and their presentation as graphs and reports were the function of the computer program"ANDY". The remainder of this section will briefly describe this program by major function and describe the output record structure. The input to this program was the output from "BILL" and has been defined in the previous section.

The functions of the computer program "ANDY" are listed in Figure C-9. Calculation of volume flows was test dependent. A maximum of three

CHANNELS

TEST	CHØI (PPM SO_2) VALUE	# IN EXCESS	CHØ2 (PPM H_2S) VALUE	# IN EXCESS	CHØ5 (THC) VALUE	# IN EXCESS
2	3700.0	-	3620.0	-	12.5	-
3	3550.0	-	3590.0	75	12.5	-
4	3700.0	-	3600.0	-	12.8	-
5	3800.0	-	3535.0	165	12.5	-
6	3275.0	-	3700.0	157	12.5	-
7	3750.0	-	3700.0	61	12.5	-
8	3750.0	-	3750.0	-	12.6	-
9	3750.0	-	3750.0	-	12.5	-
10	3750.0	-	3765.0	27	12.5	-
11	3750.0	-	3750.0	27	12.5	-
12	3750.0	-	3675.0	18	12.5	-
13	3770.0	-	3750.0	73	12.5	4
14	3750.0	-	3650.0	-	12.5	-
15	3750.0	-	3750.0	-	12.5	-
16	355.0	-	340.0	64	6.2	-
17	355.0	-	-105.0	255	6.2	-
18	350.0	240	325.0	177	6.2	49
19	3725.0	-	3670.0	33	6.2	28
20	3575.0	-	3750.0	-	6.2	-
21	3700.0	-	3750.0	243	6.2	42
22	3550.0	-	3550.0	81	12.5	28
23	3750.0	-	3750.0	73	12.5	38
24	3750.0	-	3750.0	107	6.2	23
25	3750.0	-	3750.0	74	12.5	-
26	3750.0	-	3750.0	55	12.5	10
27	3700.0	-	3700.0	22	12.5	-
28	3750.0	-	3750.0	-	12.5	-

FIGURE C-7

LINEAR THRESHOLD VALUES

TAPE CHARACTERISTICS:

TAPE NUMBER	ØØ6768
DENSITY	16ØØ BPI
TYPE	9-TRACK
LABEL	NO LABEL

DATA SET 1:

SOURCE	PROGRAM "BILL"
RECORD FORMAT	FIXED BLOCKED
LOGICAL RECORD LENGTH	1928
BLOCK SIZE	7712

DATA SET 2:

SOURCE	PROGRAM ANDY
RECORD FORMAT	FIXED BLOCKED
LOGICAL RECORD LENGTH	36Ø8
BLOCK SIZE	7216

FIGURE C-8

DATA TRANSFER DETAILS

- Identify flows monitored by test
- Calculate volume flows
- Calculate constituent volume flows
- Graphically display volume flows
- Report total flows
- Report constituent flows
- Identify and use times related to coke oven charging
- Convert temperature to degrees rankine
- Convert gas data to wet gas

FUNCTIONS OF COMPUTER PROGRAM "ANDY"

FIGURE C-9

flow channels were monitored during any test. The number of flow channels monitored during any test is indicated by the value of "NUMFLOW". Values for this and other test-related parameters are reset at "NUTEST". In addition, summary statistics for the previous test are generated in this section of the program.

Flow calculations require a pressure measurement, a temperature measurement, and an ambient pressure. A constant value used in the calculation was dependent on the type of channel, either Wilputte Emission Guides ("WEG") or Stacks or AISI/EPA Guide (SKG). The flow calculations were also adjusted to reflect standard atmospheric conditions. The total flows across all channels monitored were also tabulated for each second. The volume flows for each second were also stored in the output record structure.

Calculations of both the ambient and standard flows are identified by comments in the program. The formulae using program variables appear below:

Ambient Flow - AF (I,J) =

$$\sqrt{\frac{\text{CHAN [I, TEMP (J)]} * \text{CHAN [I, PRES (J)]}}{\text{OUTREC. CH. 14 (I)}}} \qquad \text{(C-1)}$$

Standard Flow - SF (I,J) =

$$\text{OUTREC. CH. 14 (I)/CHAN [I, TEMP (J)]} \qquad \text{(C-2)}$$

The index variables in the above formulae refer to the second of the data measurement "I", and the flow channel "J". Temperature values have all previously been converted to degrees Rankine. The variable OUTREC. CH 14 (I) contains an ambient air pressure measurement for the Ith second. "STDKON" is a program variable which contains a constant required to adjust actual temperature and pressure to standard. These volume flows

have then been displayed graphically on a standard computer page using print file "GI" for the actual flows and print file "G2" for the standard flows.

The constituent volume flows were calculated for each of the gases monitored during any test. These flows were averaged and reported for five second intervals. Constituent flows were calculated by multiplying both actual and standardized volume flows by the constituent measure monitored (CHØØ through CH09). These constituent flows, both actual and standard, were stored in the output record for each second. Some additional statistics, maximum, minimum, and averages were calculated and reported at the end of each test. These statistics were based upon the coke oven charging times. If data records exceeded these start and stop times, the data records were not used and not written to the output record file. These start and stop times are parameters set for each test.

Conversion from dry gas to wet gas data was also accomplished by this program. The four channels involved, Ø6 through Ø9, monitored H_2, 0_2, CO, and CO_2, respectively. For all tests except seven (7) and sixteen (16), relative humidity was monitored and this value has been used to convert the observed dry gas values to equivalent wet gas values. The output record contains this wet gas value for these four channels with the exception of the two tests cited.

The remainder of this section will describe the output record structure, with a complete listing of the program "ANDY" as well.

The output record structure for this program is an expanded version of the input record. The addition consists of volume flows and constituent flows under both ambient and standard atmospheric conditions. In addition, all numeric measures are stored in scientific (decimal float) format. The output record file is a subset of the input file because some of the input data were outside of the coke oven charge start and stop times. Within this subset however, the output record structure contains all of the input record data. The complete output record

structure is described in Figure C-10. Details of the data set transferred to EPA containing this output data appear in Figure C-8.

The following section contains a complete listing of the computer program "BILL".

Level	Field Name	Field Type and Length in Bytes	Field Description
1	KEY	8 CHAR	Input Record Key
2	CHØØ	4 FLOAT DECIMAL	Channel ØØ Observation
2	CHØ1	4 FLOAT DECIMAL	Channel Ø1 Observation
2	CHØ2	4 FLOAT DECIMAL	Channel Ø2 Observation
2	CHØ3	4 FLOAT DECIMAL	Channel Ø3 Observation
2	CHØ4	4 FLOAT DECIMAL	Channel Ø4 Observation
2	CHØ5	4 FLOAT DECIMAL	Channel Ø5 Observation
2	CHØ6	4 FLOAT DECIMAL	Channel Ø6 Observation
2	CHØ7	4 FLOAT DECIMAL	Channel Ø7 Observation
2	CHØ8	4 FLOAT DECIMAL	Channel Ø8 Observation
2	CHØ9	4 FLOAT DECIMAL	Channel Ø9 Observation
2	CH1Ø	4 FLOAT DECIMAL	Channel 1Ø Observation
2	CH11	4 FLOAT DECIMAL	Channel 11 Observation
2	CH13	4 FLOAT DECIMAL	Channel 13 Observation
2	CH14	4 FLOAT DECIMAL	Channel 14 Observation
2	CH16	4 FLOAT DECIMAL	Channel 16 Observation
2	CH3Ø	4 FLOAT DECIMAL	Channel 3Ø Observation
2	CH31	4 FLOAT DECIMAL	Channel 31 Observation
2	CH33	4 FLOAT DECIMAL	Channel 33 Observation
2	CH34	4 FLOAT DECIMAL	Channel 34 Observation
2	CH36	4 FLOAT DECIMAL	Channel 36 Observation
2	CH4Ø	4 FLOAT DECIMAL	Channel 4Ø Observation
2	CH41	4 FLOAT DECIMAL	Channel 41 Observation
2	CH42	4 FLOAT DECIMAL	Channel 42 Observation
2	CH43	4 FLOAT DECIMAL	Channel 43 Observation
2	CH44	4 FLOAT DECIMAL	Channel 44 Observation
2	CH45	4 FLOAT DECIMAL	Channel 45 Observation
2	CH37	4 FLOAT DECIMAL	Channel 37 Observation
2	CH39	4 FLOAT DECIMAL	Channel 39 Observation
2	CH53	4 FLOAT DECIMAL	Channel 53 Observation

FIGURE C-10
OUTPUT DATA RECORD FORMAT–PROGRAM "ANDY"

Level	Field Name	Field Type and Length in Bytes	Field Description
3**	AF	4 FLOAT DECIMAL	Standard Volume Flow
3	SF	4 FLOAT DECIMAL	Actual Volume Flow
2*	SEC	2 CHAR	Second Identifier or Blank
2*	CH17	1 CHAR	Channel 17 Observation
2*	CH18	1 CHAR	Channel 18 Observation
2*	CH19	1 CHAR	Channel 19 Observation
2*	CH2Ø	1 CHAR	Channel 2Ø Observation
2*	CH21	1 CHAR	Channel 21 Observation
2*	CH22	1 CHAR	Channel 22 Observation
2*	CH23	1 CHAR	Channel 23 Observation
2*	CH24	1 CHAR	Channel 24 Observation
2*	CH25	1 CHAR	Channel 25 Observation

*
SEC is the key for the second level segment which repeats 15 times. Data appear in sequence, i.e., 15, 16, ' ', 18,...denoting second 15, 16, no data for second 17, etc.

**
The third level repeats fourteen times to provide positions for actual and standard flows in the sequence below. If the data were not observed for a test, the data in the position are meaningless. Parameters to indicate significant positions must be obtained from the test header record and the program listing.

Flow Position	Contents
1	Flow channel one
2	Flow channel two
3	Flow channel three
4	Sum of all flows monitored
5	Constituent flow measured in Channel ØØ
6	Constituent flow measured in Channel Ø1
7	Constituent flow measured in Channel Ø2
8	Constituent flow measured in Channel Ø3
9	Constituent flow measured in Channel Ø4
10	Constituent flow measured in Channel Ø5
11	Constituent flow measured in Channel Ø6
12	Constituent flow measured in Channel Ø7
13	Constituent flow measured in Channel Ø8
14	Constituent flow measured in Channel Ø9

FIGURE C-10 (CONTINUED)
OUTPUT DATA RECORD FORMAT–PROGRAM "ANDY"

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

'LOAD,NODECK

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS--

```
                                                    EBCDIC
                                                    CHAR60
                                                  NOMACRO
                                                    SOURCE2
                                                  NOMACDCK
                                                    COMP
                                                    SOURCE
                                                    ATR
                                                    XREF
                                                  NOEXTREF
                                                  NOLIST
                                                    LOAD
                                                  NODECK
                                                    FLAGW
                                                    STMT
                                                    SIZE=0168192
                                                    LINECNT=056
                                                    OPT=01
                                                    SORMGIN=(002,072,001)
                                                  NOEXTDIC
                                                    NEST
                                                    CPLIST
                                                    SYNCHKS
```

```
*OPTIONS IN EFFECT*     EBCDIC,CHAR60,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,LOAD,
*OPTIONS IN EFFECT*     NODECK,FLAGW,STMT,SIZE=0168192,LINECNT=056,OPT=01,SORMGIN=(002,072,001),NOEXTDIC,
*OPTIONS IN EFFECT*     NEST,CPLIST,SYNCHKS
```


3-50874

```
STMT LEVEL NEST
  1                MYSTIC: PROCEDURE OPTIONS(MAIN) ;                                  00000500
  2     1            DECLARE ADDR  ENTRY (FIXED BINARY (31)) ;                        00000600
  3     1            DCL MAX1 FILE PRINT ;
  4     1             DCL CIC (4) CHAR (1) INIT ('1','2','3','4') ;
  5     1            DCL PC FIXED DECIMAL (15,6) ;
  6     1           DCL (MAX5,MAX1,MAX2) FIXED DECIMAL (7,1) ;
  7     1             DCL ECT CHAR (1) INIT (' ') ;
  8     1             DCL REPTR FILE PRINT ;
  9     1              DCL TRKEY CHAR (8) BASED (Q1) ,
                           ELC2  CHAR (2) INIT ('  ') ;
 10     1             DCL TRAN FILE RECORD INPUT SEQUENTIAL BUFFERED ENV (F(1600,80)) ;
 11     1             DCL TRC4 FIXED DECIMAL (7,2) ,
                          TR05 FIXED DECIMAL (7,1) ,
                          TR07 FIXED DECIMAL (7,2) ,
                          TR0S FIXED DECIMAL (7,1) ,
                          TR3C FIXED DECIMAL (7,3) ,
                          TR31 FIXED DECIMAL (7,1) ,
                          TR33 FIXED DECIMAL (7,3) ,
                          TR34 FIXED DECIMAL (7,1) ,
                          TR45 FIXED DECIMAL (7,3) ,
                        (QSEC,TRSEC) FIXED BIN (15) ,
                         ALLOC CHAR (80) BASED (Q1) ,
                               K04 CHAR (4) INIT ('    ') ,
                               K05 CHAR (4) INIT ('    ') ,
                               K07 CHAR (4) INIT ('    ') ,
                               K0S CHAR (4) INIT ('    ') ,
                               K30 CHAR (4) INIT ('    ') ,
                               K31 CHAR (4) INIT ('    ') ,
                               K33 CHAR (4) INIT ('    ') ,
                               K34 CHAR (4) INIT ('    ') ,
                               K45 CHAR (4) INIT ('    ') ,
                               S04 CHAR (2) INIT ('  ') ,
                               S05 CHAR (2) INIT ('  ') ,
                               S07 CHAR (2) INIT ('  ') ,
                               S09 CHAR (2) INIT ('  ') ,
                               S30 CHAR (2) INIT ('  ') ,
                               S31 CHAR (2) INIT ('  ') ,
                               S33 CHAR (2) INIT ('  ') ,
                               S34 CHAR (2) INIT ('  ') ,
                               S45 CHAR (2) INIT ('  ') ,
                               BLANK4 CHAR (4) INIT ('    ') ,
                               BLANK2 CHAR (2) INIT ('  ') ;
 12     1             DCL CHEKKEY CHAR (9) BASED (Q) ,
                          1 TRANACT BASED (Q1) ,
                          5 TRANKEY CHAR (7) ,
                           5 EB1 CHAR (1) ,
                           5 SECT  CHAR (2),
                           5 EB2 CHAR (3) ,
                           5 TRC1 CHAR (2) ,
                           5 EB3 CHAR (2) ,
                           5 TRV1 CHAR (E) ,
                           5 EB4 CHAR (2) ,
```

```
STMT LEVEL NEST

                        5 TRC2 CHAR (2) ,
                        5 EE5 CHAR (2) ,
                        5 TRV2 CHAR (8) ,
                        5 EE6 CHAR (3) ,
                        5 TRC3 CHAR (2) ,
                        5 887 CHAR (2) ,
                        5 TRV3 CHAR (8) ,
                        5 E88 CHAR (2) ,
                        5 TRC4 CHAR (2) ,
                        5 EE9 CHAR (2) ,
                        5 TRV4 CHAR (8) ,
                        5 8891 CHAR (2) ,
                        5 TRANEND CHAR (4) ,
                        5 8892 CHAR (1) ,
                        5 SECE CHAR (2) ,
                        5 EE93 CHAR (3) ,
                      STARKEY CHAR (9) INIT ('         ') ,
                      STOPKEY CHAR (9) ;
   13     1          DCL 1 HEADER ,
                        5 KEYIZ  CHAR (3) INIT ('KEY') ,
                        5 MONTH# CHAR (12) ,
                        5 DAYA   CHAR (2) ,
                        5 LABCH (39) CHAR  (7) ,
                        5 CHKC CHAR (4) ,
                        5 MRICH CHAR (3) ,
                        5 REMCH CHAR (34) ,
                        5 KKKREC CHAR (7) ,
                        5 NNN  FIXED BIN (15) ,
                        5 JUNK CHAR (1588) INIT ('JUNK') ;
   14     1                DCL DF CHAR (7) INIT ('DEC F  ') ,                    00000700
                             INDC CHAR (7) INIT ('.01= NC') ,                   00000800
                           CNFLAG CHAR (8) INIT  ('***ON***') ,                 00000840
                           ERFLAG CHAR (8) INIT  ('   ERR  ') ,                00000880
                           BLANK7 CHAR (7) INIT ('       ') ;                   00000900
   15     1              DCL TAB(12) FIXED BIN(15)        INITIAL(31,59,90,120,151,181,212,00001000
                                                                243,273,304,334,365 ) ;  00001100
   16     1              DCL LEAP FIXED BIN(15) ;                               00001200
   17     1              DCL (IDE,K)   FIXED BIN(15) ;                          00001300
   18     1          DCL MON_TAB(12) INIT('JANUARY  ','FEBRUARY ','  MARCH  ',  00001400
                                       '  APRIL  ','    MAY   ','   JUNE  ',   00001500
                                       '   JULY  ','  AUGUST  ','   SEPT  ',    00001600
                                       'OCTOBER  ','NOVEMBER ','DECEMBER ')     00001700
                        CHAR(9) ;                                               00001800
   19     1            DCL (CE,SC,LS16,LC16,LS1S,LC1S,LS2C,LC2C,LC3C) FIXED BIN (31)  00001900
                          INIT (0) ;                                            00002000
   20     1            DCL (JSEC,DATASEC,DATAMIN,DATAHR,INDSEC    ) FIXED BIN(31) INIT (0) ;00002100
   21     1            DCL (I,J,F,ALMIN,NUMREC,CUPREC,NUMSTOR,JCTR) FIXED BIN(31) INIT (0) ;00002200
   22     1            DCL KEEPSEC FIXED BIN (31) INIT (0) ;                  00002300
   23     1            DCL (ERRCODE,TRREC,TRTCT,SC         )FIXED BIN(15) INIT (0) ;  00024000
   24     1            DCL (TOTSEC,TOTIN,TOTSTOR,DEFREC    )FIXED BIN(31) INIT (0) ;  00002500
   25     1            DCL LSEC FIXED BIN (31) DEFINED SE ;                   00002600
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STMT LEVEL NEST

 26     1          DCL ICTR FIXED BIN (31) DEFINED QD ;                          00002700
 27     1          DCL ISEC FIXED BIN (31) DEFINED SC ;                          00002800
                                 /* LS3C ALWAYS EQUALS SECOND  DATA  */          00002900
 28     1          DCL NS RETURNS (CHAR (1)) ;                                   00003000
                   /* PARAMETER INITIALIZATION  */                               00003100
 29     1          DCL TEST FIXED BIN (15) INIT (1) ;                            00003200
 30     1          DCL ACC FIXED DECIMAL (7,1) INIT (   1) ,                     00003300
                        A01 FIXED DECIMAL (7,1) INIT (   3) ,                    00003400
                        EC1 FIXED DECIMAL (7,1) INIT (0) ,
                        A02 FIXED DECIMAL (7,1) INIT (   3) ,                    00003500
                        B02 FIXED DECIMAL (7,1) INIT (0) ,
                        A03 FIXED DECIMAL (7,3) INIT (1000) ,                    00003600
                        B03 FIXED DECIMAL (7,3) INIT (0) ,
                        A04 FIXED DECIMAL (7,2) INIT (   1) ,                    00003700
                        B04 FIXED DECIMAL (7,2) INIT (0) ,
                        A05 FIXED DECIMAL (7,1) INIT (   1) ,                    00003800
                        BC5 FIXED DECIMAL (7,1) INIT (0) ,
                        A06 FIXED DECIMAL (7,3) INIT ( 100) ,                    00003900
                        BC6 FIXED DECIMAL (7,3) INIT (0) ,
                        AC7 FIXED DECIMAL (7,3) INIT (  25) ,                    00004000
                        BC7 FIXED DECIMAL (7,2) INIT (0) ,
                        B13 FIXED DECIMAL (7,1) INIT (0) ,
                        A30 FIXED DECIMAL (7,6) INIT (.312) ,                    00004100
                        B3C FIXED DECIMAL (7,3) INIT (   0) ,                    00004200
                        A31 FIXED DECIMAL (7,1) INIT (   2) ,                    00004300
                        B31 FIXED DECIMAL (7,1) INIT (   0) ,                    00004400
                        A32 FIXED DECIMAL (7,6) INIT (.312) ,                    00004500
                        B33 FIXED DECIMAL (7,3) INIT (   0) ,                    00004600
                        A34 FIXED DECIMAL (7,1) INIT (   2) ,                    00004700
                        B34 FIXED DECIMAL (7,1) INIT (   0) ,                    00004800
                        A36 FIXED DECIMAL (7,6) INIT (.312) ,                    00004850
                        B36 FIXED DECIMAL (7,3) INIT (   0) ,                    00004850
                        A4C FIXED DECIMAL (7,1) INIT (   2) ,                    00004900
                        B4C FIXED DECIMAL (7,1) INIT (   0) ,                    00005000
                        A41 FIXED DECIMAL (7,6) INIT (.312) ,                    00005100
                        B41 FIXED DECIMAL (7,3) INIT (   0) ,                    00005200
                        A42 FIXED DECIMAL (7,1) INIT (   2) ,                    00005300
                        B42 FIXED DECIMAL (7,1) INIT (   0) ,                    00005400
                        A43 FIXED DECIMAL (7,1) INIT (   2) ,                    00005500
                        B43 FIXED DECIMAL (7,1) INIT (   0) ,                    00005600
                        A44 FIXED DECIMAL (7,6) INIT (.312) ,                    00005700
                        B44 FIXED DECIMAL (7,3) INIT (   0) ,                    00005800
                        A45 FIXED DECIMAL (7,6) INIT (.312) ,                    00005900
                        B45 FIXED DECIMAL (7,3) INIT (   0) ,                    00006000
                        A37 FIXED DECIMAL (7,1) INIT (   2) ,                    00006100
                        B37 FIXED DECIMAL (7,1) INIT (   0) ,                    00006200
                        A39 FIXED DECIMAL (7,1) INIT (   2) ,                    00006300
                        B39 FIXED DECIMAL (7,1) INIT (   0) ;                    00006400
 31     1          DCL FPC (28) LABEL ;                                          00006600
 32     1          DCL 1 SAMEREC BASED (C) ,                                     00006700
                      2 EO  CHAR (14) ,                                          00006800
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STMT LEVEL NEST

                2 C00 PIC 'S$$V$$$' ,                                          000069CC
                2 E1  CHAR ( 2) ,                                              00007000
                2 C01 PIC 'S$$99V$' ,                                          CCCC71C0
                2 E2  CHAR ( 2) ,                                              00007200
                2 C02 PIC 'S$$99V$' ,                                          00007300
                2 E3  CHAR ( 2) ,                                              00007400
                2 C03 PIC 'S$V$$$$' ,                                          00007500
                2 E4  CHAR ( 2) ,                                              000C76C0
                2 C04 PIC 'S$$$$V$' ,                                          00007700
                2 E5  CHAR ( 2) ,                                              000C78C0
                2 C05 PIC 'S$$V$$9' ,                                          000C79C0
                2 E6  CHAR ( 2) ,                                              00008000
                2 C06 PIC 'S9V9999' ,                                          00CC81C0
                2 E7  CHAR ( 2) ,                                              00008200
                2 C07 PIC 'S$V$$$$' ,                                          000C83C0
                2 E8  CHAR ( 2) ,                                              00008400
                2 C08 PIC 'S$V$$$$' ,                                          00008500
                2 E9  CHAR ( 2) ,                                              00008600
                2 C09 PIC 'S$$V$$$' ,                                          00008700
                2 E10 CHAR ( 2) ,                                              0CCCE8C0
                2 C10 PIC 'S$V$$$$' ,                                          00008900
                2 E11 CHAR ( 2) ,                                              0CC09000
                2 C11 PIC 'S$V9999' ,                                          00009100
                2 B13 CHAR (1C) ,                                              00009200
                2 C13 PIC 'S$V99$$' ,                                          00009300
                2 B14 CHAR ( 2) ,                                              00009400
                2 C14 PIC 'S$V9999' ,                                          00009500
                2 B16 CHAR (1C) ,                                              00009600
                2 C16 PIC 'S$V$$$$' ,   /* NEVER USED */                      00009700
                2 E17 CHAR ( 3) ,                    /*    SIGN   */          0C0C98C0
                2 C17 CHAR(1)   ,                    /*    SKIPPED */       */00009900
                2 E18 CHAR ( 7) ,                                              00010000
                2 C18 CHAR (1) ,                                               00010100
                2 E19 CHAR ( 7) ,                                              00010200
                2 C19 CHAR (1) ,                                               00010300
                2 B20 CHAR ( 7) ,                                              000104C0
                2 C20 CHAR (1) ,                                               00010500
                2 B21 CHAR ( 7) ,                                              00010600
                2 C21 CHAR (1) ,                                               00010700
                2 E22 CHAR ( 7) ,                                              0C0108C0
                2 C22 CHAR (1) ,                                               00010900
                2 E23 CHAR ( 7) ,                                              00011000
                2 C23 CHAR (1) ,                                               00011100
                2 E24 CHAR ( 7) ,                                              00011200
                2 C24 CHAR (1) ,                                               000113C0
                2 B25 CHAR ( 7) ,                                              000114C0
                2 C25 CHAR (1) ,        /*  NEVER USED  */                     00011500
                2 B26 CHAR ( 6) ,                                              00011660
                2 C26 PIC 'S$V$$$$' ,                                          00011700
                2 E30 CHAR (26) ,                                              CC0118C0
                2 C30 PIC 'S$$V$$$' ,                                          00011900
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STMT LEVEL NEST
                        2 B31 CHAR ( 2) ,                                                00012000
                        2 C31 PIC 'S$$$9V9' ,                                            00012100
                        2 B32 CHAR (10) ,                                                00012200
                        2 C33 PIC 'S$$$V999' ,                                           00012300
                        2 B34 CHAR ( 2) ,                                                00012400
                        2 C34 PIC 'S9$$9V$' ,                                            00012500
                        2 B36 CHAR (10) ,                                                00012550
                        2 C36 PIC 'S$$$V999' ,                                           00012560
                        2 B37 CHAR ( 2) ,                                                00012570
                        2 C37 PIC 'S$$$9V$' ,                                            00012580
                        2 B39 CHAR ( 10),                                                00012590
                        2 C3$ PIC 'S9$$$V$' ,                                            00012595
                        2 B40 CHAR (2) ,                                                 00012600
                        2 C40 PIC 'S$$$$V$' ,                                            00012700
                        2 B41 CHAR ( 2) ,                                                00012800
                        2 C41 PIC 'S$$$V999' ,                                           00012900
                        2 B42   CHAR (2) ,                                               00013000
                        2 C42 PIC 'S9$$9V9' ,                                            00013100
                        2 B43 CHAR ( 2) ,                                                00013200
                        2 C43 PIC 'S9$$9V9' ,      /*  NEVER USED */                  00013300
                        2 B44 CHAR ( 2) ,                                                00013400
                        2 C44 PIC 'S$$9V999' ,                                           00013500
                        2 B45 CHAR ( 2) ,                                                00013600
                        2 C45 PIC 'S99V999' ,                                            00013700
                        2 B46 CHAR ( 2) ,          /* NEVER USED */                      00013800
                        2 C46 PIC 'S9$$$V$' ,      /*  NEVER USED  */                   00013900
                        2 B47 CHAR ( 2) ,          /*   NEVER USED  */                  00014000
                        2 C47 PIC 'S9$$9V9' ,       /*   NEVER USED  */                 00014100
                        2 B48 CHAR ( 3) ,                                                00014200
                        2 C48 CHAR (5) ,                                                 00014300
                        2 CHA CHAR (10) ,                                                00014400
                        2 C53A PIC 'S$$$$V$' ;                                           00014500
33    1           DCL KEY CHAR (7) BASED (Q) ;                                           00014900
34    1           DCL 1 INREC BASED (Q),                                                 00015000
                        2 JE CHAR (3),                                                   00015100
                        2 HR CHAR (2),                                                   00015200
                        2 MIN CHAR (2),                                                  00015300
                      2   SEC CHAR (2),                                                  00015400
                      2 SECFLN  CHAR (2),                                                00015500
                      2 BLANK CHAR (1),                                                  00015600
                      2 DATA (70),                                                       00015700
                        3 CHAN CHAR(2),                                                  00015800
                        3 VOLT CHAR(6) ,                                                 00015900
                    1 NUREC BASED (Q) ,                                                  00015910
                      2 ZK CHAR (12) ,                                                   00015920
                      2 ZLEV (70) ,                                                      00015930
                        3 ZC CHAR (2) ,                                                  00015940
                        3 ZV CHAR (6)  ;                                                 00015950
35    1           DCL   1 CTRREC (4),                                                    00016000
                        3 REC_ID CHAR (7)   INIT ((4) (1)  '       ') ,                  00016100
                        3 CTR CHAR (1) INIT ((4) (1)  ' ') ,                             00016200
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STMT LEVEL NEST

                    3 SECREC (15) ,                                                    000163C0
                      5 SEC CHAR (2) INIT ((60) '  ') ,                                000164C0
                      5 CH00 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                000165C0
                      5 CH01 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                000166C0
                      5 CH02 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                00016700
                      5 CH03 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                000168C0
                      5 CH04 FIXED DECIMAL (7,2) INIT  ((60) 99999.99) ,               00016900
                      5 CH05 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                000170C0
                      5 CH06 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                000171C0
                      5 CH07 FIXED DECIMAL (7,2) INIT ((60) 99999.99) ,                00017200
                      5 CH08 FIXED DECIMAL (7,4) INIT ((60) 999.9999) ,                00017300
                      5 CH09 FIXED DECIMAL (7,1)INIT ((60) 999999.9) ,                 00017400
                      5 CH10 FIXED DECIMAL (7,2) INIT ((60) 99999.99) ,                000175C0
                      5 CH11 FIXED DECIMAL (7,0) INIT ((60) 9999999) ,                 00017600
                      5 CH13 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                000177C0
                      5 CH14 FIXED DECIMAL (7,2) INIT ((60) 99999.99) ,                00017800
                      5 CH16 FIXED DECIMAL (7,4) INIT ((60) 999.9999) ,                00017900
                      5 CH30 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                00018100
                      5 CH31 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                00018200
                      5 CH33 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                000183C0
                      5 CH34 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                00018400
                      5 CH36 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                00018450
                      5 CH4C FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                000185C0
                      5 CH41 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                00018600
                      5 CH42 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                00018700
                      5 CH43 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,  /*N U */    000188C0
                      5 CH44 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                00018900
                      5 CH45 FIXED DECIMAL (7,3) INIT ((60) 9999.999) ,                000190C0
                      5 CH37 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                00019100
                      5 CH39 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                00019200
                      5 CH53 FIXED DECIMAL (7,1) INIT ((60) 999999.9) ,                00019300
                      5 CH17 CHAR (1) INIT ((60) ' ') ,                                00019400
                      5 CH18 CHAR (1) INIT ((60) ' ') ,                                00019500
                      5 CH19 CHAR (1) INIT ((60) ' ') ,                                00019600
                      5 CH20 CHAR (1) INIT ((60) ' ') ,                                00019700
                      5 CH21 CHAR (1) INIT ((60) ' ') ,                                00019800
                      5 CH22 CHAR (1) INIT ((60) ' ') ,                                00019900
                      5 CH23 CHAR (1) INIT ((60) ' ') ,                                00020000
                      5 CH24 CHAR (1) INIT ((60) ' ') ,                                00020100
                      5 CH25 CHAR (1) INIT ((60) ' ') , /* NOT USED  */               00020200
                      5 CH48 CHAR (1)  INIT ((60) ' ') ;                               00020300
 36     1          DCL LABEL (25) CHAR (7) INIT ('% H2O  ','PPM SC2','PPM*H2S',       00020400
                    'PPM NO ','PPM NO2','% THC  ','% H2 * ','% O2   ','% CO   ',     00020500
                    '% CO2  ','NS MPH ','WD DEG ','DEG F  ','IN. HG ','VOLTS  ',     00020600
                    'TH 1   ','TH 2   ','TH 3   ','TH 4   ','TH 5   ','TH 6   ',     00020700
                    'TH 7   ','TH 8   ','DELETED','VOLTS  ','.01" WC','DEG F  ',     00020800
                    '.01" WC','DEG F  ','DEG F  ','.01" WC','DEG F  ','DEG F  ',     00020900
                    '.01" WC','.01" WC','DEG F  ','DEG F  ','TH 10  ','PPM NOX') ;   00021000
 37     1            DCL CVEN (12) CHAR (4) INIT ('3-3 ','3-8 ','3-6 ','3-10','3-11', 00021300
                        '3-9 ','3-15','3-4 ','3-5 ','3-12','3-1 ','2-23'),           00021400
                      PCINT (12) CHAR (25) INIT (                                    000215C0
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STMT LEVEL NEST

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                    '3 WILPLTTE GUIDES        ',                                  00021600
                    '#2 WILPLTTE GUIDE & STACK',                                  00021700
                    '#1 WILPUTTE GUIDE & STACK',                                  00021800
                    '#3 WILPLTTE GUIDE & STACK',                                  00021900
                    '3 WILPLTTE STACKS        ',                                  00022000
                    '#2 WILPLTTE STACK & GUIDE',                                  00022100
                    '#1 WILPLTTE STACK & GUIDE',                                  00022200
                    '3 KOPPERS GUIDES         ',                                  00022300
                    '#2 WILPLTTE STACK        ',                                  00022400
                    '#2 KOPPERS GUIDE         ',                                  00022500
                    '#1 & #2 KOPPERS GUIDE    ',                                  00022600
                    '                         ') ,                                00022700
                    MRI (17) CHAR (3) INIT ('M1 ','M2 ','M3 ','M4 ','M5 ','M6 ', 00022800
                      'M7 ','M8 ','M9 ','M10','M11','K1 ','K2 ','K3 ','M12',     00022900
                      'K4 ',' ') ,                                                00023000
                    REM (12) CHAR (34) INIT (                                     00023100
                    'MRI ACTIVATED MANUALLY - BENT BOOM',                         00023200
                    'DIFF. PRES. PITOT PLUGGED        ',                          00023300
                    'GAS LEAKS                        ',                          00023400
                    'GUIDE GAS PROBE PLUGGED          ',                          00023500
                    '#2 PROBE & THERMOCOUPLE DATA DEF ',                          00023600
                    'EARLY PART OF TEST NOT RECORDED  ',                          00023700
                    '#3 SENSOR BURNED OUT             ',                          00023800
                    'FLOW STOPPED ON #3               ',                          00023900
                    'LOW FLOW - FANS BURNED OUT       ',                          00024000
                    'BAD FIRE ON #3                   ',                          00024100
                    'POOR GAS DATA                    ',                          00024200
                    '                                 ') ,                        00024300
                   CNUM  FIXED BIN (15) INIT (12) ,                               00024400
                   PAGE  FIXED BIN (31) INIT (00) ,                               00024500
                   PCNUM  FIXED BIN (15) INIT (12) ,                              00024600
                   WRITEST FIXED BIN (15) INIT (17) ,                             00024700
                   REMNUM  FIXED BIN (15) INIT (12) ;                             00024800
38    1         DCL ALLKEY CHAR (11) BASED (Q) ;                                  00024900
39    1         DCL TJC CHAR (3) INIT ('   '), TKEY CHAR (7)  INIT (' ') ,       00025000
                 (THR,TSECHUN) CHAR (2) INIT (' ') , TALLKEY CHAR (11) INIT (' ') , 00025100
                  TMIN FIXED BIN (15) ;                                           00025200
40    1         DCL YR CHAR(2) INIT ('73') , DAY CHAR (2) INIT ('**') ;           00025300
41    1         DCL MONTH CHAR( 9) INIT ('*') ;                                   00025400
42    1         DCL EOF CHAR (1) INIT ('N') ;                                     00025500
43    1         DCL REPO FILE PRINT ;                                             00025600
44    1         OPEN FILE (REPO) LINESIZE (132) ;                                 00025700
45    1         OPEN FILE (SYSPRINT) LINESIZE (132) ;                             00025800
46    1         ON ENDFILE (INPUT) BEGIN ; EOF = 'Y' ; GO TO NOTEST ;             00025900
50    2               NUMIN = NUMIN + 1 ; END ;                                   00026000
52    1         ON ERROR BEGIN; ERRCODE = ONCODE ;                                00026100
55    2           PUT EDIT ('ERROR END ***  ERRCODE =',ERRCODE) (PAGE,A,F(4)) ;   00026200
56    2         END ;                                                             00026300
                  /*                                                            00026400
                  ON SUBSCRIPTRANGE BEGIN ;                                     00026500
                    PUT EDIT ('ERROR END *****    SUBSCRIPTS',ICTR,ISEC,        00026600
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STMT LEVEL NEST
                        JCTR,JSEC,CC,SC,LS16,LC16,LS19,LC19,LS20,LC20,LS30,LC30)        00026700
                        (PAGE,A,7(SKIP,F(12),F(12))) ;                                  00026800
                    ECF = 'Y' ; GO TO NOTEST ;                                          00026900
                   END ;                                                                00027000
                  */                                                                    00027100
     57     1     ON TRANSMIT (INPUT) BEGIN ;                                          00027110
     59     2       DEFREC = DEFREC + 1 ;                                              00027120
     60     2       GO TO READER ;                                                     00027130
     61     2     END ;                                                                00027140
     62     1     ON CONVERSION BEGIN ;                                                00027200
     64     2       PUT EDIT ('CONVERSION ERROR ***  ERRCODE= ',ONCODE,ONSOURCE,       00027300
                        ONCHAR,ONLOC) (PAGE,A,F(6),SKIP,A,SKIP,A,SKIP,A) ;            00027400
     65     2       ECF = 'Y' ; SIGNAL ERROR ; END ;                                   00027500
     68     1     ON ENDPAGE (REPO) BEGIN ;                                            00027700
     70     2           PAGE = PAGE + 1 ;                                              00027800
     71     2           PUT FILE (REPO) EDIT('MITRE - EPA CODE OVEN TESTS','PAGE',     00027900
                      PAGE,'DATE',MONTH,DAY,'-','-',' 19',YR,'OVEN',OVEN(OVNUM),      00028000
                           'MITRE TEST NUMBER',TEST,'POINTS MONITORED',POINT(PONUM),  00028100
                           'MRI   TEST NUMBER',MRI(MRITEST),'REMARKS',REM(REMNUM),    00028200
                           'TIME:',SUBSTR(QTRREC.REC_ID(JQTR),4,2),':',SUBSTR(QTRREC. 00028300
                            REC_ID(JQTR),6,2))                                        00028400
                           (PAGE,COL(50),A,COL(120),A,F(6),SKIP(2),COL(08),3(X(2),A),A,00028500
                         A,A,COL(7C),A,X(2),A,                                        00028600
                            COL(1C),A,F(6),COL(70),A,X(5),A,                          00028700
                            COL(1C),A,X(5),A,COL(70),A,X(2),A,COL(10),A,X(2),5(A)) ;  00028800
     72     2     END ;                                                                00028900
     73     1       ON ENDFILE (TRAN) BEGIN ;
     75     2           EOT = 'Y' ;
     76     2                     END ;
     77     1       OPEN FILE (REPTR) LINESIZE (132) PAGESIZE (66) ;
     78     1       READTR: READ FILE (TRAN) SET (Q1) ;
     79     1          IF SECT < '15' THEN BB1 = '1' ; ELSE IF SECT < '30' THEN BB1='2';
     83     1             ELSE IF SECT < '45' THEN BB1 = '3' ; ELSE BB1 = '4' ;
     86     1       READER: READ FILE (INPUT) SET (Q) ;   /* A1 */                     00029000
     87     1               NUMIN = NUMIN + 1 ;                                       00029100
     88     1       IF  STARKEY > CHEKKEY THEN GO TO READER ;      /* READ START CHECK */
                    /*                                                                00029200
                    PUT EDIT ('READER',ALLKEY,TALLKEY,JC,TJC,KEY,TKEY) (SKIP,7(X(2),A)) ; 00029300
                     */                                                               00029400
     90     1               IF TALLKEY ¬= ALLKEY THEN                                 00029500
     91     1                  DO ;                                                   00029600
     92     1     1               TALLKEY = ALLKEY ;                                  00029700
     93     1     1                  KEEPSEC = INREC.SEC ;                            00029800
     94     1     1               IQTR =(KEEPSEC /15) ;                               00029900
     95     1     1               ISEC = KEEPSEC - (IQTR * 15) + 1 ;                  00030000
     96     1     1               JQTR = MOD(IQTR,4) + 1 ;                            00030100
     97     1     1                  IF TKEY = KEY THEN                               00030200
     98     1     1                     DO ;                                          00030300
                    /*   DEBUG ONLY                                                   00030400
                     IF (NUMSTOW > 6C               ) THEN GO TO READER ;           00030500
                         ********** */                                               00030600
```

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STMT LEVEL NEST

 99     1    2                    DATASEC = KEEPSEC + INDSEC ;   /* CUM TIME TO MIN*/00030700
100     1    2                    END ;                                              00030800
101     1    1                  ELSE                                                 00030900
101     1    1                  IF TJD ¬= JD THEN GO TO NOTEST ;                     00031000
103     1    1                   ELSE                                                00031100
103     1    1                     DO ;                                              00031200
104     1    2                       TKEY = KEY ;                                    00031300
105     1    2                       IF THR ¬= HR THEN                               00031400
106     1    2                          DO;                                          00031500
107     1    3                          THR = HR ;                                   00031600
108     1    3                          DATAHR = HR ;                                00031700
109     1    3                          DATAMIN = MIN ;                              00031800
110     1    3                          INDSEC =(DATAHR * 3600) +(DATAMIN * 60) ;    00031900
111     1    3                          DATASEC = KEEPSEC + INDSEC ;                 00032000
112     1    3                          END ;                                        00032100
113     1    2                          ELSE                                         00032200
113     1    2                          DO;                                          00032300
114     1    3                           DATAMIN = MIN ;                             00032400
115     1    3                           INDSEC = (DATAHR * 3600) + (DATAMIN * 60) ; 00032500
116     1    3                           DATASEC = KEEPSEC + INDSEC ;                00032600
117     1    3                          END ;                                        00032700
118     1    2                       END ;                                           00032800
119     1    1                  END ;                                                00032900
120     1                     ELSE                                                   00033000
120     1                        DO;                                                 00033100
121     1    1                     DUPREC = DUPREC + 1 ;                            00033200
122     1    1                     GO TO READER ;                                   00033300
123     1    1                   END ;                                              00033400
124     1                      IF DATASEC -    JSEC > 7200 THEN GO TO NOTEST ;  /* 60 MIN*/00033500
                          /*   DEBUG ONLY                                          00033600
                           IF (NUMSTOR > 60               ) THEN GO TO READER ;  00033700
                              ********** */                                       00033800
126     1                    QCHECK:                                  /* 62 */     00033900
                           /*                                                     00034000
                          PUT EDIT ('QCHEK',DATASEC,JSEC,ISEC,JQTR,IQTR) (SKIP,A,5(F(12))) ; 00034100
                           */                                                     00034200
                                  IF DATASEC - JSEC > 59 THEN                     00034300
127     1                            DO ;                                        00034400
128     1    1                       CALL ROUS (JQTR) ;                          00034500
129     1    1                       GO TO QCHECK ;                              00034600
130     1    1                     END ;                                         00034700
131     1                         ELSE                                          00034800
131     1                           DO ;                                        00034900
132     1    1           IF STCFKEY < CHEKKEY THEN GO TO LAGGER ;  /* LAG CHECK TEST */
134     1    1                       IF QTRREC(IQTR).REC_ID = ' ' THEN          00035000
135     1    1                          DO ;                                    00035100
136     1    2                          QTRREC.REC_ID (IQTR) = KEY ;            00035200
137     1    2                          QTR (IQTR) = QID (IQTR) ;               00035300
138     1    2              NUMREC = NUMREC + 1 ;
139     1    2                          END ;                                   00035400
140     1    1                       ELSE IF QTRREC(IQTR).REC_ID ¬= KEY THEN GO TO ERROR ; 00035500
```

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STMT LEVEL NEST

142     1    1              END ;                                                    00035600
143     1           STORE:      /*  REPLACES KEEPER */
                              NUMSTOR = NUMSTOR + 1 ;                              00035800
144     1                     STOREC.SEC (QQ,SQ) = INREC.SEC ;                     00035900
                        /* CALCULATE LAGGED INDEXS FOR 16,19,20,30 SEC LAG       00036000
                           AS  LQ16 AND LS16, ETC.  */                            00036100
145     1           LAGGER:                                                       00036150
146     1               IF DATASEC - JSEC > 29 THEN GO TO LAG_30 ;                00036200
147     1                  ELSE IF DATASEC - JSEC > 19 THEN GO TO LAG_20 ;        00036300
149     1                   ELSE IF DATASEC - JSEC > 18  THEN GO TO LAG_19 ;      00036400
151     1                    ELSE IF DATASEC - JSEC > 15 THEN GO TO LAG_16 ;      00036500
153     1                     ELSE GO TO NO_LAG ;                                 00036600
154     1           LAG_30:                                                       00036700
                       /* INDEX FOR LAG OF IS RELATED TO CURRENT INDEX */        00036800
                            LQ30 = MOD(QQ + 1,4) + 1 ;                           00036900
                     /*                                                          00037000
155     1          (SUBSCRIPTRANGE):*/ CH03 (LQ30,LS30) = A03 * C03 + B03 ;      00037100
156     1                    CH04 (LQ30,LS30) = C04 * A04 + B04 ;                00037200
157     1               IF TEST < 4 THEN CH53  (LQ30,LS30) = C53 ;               00037300
159     1           LAG_20:                                                       00037400
                            LS20 = DATASEC - 20 ;                                00037500
160     1                   LQ20 = LS20 / 15 ;                                   00037600
161     1                   LS20 = LS20 - (LQ20 * 15) + 1 ;                      00037700
162     1                   LQ20 = MOD(LQ20,4) + 1 ;                             00037800
163     1                    CH06 (LQ20,LS20) = A06 * C06 + B06 ;                00037900
164     1                         CH07 (LQ20,LS20) = C07 * A07 + B07 ;           00038000
165     1                   CH08 (LQ20,LS20) = C08 ;                             00038100
166     1                   CH08 (LQ20,LS20) = CH08 (LQ20,LS20) * 3 ;            00038200
167     1                   CH09 (LQ20,LS20) = C09 ;                             00038300
168     1           LAG_19:                                                       00038400
                            LS19 = DATASEC - 19 ;                                00038500
169     1                   LQ19 = LS19 / 15 ;                                   00038600
170     1                   LS19 = LS19 - (LQ19 * 15) + 1 ;                      00038700
171     1                   LQ19 = MOD(LQ19,4) + 1 ;                             00038800
172     1                         IF LABEL(6) ¬= '       ' THEN CH05(LQ19,LS19)=C05 *  00038900
                                     A05 + B05 ;                                 00039000
174     1           LAG_16:                                                       00039100
                            LS16 = DATASEC - 16 ;                                00039200
175     1                   LQ16 = LS16 / 15 ;                                   00039300
176     1                   LS16 = LS16    - (LQ16 * 15) + 1 ;                   00039400
177     1                   LQ16 = MOD(LQ16,4) + 1 ;                             00039500
178     1                         IF LABEL(1) ¬= '       ' THEN CH00 (LQ16,LS16) = C00 00039600
                                     * A00 ;                                     00039700
180     1                   IF LABEL(2) ¬= '       ' THEN CH01 (LQ16,LS16) = C01 *A01 +00039800
                                      B01 ;                                      00039850
182     1                   IF LABEL(3) ¬= '       ' THEN CH02 (LQ16,LS16) = C02 *A02 +00039900
                                 B02 ;                                           00039950
184     1             NO_LAG:                                                     00040000
185     1           IF STOPKEY < CHEKKEY THEN GO TO READER ; /* NO_LAG STOPPER */
186     1                   CH11 (QQ,SQ) = MOD (C11 * 540,360) ;                 00040100
187     1                         CH10 (QQ,SQ) = C10 * 18.18 ;                   00040200
```

C-32

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STMT LEVEL NEST

188    1                  CH13 (CC,SC) = C13 ;                                                    00040300
189    1                  CH13 (CC,SC) =(CH13 (CC,SC) * 155.5)- 37 + B13 ;                        00040400
190    1                  CH14 (CC,SC) = C14 ;                                                    00040500
191    1                  CH14 (CC,SC) = (CH14 (CC,SC) * 20) + 22 ;                               00040600
192    1                  CH17 (CC,SD) = WS (C17) ;                                               00040800
193    1                  CH18 (CC,SC) = WS (C18) ;                                               00040900
194    1                  CH19 (CC,SC) = WS (C19) ;                                               00041000
195    1                  CH2C (CC,SC) = WS (C20) ;                                               00041100
196    1                  CH21 (CC,SC) = WS (C21) ;                                               00041200
197    1                  CH22 (CC,SC) = WS (C22) ;                                               00041300
198    1                  CH23 (CC,SC) = WS (C23) ;                                               00041400
199    1                  CH24 (CC,SC) = WS (C24) ;                                               00041500
200    1                  CH25 (CC,SC) = WS (C25) ;                                               00041600
201    1                IF LABEL (25) ¬= '       ' THEN CH36(QC,SC) = C36 * A36 + B36 ;00041700
203    1                IF LABEL (26) ¬= '       ' THEN CH30(QC,SC) = C30 * A30 + B30 ;00041800
205    1                IF LABEL (27) ¬= '       ' THEN CH31(QC,SC) = C31 * A31 + B31 ;00041900
207    1                IF LABEL (28) ¬= '       ' THEN CH33(QC,SC) = C33 * A33 + B33 ;00042000
209    1                IF LABEL (29) ¬= '       ' THEN CH34(QC,SC) = C34 * A34 + B34 ;00042100
211    1                IF LABEL (30) ¬= '       ' THEN CH40(QC,SC) = C40 * A40 + B40 ;00042200
213    1                IF LABEL (31) ¬= '       ' THEN CH41(QC,SC) = C41 * A41 + B41 ;00042300
215    1                IF LABEL (32) ¬= '       ' THEN CH42(QC,SC) = C42 * A42 + B42 ;00042400
217    1                IF LABEL (33) ¬= '       ' THEN CH43(QC,SC) = C43 * A43 + B43 ;00042500
219    1                IF LABEL (34) ¬= '       ' THEN CH44(QC,SC) = C44 * A44 + B44 ;00042600
221    1                IF LABEL (35) ¬= '       ' THEN CH45(QC,SC) = C45 * A45 + B45 ;00042700
223    1                IF LABEL (36) ¬= '       ' THEN CH37(QC,SC) = C37 * A37 + B37 ;00042800
225    1                IF LABEL (37) ¬= '       ' THEN CH39(QC,SC) = C39 * A39 + B39 ;00042900
227    1                  CH48 (CC,SC) = WS (C48) ;                                             00043000
                       /*                                                                      00043500
                        PUT EDIT ('END KEEPER',CC,SC,ICTR,ISEC,JCTR,JSEC,LC30,LS3C,          00043600
                       LC2C,LS2C,LC19,LS19,LC16,LS16,CC,SC) (SKIP,A,99(SKIP,4(F(2C)))) ;      00043700
                        */                                                                     00043800
228    1                     GC TC READER ;                                                    00043900
229    1                ALTEST:                                                               00044000
                        /*                                                                   00044005
                        PUT EDIT (ZK,(ZC(S),ZV(S) DC S = 1 TC 7C)) (PAGE,A,5C(SKIP,4(X(5),   00044010
                             A))) ;                                                          00044020
                      PUT EDIT ('NUTEST',ECF,TEST) (A,A,F(6)) ;                            00044200
                      PUT  EDIT (JC,HR,MIN,INREC,SEC,CHAN(1),VOLT(1))  (A,A,A,A,A,A) ;     00044300
                        */                                                                 00044400
                                IF TEST > 1 THEN                                           00044500
230    1                        DC ;                                                       00044600
231    1    1                   CC I = 1 TC 4 ;                                            00044700
232    1    2                        CALL RCLS (JCTR) ;                                    00044800
233    1    2                   END ;                                                      00044900
234    1    1                        PAGE = PAGE + 1 ;                                     00045000
235    1    1                    TCTSEC = TCTSEC + NUMREC ;                                00045100
236    1    1                    TCTSTCH = TCTSTCH + NUMSTCH ;                             00045200
237    1    1                    TCTIN = TCTIN + NUMIN ;                                   00045300
238    1    1                        PUT FILE (REPC) EDIT ('TEST SUMMARY STATISTICS',      00045400
                                    'PAGE',PAGE)                                           00045500
                                       (PAGE,X(5C),A,CCL(120),A,F(6)) ;                    00045600
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STMT LEVEL NEST

239    1    1                    PUT FILE (REPO) EDIT ('TEST NUMBER',TEST,NUMIN,      000457C0
                                  'INPUT RECORDS',CLPREC,'DUPLICATE RECORDS',         00045BC0
                                  NUMSTCK,'DATA RECORDS - SECONDS',NUMREC,            000459C0
                                  'DATA RECORDS - QTR MIN',DEFREC,'DEFECTIVE INPUT ',00046000
                              'RECORDS',TRREC,'TRANSACTION RECORDS') (SKIP(2),X(50),A,F(5),00046010
                                  5(SKIP,F(12),X(5),A),A,SKIP,F(12),X(5),A) ;        000461C0
240    1    1                IF ECF = 'Y' THEN DO ;                                   00046200
242    1    2                  PAGE = PAGE + 1 ;                                      00046300
243    1    2                  PUT FILE (REPO) EDIT ('ALL DATA SUMMARY STATISTICS',PAGE,00046400
                                TOTSEC,'TOTAL DATA SECONDS',TOTSTCK,                  00046500
                               'TOTAL DATA QTR MIN',TOTIN,'TOTAL INPUT RECORDS',      00046600
                                  TRTOT,'TOTAL TRANSACTION RECORDS')                  00046650
                                (PAGE,COL(50),A,COL(125),F(6),SKIP(3),4(SKIP,F(20),   00046700
                                 X(3),A)) ;                                           00046E00
244    1    2                    RETURN ; END ;                                       00046900
246    1    1                END ;                                                    00047000
247    1                     ELSE DO ;                                                00047100
248    1    1          IF ECF = 'Y' THEN RETURN ;                                     00047200
250    1    1                  JQTR = 1 ;                                             00047300
251    1    1                  DO I = 1 TO 4 ;                                        00047400
252    1    2                  CALL RCLS (JQTR) ;                                     00047500
253    1    2                  END ;                                                  00047600
254    1    1                END ;                                                    00047700
                    /*                                                              00047800
                      JULIAN (JD) FOR YEAR (YR) IS CONVERTED TO MONTH(IDE) AND DAY (DAY)00047900
                    */                                                              00048000
255    1               LEAP = 0 ;                                                   00048100
256    1              IDE = YR;  J = JD; IF J > 59 THEN IF MOD(IDE,4) = 0 THEN LEAP = 1; 00048200
261    1               DO IDE = LEAP+1  TO 12  ;                                   00048300
262    1    1          IF J <= TAB(IDE) + LEAP THEN GO TO A ;                      00048400
264    1    1          END ;                                                       00048500
265    1               J = 365 + LEAP + 59 ;                                       00048600
266    1             A:  IF IDE >1 THEN DO; IF IDE = 2 THEN J  = J  - TAB(1) ;     00048700
270    1    1                              ELSE J  = J  - (TAB(IDE-1) + LEAP) ;     00048E00
271    1    1                 END ;                                                00048900
272    1               PUT STRING(DAY) EDIT(J+100) (F(2,0)) ;                      00049000
273    1               MONTH = MON_TAB(IDE) ;                                      00049100
274    1                     JJC = JD ;                                            00049200
275    1                     TEST = TEST + 1 ;                                     00049300
276    1                     JQTR = IQTR ;                                         00049400
277    1                  TRTOT = TRTOT + TRREC ;
278    1                  TKEY = KEY ;                                             00049600
279    1                  THR = HR ;                                               00049700
280    1                  DATAHR = HR ;                                            00049800
281    1                  DATAMIN = MIN ;                                          00049900
282    1                  INDSEC = (DATAHR * 3600) + (DATAMIN * 60) ;              00050000
283    1                  DATASEC = KEEPSEC + INDSEC ;                             00050100
                        /* RESET TEST COUNTERS IN THIS BLOCK */                   00050200
284    1                  JSEC = INDSEC + (JQTR * 15) -15 ;   /*SET CUMULATIVE TIME TO  00050300
                                                               BEG OF JQTR IN SECONDS  */00050400
285    1           DEFREC,NUMIN,CLPREC,NUMSTCK,NUMREC = 0 ;                         00050500
```

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STMT LEVEL NEST

286   1            IFREC = 0 ;                                                          00050590
                   /*                                                                   00050600
                            PUT EDIT ('INIT',IQTR,ISEC,JQTR,JSEC) (SKIP,A,4(F(12))) ; 00050700
                   */                                                                   00050800
287   1          INIT: GO TO PRC (TEST) ;                                               00050900
288   1            PRC(1):                                                              00051000
                   PRC(2): LABEL (25),LABEL (26),LABEL (27),LABEL (28),LABEL (29),    00051100
                    LABEL (30) = BLANK7 ;                                             00051200
289   1                   CVNUM,MRITEST,PCNUM,REMNUM = 1 ;                            00051300
290   1            STARKEY = '17016370C0' ; STCFKEY = '17016425S' ;  /* TEST  2   */
292   1            EC1 = -5C  ;     /* TEST 2 */    B45 = +0.08 ;
294   1            EC7 = -2 ;       /* TEST 2 */  B02 = -130 ; B42 = 10 ;
297   1            E13 = -100 ;     /* TEST 2 */
298   1                   GC TC KEEPER ;                                               00051400
299   1            PRC(3): LABEL (27) = ' DEC F ' ;                                     00051600
300   1            STARKEY = '1721148B0' ; STCFKEY = '172115344' ;  /* TEST  3   */
302   1            EC1 = -200 ;     /* TEST 3 */    B31 = +5 ;
304   1            EC2 = -160 ;     /* TEST 3 */    B34 = +30 ;
306   1            EC3 = +C.1 ;     /* TEST 3 */
307   1            EC7 = +6.4 ;     /* TEST 3 */
308   1            E13 = -11C ;     /* TEST 3 */
309   1            E42 = C ;        /* TEST 2 */
310   1          LABEL(26),LABEL (28) = INNC ;                                          00051700
311   1                   LABEL (29) = DF ;                                            00051800
312   1                   LABEL (32),LABEL (31),LABEL (33),LABEL (34),LABEL (35),      00051900
                     LABEL (36),LABEL (37) = BLANK7 ;                                 00052000
313   1                   CVNUM,MRITEST,PCNUM,REMNUM = 2 ;                             00052100
314   1                   GC TC KEEPER ;                                               00052200
315   1            PRC(4): LABEL (35) = BLANK7 ;                                        00052300
316   1                   MRITEST,PCNUM = 3 ;                                          00052400
317   1                   CVNUM = 1 ;                                                  00052500
318   1                   REMNUM = 2 ;                                                 00052600
319   1            STARKEY = '1731C1ECC' ; STCFKEY = '173102129' ;  /* TEST  4   */
321   1            EC1 = - 5C ;     /* TEST 4 */    B31 = C ;
323   1            EC2 = -15C ;     /* TEST 4 */    B34 = +5 ;
325   1            EC3 = +1.0 ;     /* TEST 4 */
326   1            EC5 = + .3 ;     /* TEST 4 */
327   1            EC7 = -1.7 ;     /* TEST 4 */
328   1            E13 = -10C ;     /* TEST 4 */
329   1                   LABEL(5) = 'PPM NCX' ;          /* CHANGE  */               00052650
330   1                   GO TC KEEPER ;                                               00052700
331   1            PRC(5):                                                              00052800
                           MRITEST =4  ;                                              00052900
332   1                   CVNUM = 3 ;                                                  00053000
333   1                   PCNUM = 2 ;                                                  00053100
334   1                   REMNUM = 12;                                                 00053200
335   1            STARKEY = '1761608C0' ; STCFKEY = '176161229' ;  /* TEST  5   */
337   1            EC1 = +50  ;     /* TEST 5 */    B3C = 0.115 ;
339   1            EC2 = -225 ;     /* TEST 5 */    B31 = 10 ;
341   1            EC3 = + .1 ;     /* TEST 5 */    B33 = 0.065 ;
343   1            EC4 = + .1 ;     /* TEST 5 */
```

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STMT LEVEL NEST

344    1          EC5 =  C   ;    /* TEST 5 */
345    1          EC7 =  C   ;    /* TEST 5 */
346    1          E13 = -51  ;    /* TEST 5 */
347    1                GO TO KEEPER ;                                          00053300
348    1          PRC(6):                                                       00053400
                        PRITEST =5  ;                                          00053500
349    1                CVAUP = 4 ;                                           00053600
350    1                FCALP = 4 ;                                           00053700
351    1                REMNUM = 12;                                          00053800
352    1           STARKEY = '177110745' ; STOPKEY = '177111500' ;  /* TEST  6   */
354    1           EC1 = -475 ;    /* TEST 6 */    B30 = 0.078 ;
356    1           EC2 = -50  ;    /* TEST 6 */    B33 = 0 ;
358    1           EC3 = -15  ;    /* TEST 6 */    A33 = 3.12 ;
360    1           EC4 = -EC  ;    /* TEST 6 */
361    1           EC7 = +2.5 ;    /* TEST 6 */
362    1           E13 = -E7  ;    /* TEST 6 */
363    1                GO TO KEEPER ;                                          00053900
364    1          PRC(7): LABEL(18) = 'EG-P   ' ;          /* CHANGE  */      00054000
365    1                LABEL(19) = 'EG-M   ' ;          /* CHANGE  */      00054100
366    1                LABEL(20) = 'EG-C   ' ;          /* CHANGE  */      00054200
367    1                LABEL(21) = 'ST-P   ' ;          /* CHANGE  */      00054300
368    1                LABEL(22) = 'ST-M   ' ;          /* CHANGE  */      00054400
369    1                LABEL(23) = 'ST-C   ' ;          /* CHANGE  */      00054500
370    1                A30 = 1.12 ;                                          00054550
371    1                A33 = 1.12 ;                                          00054600
372    1                A45 = 1.12 ;                                          00054700
373    1                LABEL (36) = 'MRI    ' ;          /* CHANGE  */      00054800
374    1                LABEL (1)  = BLANK7 ;                                 00054900
375    1                                    LABEL (32) = DF ;                 00055000
376    1                LABEL (35) = INWC ;                                   00055100
377    1                PRITEST = 6 ;                                         00055200
378    1                CVAUP = 2 ;                                           00055300
379    1                FCALP = 5 ;                                           00055400
380    1                REMNUM = 12;                                          00055500
381    1           STARKEY = '179152245' ; STOPKEY = '179152644' ;  /* TEST  7   */
383    1           EC1 = C    ;    /* TEST 7 */    B30 = 0.04C ;
385    1           EC2 = -50  ;    /* TEST 7 */    B31 = 0 ;
387    1           EC3 = + .1 ;    /* TEST 7 */    B34 = -10 ;
389    1           EC4 = C    ;    /* TEST 7 */    A33 = 0.312 ;
391    1           EC7 = C    ;    /* TEST 7 */    B45 = 0.1 ;
393    1           E13 = C    ;    /* TEST 7 */
394    1                GO TO KEEPER ;                                          00055600
395    1          PRC(8): LABEL (1) =  ' % H2C ' ;                             00055800
396    1                LABEL (2),LABEL (3) ,LABEL (6) = BLANK7 ;             00055900
397    1                PRITEST = 7 ;                                         00056000
398    1                CVAUP = 2 ;                                           00056100
399    1                FCALP = 5 ;                                           00056200
400    1                REMNUM = 12;                                          00056300
401    1           STARKEY = '180113425' ; STOPKEY = '18C113755' ;  /* TEST  8   */
403    1           EC2 = C    ;    /* TEST 8 */    B30 =0.001 ;
405    1           EC3 = 0    ;    /* TEST 8 */    B33 = 0.01 ;
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STMT LEVEL NEST

407     1            EC4 = + .1 ;    /* TEST 8 */    E45 = -0.01 ;
409     1            EC5 = + .1 ;    /* TEST 8 */
410     1                  GO TO KEEPER ;                                          00056400
411     1            PRC(9): A03 = 250 ;                                           00056500
412     1                  LABEL(35)  = OF ;                                       00056600
413     1                  LABEL(1)   = '% H2O *' ;                                0005665C
414     1                  LABEL(6)   = '% THC *' ;                                00056700
415     1                  PRITEST = 9 ;                                           00056800
416     1                  CVNUM = 4 ;                                             00056900
417     1                  PCNUM = 5 ;                                             00057000
418     1                  REMNUM = 12;                                            00057100
419     1            STARKEY = '184114345' ; STOPKEY = '184114644' ;  /* TEST  9   */
421     1            EC4 = 0     ;    /* TEST 9 */    B30 = 0.045 ; B31 = 5 ; B33 = 0.001;
425     1            EC5 = C     ;    /* TEST 9 */    B34 = C ; B42 = 5 ; B45 = C ;
429     1                  GO TO KEEPER ;                                          00057200
430     1            PRC(10): A3C = .312 ;                                         000573CC
431     1                  A33 = .312 ;                                            000574CC
432     1                  A45 = .312 ;                                            00057500
433     1                  LABEL (6) = BLANK7 ;                                    00057600
434     1                  LABEL (1) = '% H2O   ' ;                                0005765C
435     1                  LABEL (2) = 'PPM SO2' ;                                 000577CC
436     1                  LABEL (3) = 'PPM H2S' ;                                 00057800
437     1                  LABEL (6) = '% THC   ' ;                                0005785C
438     1                  PRITEST = 1C ;                                          00057900
439     1                  CVNUM = 5 ;                                             000580CC
440     1                  PCNUM = 1 ;                                             000581CC
441     1                  REMNUM = 12;                                            000582CC
442     1            STARKEY = '185152609' ; STOPKEY = '185152859' ;  /* TEST 10   */
444     1            EC2 = +15   ;    /* TEST 10*/    B3C = 0.06 ;
446     1            EC3 = -100 ;     /* TEST 10*/    B31 = 0 ;    B33 = 0.06 ;
449     1            B13 = +5.2 ;     /* TEST 10*/    B42 = 0 ;
451     1                  GO TO KEEPER ;                                          000583CC
452     1            PRC(11): LABEL (6) = ' % THC ' ;                              000584CC
453     1                  PRITEST = 11 ;                                          00058500
454     1                  CVNUM = 2 ;                                             000586CC
455     1                  PCNUM = 1 ;                                             000587CC
456     1                  REMNUM = 3 ;                                            00058800
457     1            STARKEY = '186151900' ; STOPKEY = '186152214' ;  /* TEST 11   */
459     1            EC2 = C     ;    /* TEST 11*/    B3C = 0.15 ; B33 = 0.18 ;
462     1            EC3 = C     ;    /* TEST 11*/    B45 = -0.18 ;
464     1            E13 = 1C.1 ;     /* TEST 11*/
465     1                  GO TO KEEPER ;                                          00058900
466     1            PRC(12): A04 = 20 ;                                           00059000
467     1                  PRITEST = 17 ;                                          00059100
468     1                  CVNUM = 6 ;                                             000592CC
469     1                  PCNUM = 1 ;                                             00059300
470     1                  REMNUM = 12;                                            00059400
471     1            STARKEY = '192140200' ; STOPKEY = '192140814' ;  /* TEST 12   */
473     1            EC2 = -75   ;    /* TEST 12*/    B3C = 0.2 ; B33 = 0.15 ;
476     1            EC3 = + .3 ;     /* TEST 12*/    B42 = -5 ;
478     1            E13 = C     ;    /* TEST 12*/    B45 = 0.062 ;
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STMT LEVEL NEST

480     1                GO TO KEEPER ;                                                  00C595C0
481     1           FPC(13): AC3 = 1CCC ;                                                00C596C0
482     1                    A45 = 1.12 ;                                                00C597CC
483     1                    LABEL (26),LABEL (27),LABEL (30) = BLANK7 ;                 00059800
484     1                    LABEL (32) = DF ;                                           00059900
485     1                   PRITEST = 17 ;                                               00060000
486     1                   CVNUM = 7 ;                                                  00060100
487     1                   PCALP = 6 ;                                                  00060200
488     1                   REMNUM = 12;                                                 00060300
489     1            STARKEY = '193C91115' ; STOPKEY = '1920916559' ;  /* TEST 13   */
491     1            EC1 = +20  ;     /* TEST 13*/     B30 = 0 ;
493     1            EC2 = 0    ;     /* TEST 13*/     B33 = 0.066 ;
495     1            EC3 = + .3 ;     /* TEST 13*/     B34 = +10 ;
497     1            EC4 = +1.2 ;     /* TEST 13*/     B42 = C ;
499     1            EC7 = C    ;     /* TEST 13*/     B45 = 0 ;
501     1            E13 = +1C  ;     /* TEST 13*/
502     1                GO TO KEEPER ;                                                  00060400
503     1           FPC(14): AC3 = 250 ;                                                 00060500
504     1                   PRITEST = 17 ;                                               00060600
505     1                   CVNUM = 3 ;                                                  00060700
506     1                   PCALP = 7 ;                                                  00060800
507     1                   REMNUM = 4 ;                                                 00060900
508     1            STARKEY = '193151630' ; STOPKEY = '1931520l4' ;  /* TEST 14   */
510     1            EC1 = C    ;     /* TEST 14*/     B33 = 0.176 ;
512     1            EC2 = -1CO ;     /* TEST 14*/     B34 = 0 ;
514     1            EC3 = C    ;     /* TEST 14*/
515     1            EC4 = +1.C ;     /* TEST 14*/
516     1            E13 = C    ;     /* TEST 14*/
517     1                GO TO KEEPER ;              /* CONVERT & STORE  */             00061000
518     1            FPC(15):                                                            00061100
                            PRITEST = 17 ;                                              00061200
519     1                   CVNUM = 3 ;                                                  00061300
520     1                   PCALP = 11;                                                  00061400
521     1                   REMNUM = 12;                                                 00061500
522     1                      LABEL (C1) = '% F2L *' ;                                  00061550
523     1                                 LABEL (32) = DF ;                             00061700
524     1                      LABEL (3C) = BLANK7 ;                                     00061800
525     1                      AC3 = 1CCC ;                                              00061900
526     1                      AC4 = 1CC ;                                               00062000
527     1                      A30 = 1.12 ;                                              00062100
528     1                      A33 = 1.12 ;                                              00062200
529     1            STARKEY = '2181243l5' ; STOPKEY = '2181246295' ;  /* TEST 15   */
531     1            EC2 = C    ;     /* TEST 15*/     B33 = 0.048 ;
533     1            EC3 = +1.C ;     /* TEST 15*/     B34 = 50 ;
535     1            EC4 = C    ;     /* TEST 15*/     B45 = 0.001 ;
537     1                GO TO KEEPER ;                                                  00062300
538     1           FPC(16):                                                             00062400
                            LABEL (C1) = BLANK7 ;                                       00062500
539     1                   AC1 = 0.3 ;                                                  00062600
540     1                   AC2 = 0.3 ;                                                  00062700
541     1                   AC3 = 25C ;                                                  00062800
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STMT LEVEL NEST

542     1                   AC4 = 0.25 ;                                        00062500
543     1                   AC5 = C.5 ;                                         00063000
544     1                PRITEST = 17 ;                                         00063100
545     1                CYNUM = 8 ;                                            00063200
546     1                PGNUM = 8 ;                                            00063300
547     1                REPNUM = 5 ;                                           00063400
548     1          STARKEY = '2191104C2' ; STCPKEY = '219110859' ;  /* TEST 16   */
550     1          EC1 = -20  ;    /* TEST 16*/    B33 = C.0C1 ;
552     1          EC2 = -35  ;    /* TEST 16*/    B34 = 0 ;
554     1          EC3 = C    ;    /* TEST 16*/    B45 = C.0C1 ;
556     1          EC6 = + .1 ;    /* TEST 16*/
557     1                GO TC KEEPER ;                                         00063500
558     1          PRC(17):                                                     00063600
                         ACC = 2 ;                                            00063700
559     1                A30 = .312 ;                                           00063800
560     1                A33 = .312 ;                                           00063900
561     1                A45 = .312 ;                                           00064000
562     1                LABEL (1) = '% H2C *' ;                                00064100
563     1                LABEL (26) = INBC ; LABEL (27) = OF ;                  00064150
565     1                PRITEST = 17 ;                                         00064200
566     1                CYNUM = 8 ;                                            00064300
567     1                PGNUM = 8 ;                                            00064400
568     1                REPNUM = 6 ;                                           00064500
569     1          STARKEY = '220111252' ; STCPKEY = '220111659' ;  /* TEST 17   */
571     1          EC1 = -20  ;    /* TEST 17*/    B30 = 0.050 ; B33 = 0.C61 ; B34 =15;
575     1          EC2 = -480 ;    /* TEST 17*/    B42 = 10 ; B45 = 0 ;
578     1                GO TC KEEPER ;                                         00064600
579     1          PRC(18):                                                     00064700
                         LABEL (7) = '% H2    ' ;                             00064750
580     1                PRITEST = 17 ;                                         00064800
581     1                CYNUM = 1 ;                                            00064900
582     1                PGNUM = 8 ;                                            00065000
583     1                REPNUM = 7 ;                                           00065100
584     1          STARKEY = '2211521CC' ; STCPKEY = '221152944' ;  /* TEST 18   */
586     1          EC1 = -25  ;    /* TEST 18*/    B30 = 0.C12 ; B33 = 0.C75 ;
589     1          EC2 = -50  ;    /* TEST 18*/    B34 = -16 ;
591     1          EC6 = 0    ;    /* TEST 18*/    B45 = -C.05 ;
593     1                GO TC KEEPER ;                                         00065200
594     1          PRC(19):                                                     00065300
                         AC1 = 3 ;                                            00065400
595     1                AC2 = 3 ;                                              00065500
596     1                PRITEST = 12 ;                                         00065600
597     1                CYNUM = 9 ;                                            00065700
598     1                PGNUM = 8 ;                                            00065800
599     1                REPNUM = 12;                                           00065900
600     1          STARKEY = '2251111CC' ; STCPKEY = '225111529' ;  /* TEST 19   */
602     1          EC2 = -80  ;    /* TEST 19*/    B30 =-0.002 ; B33 = 0.081 ;
605     1          E13 = +6.5 ;    /* TEST 19*/    B34 = 30 ; B42 = 35 ; B45 =-0.003 ;
609     1                GO TC KEEPER ;                                         00066000
610     1          PRC(2C):                                                     00066100
                         PRITEST = 13 ;                                       00066200
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STMT LEVEL NEST

611     1                   CVNUM = 8 ;                                                    00066300
612     1                   PONUM = 6 ;                                                    00066400
613     1                   REMNUM = 12;                                                   00066500
614     1            STARKEY = '226110BC0' ; STOPKEY = '226111329' ;  /* TEST 20   */
616     1            EC1 = -175 ;     /* TEST 20*/   LABEL (23) = 'MRI-P  ' ;
618     1            EC2 = 0    ;     /* TEST 20*/    B3C =-0.01 ; B31 = -15 ; B33 = 0.2 ;
622     1            B13 = +15  ;     /* TEST 20*/    B34 = 20 ; B42 = 10 ; B45 =-0.006 ;
                                                                                           000666C0
626     1                   GC TC KEEPER ;                                                 00066700
627     1            FPC(21):                                                              00066800
                             MRITEST = 14 ;                                               00066900
628     1                    A00 = 1.5 ;                                                   00067000
629     1                    CVNUM = 1 ;                                                   00067100
630     1                    PONUM = 8 ;                                                   00067200
631     1                    REMNUM = 2 ;
632     1            STARKEY = '2271C5E15' ; STOPKEY = '22711C629' ;  /* TEST 21   */
634     1            EC1 = -50  ;     /* TEST 21*/   LABEL (23) = 'ST-C   ' ; B45 = C.04 ;
637     1            EC7 = - .2 ;     /* TEST 21*/    B3C = -0.06 ; B31 = -6C ;
640     1            B13 = C    ;     /* TEST 21*/    B33 = 0.05 ; B34 = 11C; B42 = 2C ;
                                                                                           00067300
644     1                   GC TC KEEPER ;                                                 00067400
645     1            FPC(22):                                                              00067500
                             A05 = 1 ;                                                    00067600
646     1                    MRITEST = 17 ;                                                00067700
647     1                    CVNUM = 5 ;                                                   00067800
648     1                    PONUM = 9 ;                                                   00067900
649     1                    REMNUM = 12;                                                  00068000
650     1           LABEL (25), LABEL (26),LABEL (27),LABEL (32),LABEL(35) = BLANK7 ;      00068050
651     1                       LABEL (1) = '% H2C   ' ;                                   00068100
652     1                       A33 = 1.12 ;
653     1             STARKEY = '2271537C1' ; STOPKEY = '227154144' ;  /* TEST 22   */
655     1             EC1 = -2CC ;     /* TEST 22*/    B33 = 0.005 ; B34 = 10 ;
658     1             EC2 = -2C0 ;     /* TEST 22*/
659     1             EC7 = C    ;     /* TEST 22*/
660     1             E13 = +12  ;     /* TEST 22*/
                                                                                           00068200
661     1                    GC TC KEEPER ;                                                00068300
662     1             FPC(23):                                                             00068400
                                AC3 = 1000 ;                                               00068500
663     1                       AC4 = 1 ;                                                  00068540
664     1                       LABEL (2) = 'PPM@SC2' ;                                    00068580
665     1                       LABEL (3) = 'PPM@H2S' ;                                    00068600
666     1                    MRITEST = 15 ;                                                00068700
667     1                    CVNUM = 10;                                                   00068800
668     1                    PONUM = 9 ;                                                   00068900
669     1                    REMNUM = 12;
670     1             STARKEY = '2281515451' ; STOPKEY = '2281520C9' ;  /* TEST 23   */
672     1             EC1 = C    ;     /* TEST 23*/    B33 = 0.001 ; B34 = -5 ;
675     1             EC2 = C    ;     /* TEST 23*/
676     1             EC7 = - .3 ;     /* TEST 23*/
677     1             E13 = 0    ;     /* TEST 23*/
                                                                                           00069000
678     1                    GC TC KEEPER ;                                                00069100
679     1             FPC(24):                                                             00069200
                                AC3 = 25C ;
```

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STMT LEVEL NEST

680    1                    AC4 = 0.25 ;                                                    00069300
681    1                    AC5 = C.5 ;                                                     00069400
682    1                    LABEL (23) = 'MRI - P' ;                                        00069500
683    1                    LABEL (30) = 'MRI - C' ;                                        00069550
684    1                    A33 = .312 ;                                                    00069600
685    1                    LABEL (26) = INWC ;                                             00069700
686    1                    LABEL (27) = DF ;                                               00069800
687    1                    LABEL (32) = DF ;                                               00069900
688    1                    LABEL (35) = INWC ;                                             00070000
689    1                    LABEL ( 3) = 'PPM*H2S' ; LABEL (2) = 'PPM SO2' ;                00070050
691    1                 WRITEST = 16 ;                                                     00070100
692    1                 CVNUM = 1 ;                                                        00070200
693    1                 FCNUM = 8 ;                                                        00070300
694    1                 REMNUM = 9 ;                                                       00070400
695    1           START(EY = '2291419CC' ; STOPKEY = '229142357' ;  /* TEST 24   */
697    1           EC6 = + .1 ;     /* TEST 24*/     B30 = 0.006 ; B31 = 40 ;
700    1           BC7 = + .3 ;     /* TEST 24*/     B33 = 0.003 ; B34 = 30 ;
703    1           B13 = +12  ;     /* TEST 24*/     B42 = -50 ; B45 = C.01 ;
706    1                 GO TC KEEPER ;                                                     00070500
707    1           PRC(25):                                                                 00070600
                         A05 = 1 ;                                                         00070700
708    1                 A07 = 25 ;                                                         00070800
709    1                 LABEL (23) = 'ST-C    ' ;                                          00070850
710    1                 WRITEST = 17 ;                                                     00070900
711    1                 CVNUM = 11;                                                        00071000
712    1                 FCNUM = 8 ;                                                        00071100
713    1                 REMNUM = 10;                                                       00071200
714    1           START(EY = '2341112301' ; STOPKEY = '234112059' ;  /* TEST 25   */
716    1           EC6 = C     ;     /* TEST 25*/     B30 = 0.031 ; B31 = 0 ;
719    1           EC7 = C     ;     /* TEST 25*/     B33 =-0.04 ; B34 = 10 ; B42 = C ;
723    1           B13 = +32  ;     /* TEST 25*/     B45 = C ;
725    1                 GO TC KEEPER ;                                                     00071300
726    1           PRC(26):                                                                 00071400
                         LABEL (26),LABEL (27),LABEL (32),LABEL (35) = BLANK7 ;           00071500
727    1                 A33 = 1.12 ;                                                       00071600
728    1                 CVNUM = 6 ;                                                        00071800
729    1                 FCNUM = 9 ;                                                        00071900
730    1                 REMNUM = 12;                                                       00071950
731    1                 LABEL (28) = '.01*NO*' ;                                         00072050
732    1           START(EY = '234140545' ; STOPKEY = '2341414441' ;  /* TEST 26   */
734    1           EC7 = - .7 ;     /* TEST 26*/     B33 = 0.001 ;
736    1           B13 = C     ;     /* TEST 26*/
737    1                 GO TC KEEPER ;                                                     00072100
738    1           PRC(27):                                                                 00072200
                         LABEL (26),LABEL (29) = BLANK7 ;                                 00072300
739    1                    LABEL (32) = DF ;                                               00072400
740    1                    LABEL (05) = 'PPM*NOX' ;                                        00072460
741    1                    LABEL (35) = INWC ;                                             00072500
742    1                 CVNUM = 12;                                                        00072700
743    1                 FCNUM = 10;                                                        00072800
744    1           START(EY = '2351135201' ; STOPKEY = '2351146291' ;  /* TEST 27   */
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STMT LEVEL NEST

746   1          EC1 = -50  ;    /* TEST 27*/    B34 = 0 ;
748   1          EC2 = -50  ;    /* TEST 27*/
749   1          EC7 = + .4 ;    /* TEST 27*/
750   1          E13 = +1C  ;    /* TEST 27*/
751   1                GO TO KEEPER ;                                          00073000
752   1          PRC(28):                                                      000731CC
                        LABEL (28) = INNC ;                                   00073200
753   1                    LABEL (05) = 'PPM NOX' ;                           00073250
754   1                    LABEL (29) = OF ;                                  000733CC
755   1                    LABEL (32),LABEL (35) = BLANK7 ;                   00073400
756   1                PRITEST = 17 ;                                         00073500
757   1                CVALM = 8 ;                                            00073600
758   1                PCALM = 9;                                             00073700
759   1           STARKEY = '23514C145' ; STCPKEY = '235140659' ;  /* TEST 28   */
761   1           EC1 = 0    ;    /* TEST 28*/    B33 = 0.1 ;
763   1           EC2 = C    ;    /* TEST 28*/
764   1           EC7 = 0    ;    /* TEST 28*/
765   1           E13 = - 5  ;    /* TEST 28*/
766   1          KEEPER:                                                       00035700
                 MONTHA = MONTH ;
767   1          NNN = TEST ;
768   1          DAYA = DAY ;
769   1          CVNC = CVEN (CVNUM) ;
770   1          MRICH = PRI (MRITEST) ;
771   1          REPCH = REM (REPNUM) ;
772   1          KKKREC = KEY ;
773   1          DO I = 1 TO 39 ;
774   1     1    LABCH (I) = LABEL (I) ;
775   1     1    END ;
776   1          WRITE FILE (OUT) FROM (HEADER) ;
777   1          PUT EDIT (KEYIZ,MONTHA,DAYA,(LABCH(I) DO I = 1 TO 39),CVNC,MRICH,
                    REMCH,KKKREC,NNN,'TEST HEADER') (PAGE,46(X(1),A),F(5),X(2),A) ;
778   1          MAX1 = 1250 * AC1 + BC1 ;                                   00073950
779   1          MAX2 = 125C * AC2 + BC2 ;                                   00073960
780   1          MAX5 = 12.5 * AC5 + BC5 ;                                   00073970
781   1          PUT  FILE (MAXI) EDIT ('ABOVE THRESHOLD REPORT TEST -',TEST,
                  'Ch01','Ch02','Ch05',
                MAX1,MAX2,MAX5,' ') (PAGE,COL(5C),A,F(4),SKIP,COL(2C),A,COL(6C),A,
                   COL(1CC),A,SKIP(2),COL(36),F(12,1),COL(56),F(12,1),COL(96),   00073980
                  F(12,1),SKIP(2),A) ;                                        00073982
782   1                PUT FILE (REPTR) EDIT ('TRANSACTION INPUT REPORT','TEST',  00028950
                 TEST,' ') (PAGE,COL(6C),A,COL(6C),A,F(4),COL(122),A) ;       00028952
783   1          IF STARKEY > CHEKKEY THEN GO TO READER ; ELSE GO TO STORE ;
786   1          ERROR:  PUT EDIT ('OUTPUT RECORD INDEX ERROR - RUN TERMINATED',  00074000
                            'IQTR = ',IQTR,'RECORD KEY = ',KEY,'REC_ID (1) = ',  000741CC
                          REC_ID (1),'REC_ID (2) = ',REC_ID (2),'REC_ID (3) = ',  000742CC
                          REC_ID (3),'REC_ID (4) = ',REC_ID (4),                  000743CC
                          QTR(1),CTR(2),CTR(3),QTR(4)) (PAGE,A,SKIP(2),A,F(3),    000744CC
                          9(SKIP,A,A)) ;                                          00074500
787   1                   PUT EDIT (CTR(1),(CTRREC.SEC(1,J) DO J = 1 TO 15),      00074600
                                  CTR(2),(CTRREC.SEC(2,J) DO J = 1 TO 15),      00074700
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STMT LEVEL NEST

                                   CTR(3),(CTRREC.SEC(3,J) DO J = 1 TO 15),          00074800
                                   CTR(4),(CTRREC.SEC(4,J) DO J = 1 TO 15))          00074900
                          (4(SKIP(3),A,15(X(2),A))) ;                                00075000
788     1                   PUT EDIT (SD,SD,LS16,LQ16,LS19,LQ19,LS20,LQ20,LS30,LQ30,  00075100
                              ICTR,ISEC,JSEC,DATASEC,JCTR,JSEC)  (SKIP(2),99(SKIP,    00075200
                              F(15),F(15))) ;                                        00075300
789     1                 RETURN ;                                                   00075400
790     1           RCLS: PROCEDURE (I) ;                                            00075500
791     2                   DCL   (C,S,C                  ) FIXED BIN (15) STATIC ,  00075600
                          1 FIXED BIN (31) ,                                         00075700
                              1 QTOV2 BASED (Z) ,                                    00075750
                                10 JC2 CHAR (3) ,                                    00075760
                                10 TIM CHAR (4) ,                                    00075770
                              1 QTOV BASED (Z) ,                                     00075800
                               10 KEY_IC CHAR (8) ,                                  00075900
                                     10 SECNUM CHAR (2),                             00076000
                                     10 CATCH (29) ,                                 00076100
                                        20 DAT CHAR (4) ,                            00076200
                                     10 SWCH (10) ,                                  00076300
                                        20 SW CHAR (1) ,                             00076400
                                     10 RESTREC CHAR (1752) ,                        00076500
                              DIG (39) FIXED BIN (15) STATIC INITIAL ((5)1,2,1,1,2,1,1,00076600
                             0,1,2,4,(9)0,4,3,0,3,0,0,3,0,0,3,3,0,0,0,1) ;           00076700
                            /*                                                       00076800
                          PUT EDIT ('RCUS',I,REC_IC(I),JSEC,ISEC) (SKIP,A,F(12),X(2),A,00076900
                            2(F(12))) ;                                              00077000
                            */                                                       00077100
792     2                     Z = ADDR (CTRREC (I)) ;     /* FIND QTR MIN */         00077150
793     2                   IF REC_IC(I) = '        ' THEN GO TO CLEAN ;  /* NO DATA */00077200
795     2                    ELSE                                                    00077201
795     2                 DO S = 1 TO 15 ;                                          00077205
796     2     1       SETTRAN:  IF TRKEY <= KEY_IC THEN                            00077210
797     2     1                   DO ;                                             00077215
798     2     2                     IF  CTRREC.SEC (I,S) >= SECT THEN              00077220
799     2     2                       DO ;                                         00077225
800     2     3                         TRREC = TRREC + 1 ;                        00077227
801     2     3                         IF SECE = BLO2 THEN CALL ENDSEC ;          00077230
803     2     3                         IF TRC1 ¬= BLO2 THEN CALL TRSETUP (TRC1,TRV1) ; 00077240
805     2     3                         IF TRC2 ¬= BLO2 THEN CALL TRSETUP (TRC2,TRV2) ; 00077245
807     2     3                         IF TRC3 ¬= BLO2 THEN CALL TRSETUP (TRC3,TRV3) ; 00077250
809     2     3                         IF TRC4 ¬= BLO2 THEN CALL TRSETUP (TRC4,TRV4) ; 00077255
811     2     3                         READ FILE (TRAN) SET (C1) ;                00077260
812     2     3                         IF SECT < '15' THEN BB1 = '1' ; ELSE       00077265
814     2     3                         IF SECT < '30' THEN BB1 = '2' ; ELSE       00077270
816     2     3                         IF SECT < '45' THEN BB1 = '3' ; ELSE       00077275
818     2     3                          BB1 = '4' ;                               00077280
819     2     3                         GO TO SETTRAN ;                            00077285
820     2     3                       END ;                                        00077290
821     2     2                   END ;                                            00077055
822     2     1       FIXUP:  IF CTRREC.SEC (I,S) = BLO2 THEN DO ;      /* PRINT & CHANGE*/00077300
824     2     2             PUT EDIT ('*** MISSING SECOND DATA ***  TEST =',TEST,  00077301
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STMT LEVEL NEST

                    CTRREC.REC_ID(I),CTRREC.CTR(I),CTRREC.SEC(I,S),1,S)          00077302
                    (SKIP(3),A,F(4),SKIP,A,X(2),A,X(2),A,2(F(4))) ;              00077303
825    2    2                                  END ;                             00077305
826    2    1          IF S04 ¬= BLC2 THEN DO ;                                  00077310
828    2    2               CH04 (I,S) = TR04 ;                                  00077317
829    2    2               IF  (K04 <= TIM  & S04 <= CTRREC.SEC(I,S)) THEN DO ; 00077317
831    2    3                  K04 = BLANK4 ; S04 = BLC2 ; END ;                 00077318
834    2    2          END ;
835    2    1          IF S05 ¬= BLC2 THEN DO ;                                  00077320
837    2    2               CH05 (I,S) = TR05 ;                                  00077325
838    2    2               IF  (K05 <= TIM  & S05 <= CTRREC.SEC(I,S)) THEN DO ; 00077327
840    2    3                  K05 = BLANK4 ; S05 = BLC2 ; END ;                 00077328
843    2    2          END ;
844    2    1          IF S07 ¬= BLC2 THEN DO ;                                  00077330
846    2    2               CH07 (I,S) = TR07 ;                                  00077335
847    2    2               IF  (K07 <= TIM  & S07 <= CTRREC.SEC(I,S)) THEN DO ; 00077337
849    2    3                  K07 = BLANK4 ; S07 = BLC2 ; END ;                 00077338
852    2    2          END ;
853    2    1          IF S09 ¬= BLC2 THEN DO ;                                  00077340
855    2    2               CH09 (I,S) = TR09 ;                                  00077345
856    2    2               IF  (K09 <= TIM  & S09 <= CTRREC.SEC(I,S)) THEN DO ; 00077347
858    2    3                  K09 = BLANK4 ; S09 = BLC2 ; END ;                 00077348
861    2    2          END ;
862    2    1          IF S30 ¬= BLC2 THEN DO ;                                  00077350
864    2    2               CH30 (I,S) = TR30 ;                                  00077355
865    2    2               IF  (K30 <= TIM  & S30 <= CTRREC.SEC(I,S)) THEN DO ; 00077357
867    2    3                  K30 = BLANK4 ; S30 = BLC2 ; END ;                 00077358
870    2    2          END ;
871    2    1          IF S31 ¬= BLC2 THEN DO ;                                  00077360
873    2    2               CH31 (I,S) = TR31 ;                                  00077365
874    2    2               IF  (K31 <= TIM  & S31 <= CTRREC.SEC(I,S)) THEN DO ; 00077367
876    2    3                  K31 = BLANK4 ; S31 = BLC2 ; END ;                 00077368
879    2    2          END ;
880    2    1          IF S33 ¬= BLC2 THEN DO ;                                  00077370
882    2    2               CH33 (I,S) = TR33 ;                                  00077375
883    2    2               IF  (K33 <= TIM  & S33 <= CTRREC.SEC(I,S)) THEN DO ; 00077377
885    2    3                  K33 = BLANK4 ; S33 = BLC2 ; END ;                 00077378
888    2    2          END ;
889    2    1          IF S34 ¬= BLC2 THEN DO ;                                  00077380
891    2    2               CH34 (I,S) = TR34 ;                                  00077385
892    2    2               IF  (K34 <= TIM  & S34 <= CTRREC.SEC(I,S)) THEN DO ; 00077387
894    2    3                  K34 = BLANK4 ; S34 = BLC2 ; END ;                 00077388
897    2    2          END ;
898    2    1          IF S45 ¬= BLC2 THEN DO ;                                  00077390
900    2    2               CH45 (I,S) = TR45 ;                                  00077395
901    2    2               IF  (K45 <= TIM  & S45 <= CTRREC.SEC(I,S)) THEN DO ; 00077397
903    2    3                  K45 = BLANK4 ; S45 = BLC2 ; END ;                 00077398
906    2    2     END ;
907    2    1          IF CHC0 (I,S) < C THEN CHC0 (I,S) = C ;
909    2    1          IF CHC1 (I,S) < C THEN CHC1 (I,S) = C ;
911    2    1          IF CHC2 (I,S) < C THEN CHC2 (I,S) = C ;
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STMT LEVEL NEST

913     2    1            IF CHO3 (I,S) < C THEN CHO3 (I,S) = 0 ;
915     2    1            IF CHO4 (I,S) < 0 THEN CHO4 (I,S) = 0 ;
917     2    1            IF CHO5 (I,S) < 0 THEN CHO5 (I,S) = 0 ;
919     2    1            IF CHO6 (I,S) < 0 THEN CHO6 (I,S) = 0 ;
921     2    1            IF CHO7 (I,S) < 0 THEN CHO7 (I,S) = 0 ;
923     2    1            IF CHO8 (I,S) < 0 THEN CHO8 (I,S) = 0 ;
925     2    1            IF CHO9 (I,S) < 0 THEN CHO9 (I,S) = 0 ;
927     2    1            END ;
928     2           ECT = ' ' ;
929     2                     SIGNAL ENDPAGE (REPO) ;                                  000777CC
930     2                           PUT FILE (REPO) EDIT ('SEC','SEC','SEC','SEC',    00077900
                                      'SEC','SEC','SEC','SEC','SEC','SEC',          00078000
                                      'SEC','SEC','SEC','SEC') (SKIP(2),COL(16),     00078100
                                       15(A,X(5))) ;                                 000782CC
931     2                     PUT FILE (REPO) EDIT (QTRREC.SEC (I,1)) (SKIP,          00078300
                                CCL(17),A) ;                                        000784CC
932     2                     DO S = 2 TO 15 ;                                        000785CC
933     2    1                  PUT FILE (REPO) EDIT (QTRREC.SEC (I,S)) (X(6),A) ;   00078600
934     2    1                END ;                                                  00078700
935     2                    IF LABEL (01) ¬= '       ' THEN                        00078800
936     2                       DO ;                                                 00078900
937     2    1                    PUT FILE (REPO) EDIT ('00',LABEL(01))(LINE(11),A,X(3),A) ;00079000
938     2    1                    C = DIG (01) ;                                    000791CC
939     2    1                    DO S = 1 TO 15 ;                                  00079200
940     2    2                      IF CHO0 (I,S) ¬= 999999.9 THEN PUT FILE (REPO) EDIT  00079300
                                      (CHO0 (I,S)) (COL(S*8+5),F(8,D)) ;            00079500
942     2    2                  ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CHO0',I,S,  00079640
                                    QTRREC.REC_ID(I),QTRREC.SEC (I,S))              00079650
                                      (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;   00079660
943     2    2                END ;                                                  000795E0
944     2    1                  END ;                                                00079700
945     2                    IF LABEL (02) ¬= '       ' THEN                        00079800
946     2                       DO ;                                                 00079900
947     2    1                    PUT FILE (REPO) EDIT ('01',LABEL(02))(LINE(12),A,X(3),A) ;00080000
948     2    1                    C = DIG (02) ;                                    000801C0
949     2    1                    DO S = 1 TO 15 ;                                  00080200
950     2    2                      IF CHO1 (I,S) ¬= 999999.9 THEN DO ;
952     2    3           IF CHO1 (I,S) > MAX1 THEN DO ;
954     2    4            CH25 (I,S) = '1' ; PUT FILE (MAX1) EDIT (QTRREC.REC_ID (I),
                         QTRREC.SEC (I,S),CHO1 (I,S)) (COL(5),A,X(2),A,F(12,1)) ;
956     2    4            ECT = '*' ;
957     2    4           PUT FILE (REPO) EDIT (CHO1 (I,S)) (COL(S*8 + 5),P'*****9V.9') ; END ;
959     2    3           ELSE PUT FILE (REPO) EDIT
                                (CHO1 (I,S)) (COL(S*8+5),F(8,D)) ;                  00080400
960     2    3                END ;                                                  000805EC
961     2    2                ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CHO1',I,S,  00080540
                                    QTRREC.REC_ID(I),QTRREC.SEC (I,S))
                                      (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
962     2    2                  END ;                                                00080600
963     2    1            END ;
964     2                    IF LABEL (03) ¬= '       ' THEN                        00080700
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STMT LEVEL NEST

 965    2                    DO ;                                                                  00080800
 966    2    1                 PUT FILE (REPO) EDIT ('02',LABEL(03))(LINE(13),A,X(3),A) ;00080900
 967    2    1                 I = DIG (03) ;                                                      00081000
 968    2    1                 DO S = 1 TO 15 ;                                                    00081100
 969    2    2                   IF CHO2 (I,S) ¬= 999999.9 THEN DO ;
 971    2    3       IF CHO2 (I,S) > MAX2 THEN DO ;
 973    2    4        CH25 (I,S) = '2' ; PUT FILE (MAXI) EDIT (QTRREC.REC_ID (I),
                     QTRREC.SEC (I,S),CHO2 (I,S)) (COL(45),A,X(2),A,F(12,1)) ;
 975    2    4        ECT = '**' ;
 976    2    4       PUT FILE (REPO) EDIT (CHO2 (I,S)) (COL(S*8 + 5),P'*****9V.9') ; END ;
 978    2    3       ELSE PUT FILE (REPO) EDIT
                           (CHO2 (I,S)) (COL(S*8+5),F(8,0)) ;                                    00081300
 979    2    3                 END ;                                                               00081400
 980    2    2           ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CHO2',I,S,  00081440
                          QTRREC.REC_ID(I),QTRREC.SEC (I,S))
                             (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
 981    2    2                 END ;                                                               00081500
 982    2    1        END ;
 983    2                      PUT FILE (REPO) EDIT ('03',LABEL(04))(LINE(14),A,X(3),A) ;00081600
 984    2                      I = DIG (04) ;                                                      00081700
 985    2                      DO S = 1 TO 15 ;                                                    00081800
 986    2    1                   IF CHO3 (I,S) ¬= 9999.999 THEN PUT FILE (REPO)  EDIT    00081900
                                   (CHO2 (I,S)) (COL(S*8+5),F(8,0)) ;                            00082000
 988    2    1           ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CHO3',I,S,  00082340
                          QTRREC.REC_ID(I),QTRREC.SEC (I,S))
                             (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
 989    2    1                 END ;                                                               00082100
 990    2                      PUT FILE (REPO) EDIT ('04',LABEL(05))(LINE(15),A,X(3),A) ;00082200
 991    2                      I = DIG (05) ;                                                      00082300
 992    2                      DO S = 1 TO 15 ;                                                    00082400
 993    2    1                   IF CHO4 (I,S) ¬= 99999.99 THEN PUT FILE (REPO)  EDIT    00082500
                                   (CHO4 (I,S)) (COL(S*8+5),F(8,0)) ;                            00082600
 995    2    1           ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CHO4',I,S,  00083240
                          QTRREC.REC_ID(I),QTRREC.SEC (I,S))
                             (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
 996    2    1                 END ;                                                               00082700
 997    2                    IF LABEL (06) ¬= '       ' THEN                                      00082800
 998    2                      DO ;                                                              00082900
 999    2    1                   PUT FILE (REPO) EDIT ('05',LABEL(06))(LINE(16),A,X(3),A) ;00083000
1000    2    1                   I = DIG (06) ;                                                  00083100
1001    2    1                   DO S = 1 TO 15 ;                                                00083200
1002    2    2                     IF CHO5 (I,S) ¬= 999999.9 THEN DO ;
1004    2    3       IF CHO5 (I,S) > MAX5 THEN DO ;
1006    2    4        CH25 (I,S) = '5' ; PUT FILE (MAXI) EDIT (QTRREC.REC_ID (I),
                     QTRREC.SEC (I,S),CHO5 (I,S)) (COL(85),A,X(2),A,F(12,1)) ;
1008    2    4        ECT = '**' ;
1009    2    4       PUT FILE (REPO) EDIT (CHO5 (I,S)) (COL(S*8 + 5),P'*****9V.9') ; END ;
1011    2    3       ELSE PUT FILE (REPO) EDIT
                           (CHO5 (I,S)) (COL(S*8+5),F(8,0)) ;                                    00083400
1012    2    3                 END ;                                                               00083500
1013    2    2           ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CHO5',I,S,  00084140
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STMT LEVEL NEST

                        CTRREC.REC_ID(I),CTRREC.SEC (I,S))
                             (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1014    2    2              END ;                                                    00083600
1015    2    1       END ;
1016    2                   PUT FILE (REPC) EDIT ('06',LABEL(07))(LINE(17),A,X(3),A) ;00083700
1017    2                   D = DIG (07) ;                                           00083800
1018    2                   DO S = 1 TO 15 ;                                         00083900
1019    2    1                IF CH06 (I,S) ¬= 9999.999 THEN PUT FILE (REPC)  EDIT   00084000
                                (CH06 (I,S)) (COL(S*8+5),F(8,D)) ;                  00084100
1021    2    1          ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CH06',I,S,  00085040
                          CTRREC.REC_ID(I),CTRREC.SEC (I,S))
                               (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1022    2    1              END ;                                                    00084200
1023    2                   PUT FILE (REPC) EDIT ('07',LABEL(08))(LINE(18),A,X(3),A) ;00084300
1024    2                   D = DIG (08) ;                                           00084400
1025    2                   DO S = 1 TO 15 ;                                         00084500
1026    2    1                IF CH07 (I,S) ¬= 99999.99 THEN PUT FILE (REPC)  EDIT   00084600
                                (CH07 (I,S)) (COL(S*8+5),F(8,D)) ;                  00084700
1028    2    1          ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CH07',I,S,  00085940
                          CTRREC.REC_ID(I),CTRREC.SEC (I,S))
                               (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1029    2    1              END ;                                                    00084800
1030    2                   PUT FILE (REPC) EDIT ('08',LABEL(09))(LINE(19),A,X(3),A) ;00084900
1031    2                   D = DIG (09) ;                                           00085000
1032    2                   DO S = 1 TO 15 ;                                         00085100
1033    2    1                IF CH08 (I,S) ¬= 999.9999 THEN PUT FILE (REPC)  EDIT   00085200
                                (CH08 (I,S)) (COL(S*8+5),F(8,D)) ;                  00085300
1035    2    1          ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CH08',I,S,  00086840
                          CTRREC.REC_ID(I),CTRREC.SEC (I,S))
                               (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1036    2    1              END ;                                                    00085400
1037    2                   PUT FILE (REPC) EDIT ('09',LABEL(10))(LINE(20),A,X(3),A) ;00085500
1038    2                   D = DIG (10) ;                                           00085600
1039    2                   DO S = 1 TO 15 ;                                         00085700
1040    2    1                IF CH09 (I,S) ¬= 999999.9 THEN PUT FILE (REPC)  EDIT   00085800
                                (CH09 (I,S)) (COL(S*8+5),F(8,D)) ;                  00085900
1042    2    1          ELSE PUT EDIT ('MISSING LAGGED DATA ***  TEST',TEST,'CH09',I,S,
                          CTRREC.REC_ID(I),CTRREC.SEC (I,S))
                               (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1043    2    1              END ;                                                    00086000
1044    2                 IF LABEL (25) ¬= '       ' THEN                          00086100
1045    2                   DO ;                                                   00086200
1046    2    1                D = DIG (25) ;                                       00086300
1047    2    1                PUT FILE (REPC) EDIT ('36',LABEL(25)) (LINE(22),A,X(3),A);00086400
1048    2    1                DO S = 1 TO 15 ;                                     00086500
1049    2    2                  IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT  00086600
                                                (CH36 (I,S))(COL(S*8+5),F(8,D)) ;   00086700
1051    2    2                END ;                                                00086800
1052    2    1              END ;                                                  00086900
1053    2                 IF LABEL (26) ¬= '      ' THEN                          00087000
1054    2                   DO ;                                                   00087100
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STMT LEVEL NEST

1055    2   1               D = DIG (26) ;                                                  000872CC
1056    2   1               PUT FILE (REPC) EDIT ('30',LABEL(26)) (LINE(23),A,X(3),A);000873CC
1057    2   1               DO S = 1 TO 15 ;                                                000874CC
1058    2   2                 IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT        000875CC
                                        (CH30 (I,S))(COL(S*8+5),F(8,0)) ;                 000876CC
1060    2   2               END ;                                                           00087700
1061    2   1             END ;                                                             000878CC
1062    2               IF LABEL (27) ¬= '       ' THEN                                     000879CC
1063    2                 DO ;                                                            000880CC
1064    2   1               D = DIG (27) ;                                                  000881CC
1065    2   1               PUT FILE (REPC) EDIT ('31',LABEL(27)) (LINE(24),A,X(3),A);00088200
1066    2   1               DO S = 1 TO 15 ;                                                000883CC
1067    2   2                 IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT        00088400
                                        (CH31 (I,S))(COL(S*8+5),F(8,0)) ;                 000885CC
1069    2   2               END ;                                                           000886CC
1070    2   1             END ;                                                             00088700
1071    2               IF LABEL (28) ¬= '       ' THEN                                     000888CC
1072    2                 DO ;                                                            00088900
1073    2   1               D = DIG (28) ;                                                  000890CC
1074    2   1               PUT FILE (REPC) EDIT ('33',LABEL(28)) (LINE(25),A,X(3),A);000891CC
1075    2   1               DO S = 1 TO 15 ;                                                00089200
1076    2   2                 IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT        000893CC
                                        (CH33 (I,S))(COL(S*8+5),F(8,0)) ;                 00089400
1078    2   2               END ;                                                           000895CC
1079    2   1             END ;                                                             000896CC
1080    2               IF LABEL (29) ¬= '       ' THEN                                     00089700
1081    2                 DO ;                                                            000898CC
1082    2   1               D = DIG (29) ;                                                  000899CC
1083    2   1               PUT FILE (REPC) EDIT ('34',LABEL(29)) (LINE(26),A,X(3),A);CC090CC0
1084    2   1               DO S = 1 TO 15 ;                                                00090100
1085    2   2                 IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT        000902CC
                                        (CH34 (I,S))(COL(S*8+5),F(8,0)) ;                 000903CC
1087    2   2               END ;                                                           CC090400
1088    2   1             END ;                                                             CCC905CC
1089    2               IF LABEL (35) ¬= '       ' THEN                                     000906CC
1090    2                 DO ;                                                            000907CC
1091    2   1               D = DIG (35) ;                                                  CCC908CC
1092    2   1               PUT FILE (REPC) EDIT ('45',LABEL(35)) (LINE(27),A,X(3),A);00090900
1093    2   1               DO S = 1 TO 15 ;                                                CCC910CC
1094    2   2                 IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT        00091100
                                        (CH45 (I,S))(COL(S*8+5),F(8,0)) ;                 00091200
1096    2   2               END ;                                                           000913CC
1097    2   1             END ;                                                             CCC914CC
1098    2               IF LABEL (32) ¬= '       ' THEN                                     CCC915CC
1099    2                 DO ;                                                            00091600
1100    2   1               D = DIG (32) ;                                                  CCC917CC
1101    2   1               PUT FILE (REPC) EDIT ('42',LABEL(32)) (LINE(28),A,X(3),A);00091800
1102    2   1               DO S = 1 TO 15 ;                                                CCC919CC
1103    2   2                 IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT        CCC920CC
                                        (CH42 (I,S))(COL(S*8+5),F(8,0)) ;                 000921CC
1105    2   2               END ;                                                           CCC922CC
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STMT LEVEL NEST

1106    2    1              END ;                                                                00092300
1107    2                IF LABEL (31) ¬= '       ' THEN                                         000924CC
1108    2                   DO ;                                                                000925C0
1109    2    1                D = DIG (31) ;                                                    00092600
1110    2    1                PUT FILE (REPC) EDIT ('41',LABEL(31)) (LINE(29),A,X(3),A);000927C0
1111    2    1                DO S = 1 TO 15 ;                                                  00092800
1112    2    2                  IF QTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT           000929C0
                                                    (CH41 (I,S))(COL(S*8+5),F(8,0)) ;          000930C0
1114    2    2                END ;                                                             000931C0
1115    2    1                END ;                                                             000932CC
                    /*       IF LABEL (33) ¬= '       ' THEN          ***NO LONGER USED ***    000933C0
                                DO ;                                                           00093400
                                  D = DIG (33) ;                                               000935C0
                                  PUT FILE (REPC) EDIT ('43',LABEL(33)) (LINE(30),A,X(3),A);00093600
                                  DO S = 1 TO 15 ;                                             000937C0
                                    IF QTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPO) EDIT      000938C0
                                                    (CH43 (I,S))(COL(S*8+5),F(8,0)) ;          000939C0
                                  END ;                                                        00094000
                                END ;              */                                        000941C0
1116    2                IF LABEL (34) ¬= '       ' THEN                                         000942C0
1117    2                   DO ;                                                                000943C0
1118    2    1                D = DIG (34) ;                                                    000944C0
1119    2    1                PUT FILE (REPC) EDIT ('44',LABEL(34)) (LINE(31),A,X(3),A);00094500
1120    2    1                DO S = 1 TO 15 ;                                                  00094600
1121    2    2                  IF QTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT           00094700
                                                    (CH44 (I,S))(COL(S*8+5),F(8,0)) ;          00094800
1123    2    2                END ;                                                             000949C0
1124    2    1                END ;                                                             00095000
1125    2                IF LABEL (36) ¬= '       ' THEN                                         00095100
1126    2                   DO ;                                                                00095200
1127    2    1                D = DIG (36) ;                                                    00095300
1128    2    1                PUT FILE (REPC) EDIT ('37',LABEL(36)) (LINE(32),A,X(3),A);00095400
1129    2    1                DO S = 1 TO 15 ;                                                  00095500
1130    2    2                  IF QTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT           000956CC
                                                    (CH37 (I,S))(COL(S*8+5),F(8,0)) ;          00095700
1132    2    2                END ;                                                             00095800
1133    2    1                END ;                                                             00095900
1134    2                IF LABEL (30) ¬= '       ' THEN                                         00096000
1135    2                   DO ;                                                                000961C0
1136    2    1                D = DIG (30) ;                                                    00096200
1137    2    1                PUT FILE (REPO) EDIT ('40',LABEL(30)) (LINE(33),A,X(3),A);000963C0
1138    2    1                DO S = 1 TO 15 ;                                                  000964C0
1139    2    2                  IF QTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPO) EDIT           00096500
                                                    (CH40 (I,S))(COL(S*8+5),F(8,0)) ;          000966C0
1141    2    2                END ;                                                             00096700
1142    2    1                END ;                                                             000968C0
1143    2                IF LABEL (37) ¬= '       ' THEN                                         000969C0
1144    2                   DO ;                                                                000970C0
1145    2    1                D = DIG (37) ;                                                    000971C0
1146    2    1                PUT FILE (REPC) EDIT ('39',LABEL(37)) (LINE(34),A,X(3),A);000972C0
1147    2    1                DO S = 1 TO 15 ;                                                  000973C0
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STMT LEVEL NEST
1148    2    2                IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT   00097400
                                  (CH35 (I,S))(COL(S*8+5),F(8,0)) ;                    00097500
                                                                                       00097600
1150    2    2              END ;                                                      00097700
1151    2    1            END ;                                                        00097800
1152    2                 D = DIG (11) ;                                               00097900
1153    2                 PUT FILE (REPC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A);00097900
1154    2                 DO S = 1 TO 15 ;                                             00098000
1155    2    1              IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT   00098100
                                  (CH10 (I,S))(COL(S*8+5),F(8,0)) ;                    00098200
                                                                                       00098300
1157    2    1              END ;                                                      00098400
1158    2                 D = DIG (12) ;                                               00098500
1159    2                 PUT FILE (REPC) EDIT ('11',LABEL(12)) (LINE(36),A,X(3),A);00098500
1160    2                 DO S = 1 TO 15 ;                                             00098600
1161    2    1              IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT   00098700
                                  (CH11 (I,S))(COL(S*8+5),P'ZZZZZ999') ;               00098800
                                                                                       00098900
1163    2    1              END ;                                                      00099000
1164    2                 D = DIG (13) ;                                               00099100
1165    2                 PUT FILE (REPC) EDIT ('13',LABEL(13)) (LINE(37),A,X(3),A);00099100
1166    2                 DO S = 1 TO 15 ;                                             00099200
1167    2    1              IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT   00099300
                                  (CH13 (I,S))(COL(S*8+5),F(8,0)) ;                    00099400
                                                                                       00099500
1169    2    1              END ;                                                      00099600
1170    2                 D = DIG (14) ;                                               00099700
1171    2                 PUT FILE (REPC) EDIT ('14',LABEL(14)) (LINE(38),A,X(3),A);00099700
1172    2                 DO S = 1 TO 15 ;                                             00099800
1173    2    1              IF CTRREC.SEC (I,S) ¬= '  ' THEN PUT FILE (REPC) EDIT   00099900
                                  (CH14 (I,S))(COL(S*8+5),F(8,0)) ;                    00100000
                                                                                       00100100
1175    2    1              END ;                                                      00100200
1176    2                 PUT FILE (REPC) EDIT ('17',LABEL(16)) (LINE(39),A,X(3),A);00100300
1177    2                 DO S = 1 TO 15 ;                                             00100400
1178    2    1              IF      CH17 (I,S)  = '1'  THEN PUT FILE (REPC) EDIT   00100500
                                  (CNFLAG)     (COL(S*8+5),A) ;                     00100600
1180    2    1          ELSE IF CH17 (I,S) = 'E' THEN PUT FILE (REPC) EDIT (ERFLAG)
                           (COL(S*8+5),A) ;                                          00100700
1182    2    1              END ;                                                      00100800
1183    2                 PUT FILE (REPC) EDIT ('18',LABEL(17)) (LINE(40),A,X(3),A);00100900
1184    2                 DO S = 1 TO 15 ;                                             00101000
1185    2    1              IF      CH18(I,S)  = '1'  THEN PUT FILE (REPC) EDIT   00101100
                                  (CNFLAG)     (COL(S*8+5),A) ;                     00101200
1187    2    1          ELSE IF CH18 (I,S) = 'E' THEN PUT FILE (REPC) EDIT (ERFLAG)
                           (COL(S*8+5),A) ;                                          00101300
1189    2    1              END ;                                                      00101400
1190    2                 PUT FILE (REPC) EDIT ('19',LABEL(18)) (LINE(41),A,X(3),A);00101500
1191    2                 DO S = 1 TO 15 ;                                             00101600
1192    2    1              IF      CH19(I,S)  = '1'  THEN PUT FILE (REPC) EDIT   00101700
                                  (CNFLAG)     (COL(S*8+5),A) ;                     00101800
1194    2    1          ELSE IF CH19 (I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
                           (COL(S*8+5),A) ;                                          00101900
1196    2    1              END ;                                                      00102000
1197    2                 PUT FILE (REPC) EDIT ('20',LABEL(19)) (LINE(42),A,X(3),A);00102100
1198    2                 DO S = 1 TO 15 ;                                             00102200
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STMT LEVEL NEST

1199    2    1                IF        CH20(I,S)  = '1'  THEN PUT FILE (REPC) EDIT   00102300
                                        (CNFLAG)     (COL(S*8+5),A) ;
1201    2    1            ELSE IF CH2C (I,S) = 'E' THEN PUT FILE (REPC) EDIT (ERFLAG)
                              (COL(S*8+5),A) ;
1203    2    1                END ;                                                   00102500
1204    2                     PUT FILE (REPC) EDIT ('21',LABEL(20)) (LINE(43),A,X(3),A);00102700
1205    2                     DO S = 1 TO 15 ;                                        00102800
1206    2    1                IF        CH21(I,S)  = '1'  THEN PUT FILE (REPO) EDIT   00102900
                                        (CNFLAG)     (COL(S*8+5),A) ;
1208    2    1            ELSE IF CH21 (I,S) = 'E' THEN PUT FILE (REPC) EDIT (ERFLAG)
                              (COL(S*8+5),A) ;
1210    2    1                END ;                                                   00103100
1211    2                     PUT FILE (REPC) EDIT ('22',LABEL(21)) (LINE(44),A,X(3),A);00103300
1212    2                     DO S = 1 TO 15 ;                                        00103400
1213    2    1                IF        CH22(I,S)  = '1'  THEN PUT FILE (REPC) EDIT   00103500
                                        (CNFLAG)     (COL(S*8+5),A) ;
1215    2    1            ELSE IF CH22 (I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
                              (COL(S*8+5),A) ;
1217    2    1                END ;                                                   00103700
1218    2                     PUT FILE (REPO) EDIT ('23',LABEL(22)) (LINE(45),A,X(3),A);00103900
1219    2                     DO S = 1 TO 15 ;                                        00104000
1220    2    1                IF        CH23(I,S)  = '1'  THEN PUT FILE (REPC) EDIT   00104100
                                        (CNFLAG)     (COL(S*8+5),A) ;
1222    2    1            ELSE IF CH23 (I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
                              (COL(S*8+5),A) ;
1224    2    1                END ;                                                   00104300
1225    2                     PUT FILE (REPC) EDIT ('24',LABEL(23)) (LINE(46),A,X(3),A);00104500
1226    2                     DO S = 1 TO 15 ;                                        00104600
1227    2    1                IF        CH24(I,S)  = '1'  THEN PUT FILE (REPC) EDIT   00104700
                                        (CNFLAG)     (COL(S*8+5),A) ;
1229    2    1            ELSE IF CH24 (I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
                              (COL(S*8+5),A) ;
1231    2    1                END ;                                                   00104900
                      /*        PUT FILE (REPC) EDIT ('25',LABEL(24)) (LINE(47),A,X(3),A);00105100
                                DO S = 1 TO 15 ;                                      00105200
                                  IF        CH25(I,S)  = '1'  THEN PUT FILE (REPC) EDIT 00105300
                                        (CNFLAG)     (COL(S*8+5),A) ;
                                ELSE IF CH25 (I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
                                  (COL(S*8+5),A) ;
                                END ;                          */                     00105500
1232    2                     E = DIG (38) ;                                          00105510
1233    2                     PUT FILE (REPC) EDIT ('48',LABEL(38)) (LINE(48),A,X(3),A);00105520
1234    2                     DO S = 1 TO 15 ;                                        00105530
1235    2    1                IF        CH48(I,S)  = '1'  THEN PUT FILE (REPO) EDIT   00105540
                                        (CNFLAG)     (COL(S*8+5),A) ;               00105550
1237    2    1            ELSE IF CH48 (I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG) 00105560
                              (COL(S*8+5),A) ;                                        00105570
1239    2    1                END ;                                                   00105580
1240    2                   IF TEST < 4 THEN                                          00106800
1241    2                     DO ;                                                    00106900
1242    2    1                E = DIG (35) ;                                          00107000
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STMT LEVEL NEST

1243    2    1              PUT FILE (REPC) EDIT ('53'||LABEL(39)) (LINE(50),A,X(3),A);00107100
1244    2    1                DO S = 1 TO 15 ;                                          00107300
1245    2    2                IF CH53 (I,S) ¬= 555555.5 THEN PUT FILE (REPC)            00107400
          EDIT                                                                         00107500
                                (CH53 (I,S)) (COL(S*8+5),F(8,1)) ;                     00107600
1247    2    2                END ;                                                     00107700
1248    2    1            END ;                                                        00107800
1249    2              IF ECT = '**' THEN PUT FILE (REPC) EDIT ('LEADING ASTERISKS  DENOTE VAL
                      UES ABOVE LINEAR LIMITS OF THE INSTRUMENT')
                        (LINE(53),COL(25),A) ;
1251    2                        WRITE FILE (CLT) FROM (CTCV) ;                       00107E00
1252    2            CLEAR:                                                         00108400
                       REC_IC (I) = ' ' ;                                          00108500
1253    2                  DO S = 1 TO 15 ;                                         00108600
1254    2    1           CTPREC.SEC (I,S) = '  ' ;                                  00108700
1255    2    1                 CH00 (I,S),CH01 (I,S),CH02 (I,S),CH05 (I,S),       00108800
                               CH09 (I,S),CH53 (I,S) = 555555.5 ;                  00108900
1256    2    1                  CH08 (I,S)   = 999.9999 ;                          00108A00
1257    2    1                 CH04 (I,S),CH07 (I,S)= 55555.55 ;                   00109000
1258    2    1                 CH03 (I,S),CH06 (I,S)= 5555.555 ;                   00109100
1259    2    1                 CH17(I,S),CH1E(I,S),CH19(I,S),CH20(I,S),CH21(I,S),CH22(I,S),00109200
                                 CH23(I,S),CH24(I,S),CH25(I,S),CH48(I,S) = ' ' ;   00109300
1260    2    1              END ;                                                    00109400
1261    2                   JSEC = JSEC + 15 ;                                      00109500
1262    2                   I = MOD (I,4) + 1 ;                                     00109600
1263    2            END RCLS ;                                                     00109700
1264    1            HS: PROCEDURE (A) RETURNS (CHAR(1)) ;                          00109800
1265    2                  DCL A CHAR (1) ;                                        00109900
1266    2                    IF A = '1' THEN RETURN ('1')  ;ELSE IF A = '0' THEN   00110200
1269    2                    RETURN ('0')    ; ELSE RETURN ('E') ;                 00110300
1271    2               END HS ;                                                    00110400
1272    1            ENDSEC: PROCEDURE ;                                            00110500
1273    2                   IF SECT < '56' THEN
1274    2                      DO ;
1275    2    1                  PUT STRING (SECE) EDIT (SECT + 4) (P'99') ;
1276    2    1                  TRANKEY = SUBSTR (TRANKEY,4,4) ;
1277    2    1                  RETURN ;
1278    2    1                 END ;
1279    2                   ELSE IF SUBSTR (TRANKEY,6,2) < '55' THEN
1280    2                      DO ;
1281    2    1                   SC = SECT ;
1282    2    1                   SC = MOD (SC + 4,60) ;
1283    2    1                   PUT STRING (SECE) EDIT (SC) (P'99') ;
1284    2    1                   SC = SUBSTR (TRANKEY,6,2) ;
1285    2    1                   PUT STRING (SUBSTR(TRANKEY,3,2)) EDIT (SC + 1) (P'99');
1286    2    1                   SUBSTR (TRANKEY,1,2)  = SUBSTR (TRANKEY,4,2) ;
1287    2    1                   RETURN ;
1288    2    1                  END ;
1289    2                   ELSE
1289    2                      DO ;
1290    2    1                    SC = SUBSTR (TRANKEY,4,2) ;
```

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STMT LEVEL NEST

1291     2    1                    SC = SC + 1 ;
1292     2    1                    PUT STRING (TRANEND) EDIT (SC,'00') (P'99',A(2)) ;
1293     2    1                    SC = SECT ;
1294     2    1                    SC = MOD (SC + 4,60) ;
1295     2    1                    PUT STRING (SECE) EDIT (SC) (P'99') ;
1296     2    1                    RETURN ;
1297     2    1                   END ;
1298     2           END ENDSEC ;
1299     1           TRSETUP: PROCEDURE (A,F) ;
1300     2              DCL A CHAR (2) ,
                           F CHAR (8) ;
1301     2                IF A = '04' THEN DO ; K04 = TRANEND ; S04 = SECE ;TR04 =F;END;
1307     2              ELSE IF A = '09' THEN DO ; K09 = TRANEND ; S09 = SECE ;TR09 =F;END;
1313     2              ELSE IF A = '05' THEN DO ; K05 = TRANEND ; S05 = SECE ;TR05 =F;END;
1319     2              ELSE IF A = '07' THEN DO ; K07 = TRANEND ; S07 = SECE ;TR07 =F;END;
1325     2              ELSE IF A = '30' THEN DO ; K30 = TRANEND ; S30 = SECE ;TR30 =F;END;
1331     2              ELSE IF A = '31' THEN DO ; K31 = TRANEND ; S31 = SECE ;PD = F ;
1336     2    1             TR31 = PD * 100 ; END ;
1338     2              ELSE IF A = '33' THEN DO ; K33 = TRANEND ; S33 = SECE ;PD = F ;
1343     2    1             TR33 = PD * 100 ; END ;
1345     2              ELSE IF A = '34' THEN DO ; K34 = TRANEND ; S34 = SECE ;TR34 =F;END;
1351     2              ELSE IF A = '45' THEN DO ; K45 = TRANEND ; S45 = SECE ;PD = F ;
1356     2    1             TR45 = PD * 100 ; END ;
1358     2              ELSE DO ; PUT EDIT ('*** TRAN ERROR ***',ALLEC,A,F) (SKIP(2),
1360     2    1                   4(A,X(2))); RETURN ; END ;
1362     2                 PUT FILE (REPTR) EDIT (TRREC,TRKEY,SECT,A,F,TRANEND,SECE)
                        (X(2),F(6),X(2),99(X(1),A)) ;
1363     2              END TRSETUP ;
1364     1           END MYSTIC ;                                              001105C0
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
1300	A	PARAMETER,UNALIGNED,STRING(2),CHARACTER 1299,1301,1307,1313,1319,1325,1331,1338,1345,1351,1359,1362
1265	A	PARAMETER,UNALIGNED,STRING(1),CHARACTER 1264,1266,1268
266	A	STATEMENT LABEL CONSTANT 263
30	A00	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 179,558,628
30	A01	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 181,539,554,778
30	A02	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 182,540,595,779
30	A03	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 155,411,481,503,525,541,662,675
30	A04	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,2) 156,542,663,660
30	A05	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 173,543,645,681,707,780
30	A06	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 163,466,526
30	A07	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 164,708
30	A30	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,6) 204,370,430,527,559
30	A31	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 206
30	A33	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,6) 208,359,371,390,431,528,560,652,684,727
30	A34	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 210
30	A36	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,6) 202

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
30	A37	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 224
30	A39	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 226
30	A40	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 212
30	A41	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,6) 214
30	A42	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 216
30	A43	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 218
30	A44	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,6) 220
30	A45	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,6) 222,372,432,482,561
	ADDR	GENERIC,BUILT-IN FUNCTION 792
11	ALLBC	BASED(Q1),UNALIGNED,STRING(80),CHARACTER 1359
38	ALLKEY	BASED(Q),UNALIGNED,STRING(11),CHARACTER SG,92
32	BC	IN SAMEREC,BASED(Q),UNALIGNED,STRING(14),CHARACTER
30	B01	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 181,292,302,321,337,354,383,491,510,550,571,586,616,634,655,672,746 761,778
30	B02	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 183,295,304,323,339,356,385,403,444,459,473,493,512,531,552,575,589 602,618,658,675,748,763,779
30	B03	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 155,366,325,341,358,387,405,446,462,495,514,533,554
30	B04	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,2) 156,343,360,389,407,421,497,515,535
30	B05	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		173,326,344,405,425,780
30	BC6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 163,556,591,697,716
30	BC7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 164,294,307,327,345,361,391,476,495,637,659,676,700,719,734,749,764
32	B1	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B1C	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B11	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B13	IN SAMEREC,BASED(Q),UNALIGNED,STRING(10),CHARACTER
30	B13	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 185,257,308,326,346,362,393,445,464,478,501,516,605,622,640,660,677 703,723,736,750,765
32	B14	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B16	IN SAMEREC,BASED(Q),UNALIGNED,STRING(10),CHARACTER
32	B17	IN SAMEREC,BASED(Q),UNALIGNED,STRING(3),CHARACTER
32	B18	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B19	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B2	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B2C	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B21	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B22	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B23	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B24	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B25	IN SAMEREC,BASED(Q),UNALIGNED,STRING(7),CHARACTER
32	B26	IN SAMEREC,BASED(Q),UNALIGNED,STRING(6),CHARACTER
32	B3	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B30	IN SAMEREC,BASED(Q),UNALIGNED,STRING(26),CHARACTER
30	B3C	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		204,336,355,384,404,422,445,460,474,492,572,587,603,619,638,696,717
32	B31	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B31	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 206,303,322,340,386,423,447,620,639,699,718
32	B33	IN SAMEREC,BASED(Q),UNALIGNED,STRING(10),CHARACTER
30	B33	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 208,342,357,406,424,448,461,475,494,511,532,551,573,588,604,621,641 656,673,701,720,735,762
32	B34	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B24	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 210,305,224,388,426,496,513,534,553,574,590,606,623,642,657,674,702 721,747
32	B36	IN SAMEREC,BASED(Q),UNALIGNED,STRING(10),CHARACTER
30	B36	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 202
32	B37	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B37	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 224
32	B39	IN SAMEREC,BASED(Q),UNALIGNED,STRING(10),CHARACTER
30	B39	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 226
32	B4	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B40	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B40	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 212
32	B41	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B41	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 214
32	B42	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B42	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 216,296,309,427,450,477,498,576,607,624,643,704,722

LCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
32	B43	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B43	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 216
32	B44	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B44	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 220
32	B45	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B45	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 223,253,352,408,428,463,479,500,536,555,577,592,608,625,636,705,720
32	B46	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B47	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B48	IN SAMEREC,BASED(Q),UNALIGNED,STRING(3),CHARACTER
32	B5	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B6	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B7	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B8	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B9	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	BB1	IN TRANACT,BASED(Q1),UNALIGNED,STRING(1),CHARACTER 80,82,84,85,813,815,817,818
12	BB2	IN TRANACT,BASED(Q1),UNALIGNED,STRING(3),CHARACTER
12	BB3	IN TRANACT,BASED(Q1),UNALIGNED,STRING(2),CHARACTER
12	BB4	IN TRANACT,BASED(C1),UNALIGNED,STRING(2),CHARACTER
12	BB5	IN TRANACT,BASED(C1),UNALIGNED,STRING(2),CHARACTER
12	BB6	IN TRANACT,BASED(Q1),UNALIGNED,STRING(3),CHARACTER
12	BB7	IN TRANACT,BASED(Q1),UNALIGNED,STRING(2),CHARACTER
12	BB8	IN TRANACT,BASED(Q1),UNALIGNED,STRING(2),CHARACTER
12	BB9	IN TRANACT,BASED(Q1),UNALIGNED,STRING(2),CHARACTER
12	BB91	IN TRANACT,BASED(C1),UNALIGNED,STRING(2),CHARACTER

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
12	BBS2	IN TRANACT,BASED(G1),UNALIGNED,STRING(1),CHARACTER
12	BBS3	IN TRANACT,BASED(G1),UNALIGNED,STRING(3),CHARACTER
9	BLG2	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 801,803,805,807,809,822,826,832,835,841,844,850,853,859,862,868,871 877,880,886,889,895,898,904
34	BLANK	IN INREC,BASED(G),UNALIGNED,STRING(1),CHARACTER
11	BLANK2	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER
11	BLANK4	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 831,840,849,858,867,876,885,894,903
14	BLANK7	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 286,312,315,374,396,433,483,524,538,650,726,738,755
791	********* C	STATIC,ALIGNED,BINARY,FIXED(15,0)
32	CC0	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S99V999) 179
32	CC1	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9999V9) 181
32	CC2	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9999V9) 183
32	CC3	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 155
32	CC4	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9999V9) 156
32	CC5	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S99V999) 173
32	CC6	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 163
32	CC7	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 164
32	CC8	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 165
32	CC9	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S99V999) 167

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
32	C10	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 187
32	C11	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 186
32	C13	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 188
32	C14	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 190
32	C16	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999)
32	C17	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 192
32	C18	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 193
32	C19	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 194
32	C20	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 195
32	C21	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 196
32	C22	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 197
32	C23	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 198
32	C24	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 199
32	C25	IN SAMEREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 200
32	C26	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999)
32	C30	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S99V999) 204
32	C31	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9999V9) 206
32	C33	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S99V999) 208

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
32	C34	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9999V9) 210
32	C36	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S99V999) 202
32	C37	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9999V9) 224
32	C39	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9999V9) 226
32	C4C	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9999V9) 212
32	C41	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S99V999) 214
32	C42	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9999V9) 216
32	C43	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9999V9) 21E
32	C44	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S99V999) 220
32	C45	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S99V999) 222
32	C46	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9999V9)
32	C47	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9999V9)
32	C48	IN SAMEREC,BASED(Q),UNALIGNED,STRING(5),CHARACTER 227
	C53	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 15E
32	C53A	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9999V9)
35	CHCC	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 175,9C7,9C8,940,941,1255
35	CH01	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 181,9C9,910,950,952,955,957,955,1255

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
35	CH02	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 182,911,912,969,971,974,976,978,1255
35	CH03	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 155,913,914,986,987,1258
35	CH04	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,2) 156,826,915,916,953,994,1257
35	CH05	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 173,837,917,918,1002,1004,1007,1009,1011,1255
35	CH06	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 163,919,920,1019,1020,1258
35	CH07	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,2) 164,846,921,922,1026,1027,1257
35	CH08	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,4) 165,166,166,923,924,1033,1034,1256
35	CH09	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 167,855,925,926,1040,1041,1255
35	CH10	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,2) 187,1156
35	CH11	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,0) 186,1162
35	CH13	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 188,189,189,1168
35	CH14	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,2) 190,191,191,1174
35	CH16	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,4)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
35	CH17	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 192,1176,1180,1259
35	CH18	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 193,1185,1187,1259
35	CH19	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 194,1192,1194,1259
35	CH20	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 195,1199,1201,1259
35	CH21	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 196,1206,1208,1259
35	CH22	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 197,1213,1215,1259
35	CH23	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 198,1220,1222,1259
35	CH24	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 199,1227,1229,1259
35	CH25	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 200,954,973,1006,1259
35	CH30	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 204,864,1059
35	CH31	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 206,873,1066
35	CH33	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 208,882,1077
35	CH34	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 210,891,1088

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
35	CH36	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 202,1050
35	CH37	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 224,1131
35	CH38	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 226,1149
35	CH40	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 212,114C
35	CH41	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 214,1113
35	CH42	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 216,1104
35	CH43	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 21E
35	CH44	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 226,1122
35	CH45	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 222,900,1055
35	CH46	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 227,1235,1237,1255
35	CH53	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 15E,1245,1246,1255
32	CHA	IN SAMEREC,BASED(C),UNALIGNED,STRING(10),CHARACTER
34	CHAN	IN DATA(70) IN INREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	CHEKKEY	BASED(Q),UNALIGNED,STRING(S),CHARACTER 88,132,164,783

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
1252		CLEAR	STATEMENT LABEL CONSTANT 794
791	*********	C	STATIC,ALIGNED,BINARY,FIXED(15,0) 938,941,94E,955,967,978,984,987,991,994,1000,1011,1017,1020,1024 1027,1031,1034,103E,1041,1046,105C,1055,1059,1064,1068,1073,1077 1082,108E,1091,1095,1100,1104,1109,1113,1118,1122,1127,1131,1136 114C,1145,1149,1152,1156,115E,1164,116E,1170,1174,1232,1242
791		CAT	IN CATCH(29) IN CTCV,BASED(Z),UNALIGNED,STRING(4),CHARACTER
24		CATA	(7C)IN JAREC,BASED(Q),STRUCTURE
20		CATAHF	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 10E,11C,115,28C,282
20		CATAMIN	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 109,11C,114,115,281,282
20		CATASEC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 99,111,116,124,126,145,147,149,151,159,168,174,283,788
791		CATCH	(29)IN CTCV,BASED(Z),STRUCTURE
40		CAY	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 71,272,76E
13		CAYA	IN HEADER,AUTOMATIC,UNALIGNED,STRING(2),CHARACTER 76E,777
24		CEFREC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 59,55,235,285
14		CF	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 311,375,412,4E4,522,564,6EE,6E7,735,754
791	*********	CIC	(39)STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 93E,946,967,9E4,991,1000,1017,1024,1031,1036,1046,1055,1064,1073 10E2,1091,1100,1109,1118,1127,1136,1145,1152,1158,1164,1170,1232 1242
21		CLFREC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 121,121,225,285
1272		ENDSEC	ENTRY,DECIMAL,FLOAT(SINGLE) EO2
42		EOF	AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 48,65,240,24E

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
7		ECT	AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 75,928,956,975,1008,1245
14		ERFLAG	AUTOMATIC,UNALIGNED,INITIAL,STRING(6),CHARACTER 1161,1188,1195,1202,1209,1216,1223,123C,123E
23	*********	ERRCCDE	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 54,55
78E		ERROR	STATEMENT LABEL CONSTANT 141
1300		F	PARAMETER,UNALIGNED,STRING(8),CHARACTER 1299,1305,1311,1317,1323,1329,1335,1342,1349,1355,1359,1362
21		F	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0)
822		FIXUP	STATEMENT LABEL CONSTANT
13		HEADER	AUTOMATIC,STRUCTURE 776
34		HR	IN INREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER 105,107,108,279,280
791		I	PARAMETER,ALIGNED,BINARY,FIXED(31,0) 790,792,793,798,822,824,824,824,824,828,829,837,838,846,847,855,856 864,865,873,874,882,883,891,892,900,901,907,908,909,910,911,912,913 914,915,916,917,918,919,920,921,922,923,924,925,926,931,933,940,941 942,942,942,950,952,954,955,955,955,957,959,961,961,961,965,971,973 974,974,974,976,978,98C,98C,98D,9E6,987,988,988,988,993,994,995,995 995,1002,1004,1006,1007,1007,1007,1009,1011,1013,1013,1013,1019,1020 1021,1021,1021,1026,1027,1028,102E,1028,1033,1034,1035,1035,1035 1040,1041,1042,1042,1042,1049,105C,105E,1059,1067,1068,1076,1077 1085,1086,1094,1095,1103,1104,1112,1113,1121,1122,1130,1131,1139 1140,1148,1145,1155,1156,1161,1162,1167,1168,1173,1174,1178,1180 1185,1187,1192,1194,1199,1201,1206,120E,1213,1215,1220,1222,1227 1229,1235,1237,1245,1246,1252,1254,1255,1255,1255,1255,1255,1255 1256,1257,1257,1258,1258,1259,1259,1259,1259,1259,1259,1259,1259 1259,1259,1262,1262
21		I	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 231,251,773,774,774,777,777
17	*********	IDE	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 256,259,261,262,266,268,270,273
20		INDSEC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 99,110,111,115,116,282,283,284
287		INIT	STATEMENT LABEL CONSTANT

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
		INFL1	FILE,EXTERNAL 46,57,88
34		INREC	BASED(C),STRUCTURE
14		INRC	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 310,376,563,685,688,741,752
26		ICTR	AUTOMATIC,DEFINED,ALIGNED,BINARY,FIXED(31,0) 94,95,96,96,134,136,137,137,140,276,788,788
27		ISEC	AUTOMATIC,DEFINED,ALIGNED,BINARY,FIXED(31,0) 95,788
21		J	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 257,258,262,265,269,269,270,270,272,787,787,787,787,787,787,787,787
34		JC	IN INREC,BASED(Q),UNALIGNED,STRING(3),CHARACTER 101,257,274
751		JC2	IN CTCV2,BASED(Z),UNALIGNED,STRING(3),CHARACTER
21		JCTR	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 71,71,128,232,250,252,276,284,788
20		JSEC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 124,126,145,147,149,151,264,788,788,1261,1261
13		JUNK	IN HEADER,AUTOMATIC,UNALIGNED,INITIAL,STRING(1588),CHARACTER
17	*********	K	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0)
11		KC4	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 829,831,1303
11		KC5	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 838,840,1315
11		KC7	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 847,849,1321
11		KC9	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 856,858,1309
11		K3C	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 865,867,1327
11		K31	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 874,876,1333

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
11	K33	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 883,885,1340
11	K34	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 892,894,1347
11	K45	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 901,903,1353
766	KEEPER.	STATEMENT LABEL CONSTANT 298,314,330,347,363,394,410,429,451,465,480,502,517,537,557,578,593 605,626,644,661,678,706,725,737,751
22	KEEPSEC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 93,94,95,99,111,116,283
33	KEY	BASED(Q),UNALIGNED,STRING(7),CHARACTER 97,104,136,140,278,772,786
791	KEY_IC	IN QTOV,BASED(Z),UNALIGNED,STRING(8),CHARACTER 796
13	KEYIZ	IN HEADER,AUTOMATIC,UNALIGNED,INITIAL,STRING(3),CHARACTER 777
13	KKRREC	IN HEADER,AUTOMATIC,UNALIGNED,STRING(7),CHARACTER 772,777
13	LABCH	(39)IN HEADER,AUTOMATIC,UNALIGNED,STRING(7),CHARACTER 774,777
36	LABEL	(39)AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 172,178,180,182,201,203,205,207,209,211,213,215,217,219,221,223,225 288,288,288,288,288,288,299,310,310,311,312,312,312,312,312,312 315,329,364,365,366,367,368,369,373,374,375,376,395,396,396,396,412 413,414,433,434,435,436,437,452,483,483,483,484,522,523,524,538,562 563,564,579,617,635,650,650,650,650,650,651,664,665,682,683,685,686 687,688,689,690,705,726,726,726,726,731,738,738,739,740,741,752,753 754,755,755,774,935,937,945,947,964,966,983,990,997,999,1016,1023 1030,1037,1044,1047,1053,1056,1062,1065,1071,1074,1080,1083,1089 1092,1096,1101,1107,1110,1116,1119,1125,1128,1134,1137,1143,1146 1153,1159,1165,1171,1176,1183,1190,1197,1204,1211,1218,1225,1233 1243
174	LAC_16	STATEMENT LABEL CONSTANT 152
168	LAC_19	STATEMENT LABEL CONSTANT 150
159	LAC_20	STATEMENT LABEL CONSTANT

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		14E
154	LAC_3C	STATEMENT LABEL CONSTANT 14E
145	LACCER	STATEMENT LABEL CONSTANT 133
16	********* LEAP	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 255,260,261,262,265,270
19	LC16	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 175,176,177,177,179,181,183,788
19	LC19	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 165,170,171,171,173,788
19	LC2C	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 160,161,162,162,163,164,165,166,166,167,788
19	LC3C	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 154,155,156,158,788
19	LS16	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 174,175,176,176,179,181,183,788
19	LS19	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 16E,165,17C,17C,173,78E
19	LS2C	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 159,160,161,161,163,164,165,166,166,167,788
25	LS3C	AUTOMATIC,DEFINED,ALIGNED,BINARY,FIXED(31,0) 155,156,158,78E
6	MAX1	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 776,781,552
6	MAX2	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 775,781,571
6	MAX5	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 78C,781,1004
3	MAXI	FILE,EXTERNAL,PRINT 781,555,574,1007
34	MIN	IN INREC,BASED(0),UNALIGNED,STRING(2),CHARACTER 105,114,281
	MOD	GENERIC,BUILT-IN FUNCTION

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		56,154,162,171,177,186,259,1262,1282,1294
18	PCN_TAB	(12)AUTOMATIC,UNALIGNED,INITIAL,STRING(9),CHARACTER 273
41	MONTH	AUTOMATIC,UNALIGNED,INITIAL,STRING(9),CHARACTER 71,273,766
13	MONTHA	IN HEADER,AUTOMATIC,UNALIGNED,STRING(12),CHARACTER 766,777
37	MRI	(17)AUTOMATIC,UNALIGNED,INITIAL,STRING(3),CHARACTER 71,770
13	MRICH	IN HEADER,AUTOMATIC,UNALIGNED,STRING(2),CHARACTER 770,777
37	********* MRITEST	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,289,313,316,331,348,377,397,415,438,453,467,485,504,518,544,565 580,596,610,627,646,666,691,710,756,770
1	********* MYSTIC	ENTRY,BINARY,FIXED(15,0)
13	********* NNN	IN HEADER,AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 767,777
184	NO_LAG	STATEMENT LABEL CONSTANT 153
21	NUMIN	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 50,50,87,87,237,239,285
21	NUMREC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 138,138,235,239,285
21	NUMSTCN	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 143,143,236,239,285
34	NUREC	BASED(G),STRUCTURE
229	NLTEST	STATEMENT LABEL CONSTANT 49,102,125
	ONCHAR	BUILT-IN FUNCTION 64
	ONCODE	BUILT-IN FUNCTION 54,64
14	ONFLAG	AUTOMATIC,UNALIGNED,INITIAL,STRING(8),CHARACTER 1179,1186,1193,1200,1207,1214,1221,1228,123E

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
	CALCC	BUILT-IN FUNCTION 64
	CNSOURCE	BUILT-IN FUNCTION 64
	CUT	FILE,EXTERNAL 776,1251
57	CVEN	(12)AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 71,765
13	CVRC	IN HEADER,AUTOMATIC,UNALIGNED,STRING(4),CHARACTER 765,777
37 *********	CVNUM	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,289,313,317,332,349,378,356,416,429,454,468,486,505,519,545,566 581,597,611,629,647,667,692,731,728,742,757,765
27	PAGE	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 70,70,71,234,234,238,242,242,243
5	PC	AUTOMATIC,ALIGNED,DECIMAL,FIXED(15,6) 1335,1336,1342,1343,1355,1356
57	PCINT	(12)AUTOMATIC,UNALIGNED,INITIAL,STRING(25),CHARACTER 71
37 *********	PCNUM	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,285,313,316,333,350,375,395,417,440,455,469,487,506,520,546,567 582,598,612,630,648,668,693,712,729,743,758
31	PPC	(28)AUTOMATIC,INITIAL,LABEL 288,288,299,315,331,348,364,395,411,430,452,466,481,503,516,536,558 579,594,610,627,645,662,679,707,726,738,752,287
	C	AUTOMATIC,ALIGNED,POINTER 86,88,90,92,93,97,101,104,105,107,108,109,114,132,136,140,144,155 156,162,164,165,167,173,175,181,183,184,186,187,188,190,192,193,194 195,196,197,198,199,200,202,204,206,208,210,212,214,216,218,220,222 224,226,227,257,274,278,279,280,281,772,783,786
	C1	AUTOMATIC,ALIGNED,POINTER 78,79,80,81,82,83,84,85,796,798,801,803,804,804,805,806,806,807,808 808,809,810,810,811,812,813,814,815,816,817,818,1273,1275,1275,1276 1276,1279,1281,1283,1284,1285,1286,1286,1290,1292,1293,1295,1303 1304,1309,1310,1315,1316,1321,1322,1327,1326,1333,1334,1340,1341 1347,1348,1353,1354,1359,1362,1362,1362,1362
126	CCHECK	STATEMENT LABEL CONSTANT

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
			125
19		CL	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 144,154,166,167,168,169,169,190,191,191,192,193,194,195,196,197,198 199,200,202,204,206,208,210,212,214,216,218,220,222,224,226,227,788
4		CIC	(4)AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 137
11	*********	CSEC	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0)
791		CTCV	BASED(Z),STRUCTURE 1251
791		CTCV2	BASED(Z),STRUCTURE
35		CTR	IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 137,786,786,786,786,787,787,787,787,824
35		CTRREC	(4)AUTOMATIC,STRUCTURE 792
86		READER	STATEMENT LABEL CONSTANT 60,89,122,185,228,784
78		READTR	STATEMENT LABEL CONSTANT
35		REC_IC	IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 71,71,134,136,140,786,786,786,786,793,824,942,955,961,974,980,988 995,1007,1013,1021,1028,1035,1042,1252
37		REM	(12)AUTOMATIC,UNALIGNED,INITIAL,STRING(34),CHARACTER 71,771
13		REMCH	IN HEADER,AUTOMATIC,UNALIGNED,STRING(34),CHARACTER 771,777
37	*********	REMALM	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,289,313,318,334,351,380,400,418,441,456,470,488,507,521,547,568 583,599,613,631,649,665,694,713,730,771
43		REPC	FILE,EXTERNAL,PRINT 44,68,71,238,239,243,929,930,931,933,937,941,947,957,959,966,976,978 983,987,990,994,999,1009,1011,1016,1020,1023,1027,1030,1034,1037 1041,1047,1050,1056,1059,1065,1068,1074,1077,1083,1086,1092,1095 1101,1104,1110,1113,1119,1122,1128,1131,1137,1140,1146,1149,1153 1156,1159,1162,1165,1168,1171,1174,1176,1179,1181,1183,1186,1188 1190,1193,1195,1197,1200,1202,1204,1207,1209,1211,1214,1216,1218 1221,1223,1225,1228,1230,1233,1236,1238,1243,1246,1250
8		REPTR	FILE,EXTERNAL,PRINT

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		77,782,1362
791	RESTART	IN CTCV,BASED(Z),UNALIGNED,STRING(1752),CHARACTER
79C	RCLS	ENTRY,DECIMAL,FLOAT(SINGLE) 126,232,252
791	******** S	STATIC,ALIGNED,BINARY,FIXED(15,0) 795,796,822,824,824,826,825,837,838,846,847,855,856,864,865,873,874 882,883,891,892,9CC,9C1,9C7,9CE,9C9,91C,911,912,913,914,915,916,917 91E,915,920,921,922,923,924,925,926,932,933,93S,94C,941,941,942,942 945,950,952,954,955,955,957,957,955,955,961,961,968,969,971,973,974 974,976,976,97E,978,98C,9EC,9E5,9E6,9E7,9E7,9E8,9E8,992,993,994,994 995,995,1CC1,1CC2,1CC4,1CC6,1CC7,1CC7,1CC9,1CC9,1C11,1C11,1C13,1C13 1018,1019,102C,1020,1021,1C21,1025,1C26,1C27,1C27,1028,1C2E,1032 1033,1C34,1034,1035,1035,1C39,1040,1041,1041,1042,1042,1C48,1C49 1050,1C50,1057,1C5E,1C59,1C59,1C6E,1C67,1C66,1C68,1C75,1C76,1C77 1077,1C84,1C85,1C86,1C86,1C93,1C94,1C95,1095,11C2,1103,1104,11C4 1111,1112,1113,1115,1120,1121,1122,1122,1129,1130,1131,1131,1138 1139,1140,1140,1147,1148,1149,1145,1154,1155,1156,1156,116C,1161 1162,1162,1166,1167,1168,1168,1172,1173,1174,1174,1177,1178,1179 118C,1181,1184,1185,1186,1187,11E8,1191,1192,1193,1194,1195,1198 1199,120C,12C1,1202,1205,1206,1207,1208,1209,1212,1213,1214,1215 1216,1219,12.C,1221,1222,1223,1226,1227,1228,1229,1230,1234,1235 1236,1237,1238,1244,1245,1246,1246,1253,1254,1255,1255,1255,1255 1255,1255,1256,1257,1257,1258,1258,1259,1259,1259,1259,1259 1259,1259,1259,1255
11	SC4	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 826,825,832,13C4
11	SC5	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 835,836,841,1316
11	SC7	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 844,847,850,1322
11	SC9	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 853,856,859,131C
11	S3C	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 862,865,868,1328
11	S31	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 871,874,877,1334
11	S33	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 88C,883,886,1341
11	S34	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 889,892,895,1348

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
11	S45	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 69E,901,904,1354
32	SAMEREC	BASED(Q),STRUCTURE
23 ********	SC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 1281,1282,1282,1283,1284,1285,129C,1291,1291,1292,1293,1294,1294 1295
19	SC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 144,186,187,188,189,189,19C,191,191,192,193,194,195,196,197,19E,199 20C,202,204,2C6,2C8,21C,212,214,216,21E,22C,222,224,226,227,788
34	SEC	IN INREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER 93,144
35	SEC	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(2), CHARACTER 144,787,787,787,787,796,822,824,829,838,847,856,865,874,883,892,901 931,938,942,955,961,974,9EC,9EE,995,10C7,1013,1021,102E,1C35,1042 1C49,1058,1067,1076,1085,1094,11C3,1112,1121,1130,1139,114E,1155 1161,1167,1173,1254
12	SECE	IN TRANACT,BASED(Q1),UNALIGNED,STRING(2),CHARACTER 801,1275,1283,1295,1304,1310,1316,1322,1328,1334,1341,1348,1354,1362
34	SECFLA	IN INREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
791	SECNUM	IN CTCV,BASED(Z),UNALIGNED,STRING(2),CHARACTER
35	SECREC	(15)IN CTRREC(4),AUTOMATIC,STRUCTURE
12	SECT	IN TRANACT,BASED(Q1),UNALIGNED,STRING(2),CHARACTER 79,81,83,796,812,814,816,1273,1275,1281,1293,1362
796	SETTRAN	STATEMENT LABEL CONSTANT 819
12	STARKEY	AUTOMATIC,UNALIGNED,INITIAL,STRING(9),CHARACTER 6B,29C,3CC,319,335,352,381,4C1,419,442,457,471,489,5C6,529,54E,569 584,6CC,614,632,653,67C,695,714,732,744,759,783
12	STCFKEY	AUTOMATIC,UNALIGNED,STRING(9),CHARACTER 132,184,291,3C1,32C,336,353,382,4C2,42C,443,45E,472,49C,5C9,53C,549 57C,585,6C1,615,633,654,671,6E6,715,733,745,76C
143	STORE	STATEMENT LABEL CONSTANT 785
	SUBSTR	GENERIC,BUILT-IN FUNCTION

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
			71,71,1276,1279,1284,1285,1286,1286,1290
791		SA	IN SWCH(10) IN QTCV,BASED(Z),UNALIGNED,STRING(1),CHARACTER
791		SWCH	(10)IN QTCV,BASED(Z),STRUCTURE
		SYSPRINT	FILE,EXTERNAL 45,55,64,777,786,787,788,824,942,961,98C,986,995,1013,1021,1028,1035 1042,1359
15	*********	TAB	(12)AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,C) 262,269,27C
39		TALLKEY	AUTOMATIC,UNALIGNED,INITIAL,STRING(11),CHARACTER 90,92
29	*********	TEST	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,157,225,239,275,275,287,767,7E1,782,824,942,961,98C,98E,995,1013 1021,1028,1035,1042,1240
39		THA	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 105,107,279
791		TIM	IN QTCV2,BASED(Z),UNALIGNED,STRING(4),CHARACTER 829,83E,847,85o,865,874,883,892,901
39		TJC	AUTOMATIC,UNALIGNED,INITIAL,STRING(3),CHARACTER 101,274
39		TKEY	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 97,104,278
39	*********	TMIN	AUTOMATIC,ALIGNED,BINARY,FIXED(15,C)
24		TOTIM	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,C) 237,237,245
24		TOTSEC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,C) 235,235,243
24		TOTSTEP	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 236,236,243
11		TRC4	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,2) 82E,13C5
11		TRC5	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 837,1317
11		TRC7	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,2) 846,1323

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
11	TRC9	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 855,1311
11	TR3C	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,3) 864,1329
11	TR31	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 873,1326
11	TR33	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,3) 882,1343
11	TR34	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 891,1349
11	TR45	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,3) 900,1356
10	TRAN	FILE,EXTERNAL,RECORD,INPUT,SEQUENTIAL,BUFFERED,ENVIRONMENT(F(160,80)) 73,78,811
12	TRANACT	BASED(C1),STRUCTURE
12	TRANBNC	IN TRANACT,BASED(C1),UNALIGNED,STRING(4),CHARACTER 1276,1285,1286,1292,1303,1309,1315,1321,1327,1333,1340,1347,1353 1362
12	TRANKEY	IN TRANACT,BASED(C1),UNALIGNED,STRING(7),CHARACTER 1276,1279,1284,1286,1290
12	TRC1	IN TRANACT,BASED(C1),UNALIGNED,STRING(2),CHARACTER 803,804
12	TRC2	IN TRANACT,BASED(C1),UNALIGNED,STRING(2),CHARACTER 805,806
12	TRC3	IN TRANACT,BASED(C1),UNALIGNED,STRING(2),CHARACTER 807,808
12	TRC4	IN TRANACT,BASED(C1),UNALIGNED,STRING(2),CHARACTER 809,810
9	TRKEY	BASED(C1),UNALIGNED,STRING(8),CHARACTER 796,1362
23	********* TRREC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 239,277,286,800,800,1362
11	********* TRSEC	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0)

DCL NO.		IDENTIFIER	ATTRIBUTES AND REFERENCES
1259		TESETUP	ENTRY,DECIMAL,FLOAT(SINGLE) 804,806,808,810
23	*********	TRICT	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 243,277,277
12		TRV1	IN TRANACT,BASED(Q1),UNALIGNED,STRING(8),CHARACTER 804
12		TRV2	IN TRANACT,BASED(Q1),UNALIGNED,STRING(8),CHARACTER 806
12		TRV3	IN TRANACT,BASED(Q1),UNALIGNED,STRING(8),CHARACTER 808
12		TRV4	IN TRANACT,BASED(Q1),UNALIGNED,STRING(8),CHARACTER 810
39		TSECFUN	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER
34		VCLT	IN DATA(70) IN INREC,BASED(Q),UNALIGNED,STRING(6),CHARACTER
1264		VS	ENTRY,STRING(1),CHARACTER 192,193,194,195,196,197,198,199,200,227
40		VR	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 71,256
		Z	AUTOMATIC,ALIGNED,POINTER 792,796,825,836,847,856,865,874,883,892,901,1251
34		ZC	IN ZLEV(7C) IN NUREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
34		ZK	IN NUREC,BASED(Q),UNALIGNED,STRING(12),CHARACTER
34		ZLEV	(70)IN NUREC,BASED(Q),STRUCTURE
34		ZV	IN ZLEV(7C) IN NUREC,BASED(Q),UNALIGNED,STRING(6),CHARACTER

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
791	DIG	78
13	HEADER	152E
34	INREC	572
36	LABEL	273
1E	MCN_TAB	10E
37	MRI	51
34	NUREC	572
37	OVER	48
37	POINT	300
31	PRC	224
4	QIC	4
791	QTOV	152E
791	QTOV2	7
35	QTRREC	7712
37	REM	40E
32	SAMPREC	42C
15	TAB	24
12	TRANACT	50

STORAGE REQUIREMENTS.

THE STORAGE AREA FOR THE PROCEDURE LABELLED MYSTIC IS 13928 BYTES LONG.
THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 47 IS 728 BYTES LONG.
THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 53 IS 732 BYTES LONG.
THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 58 IS 728 BYTES LONG.
THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 62 IS 772 BYTES LONG.
THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 69 IS 960 BYTES LONG.
THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 74 IS 728 BYTES LONG.
THE STORAGE AREA FOR THE PROCEDURE LABELLED FOOS IS 1360 BYTES LONG.
THE STORAGE AREA FOR THE PROCEDURE LABELLED WS IS 736 BYTES LONG.
THE STORAGE AREA FOR THE PROCEDURE LABELLED ENDSEC IS 768 BYTES LONG.
THE STORAGE AREA FOR THE PROCEDURE LABELLED TRSETUP IS 776 BYTES LONG.
THE PROGRAM CSECT IS NAMED MYSTIC AND IS 63788 BYTES LONG.
THE STATIC CSECT IS NAMED =MYSTICA AND IS 8768 BYTES LONG.

STATISTICS SOURCE RECORDS = 1560,PROC TEXT STMNTS = 1364,OBJECT BYTES = 63788

C-80

COMPILER DIAGNOSTICS.

WARNINGS.

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS. SYSIN/SYSPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM0764I ONE OR MORE FIXED BINARY ITEMS OF PRECISION 15 OR LESS HAVE BEEN GIVEN HALFWORD STORAGE. THEY ARE FLAGGED '*********' IN THE XREF/ATR LIST.

IEM1790I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS 93, 108, 109, 114, 156, 256, 257, 280, 281, 1275, 1281, 1284, 1290, 1293, 1305, 1311, 1317, 1323, 1329, 1335, 1342, 1349.

IEM1790I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS 1355.

IEM3868I COMPILER CORE REQUIREMENT EXCEEDED SIZE GIVEN. AUXILIARY STORAGE USED.

END OF DIAGNOSTICS.

AUXILIARY STORAGE WILL NOT BE USED FOR DICTIONARY WHEN SIZE = 12CK

COMPILE TIME 2.28 MINS

ELAPSED TIME 12.55 MINS

The following is a complete listing of the computer program "ANDY".

PL/I F COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

LOAD,NODECK

THE COMPLETE LIST OF OPTIONS USED DURING THIS COMPILATION IS-- EBCDIC
CHARSET
NOMACRO
SOURCE2
NOMACDCK
COMP
SOURCE
ATR
XREF
NOEXTREF
NOLIST
LOAD
NODECK
FLAGW
STMT
SIZE=0147712
LINECNT=056
OPT=01
SORMGIN=(002,072,001)
NOEXTDIC
NEST
CPLIST
SYNCHKS

OPTIONS IN EFFECT EBCDIC,CHARSET,NOMACRO,SOURCE2,NOMACDCK,COMP,SOURCE,ATR,XREF,NOEXTREF,NOLIST,LOAD,
OPTIONS IN EFFECT NODECK,FLAGW,STMT,SIZE=0147712,LINECNT=056,OPT=01,SORMGIN=(002,072,001),NOEXTDIC,
OPTIONS IN EFFECT NEST,CPLIST,SYNCHKS

```
STMT LEVEL NEST
  1                CALC: PROCEDURE OPTIONS(MAIN) ;
                   /* PRINT SEC  CHC1 - SC2
                                 CHC3 - NC
                                 CHC4 - NCX
                                 CHC5 - THC
                                 CHC8 - CC
                                 CHC9 - CC2
                                 CHCC - H2C
                                 CHC6 - H2
                                 CHC7 - C2   */
  2     1            DCL (TF,TA1,TC1,TA2,TC3,TA4,TC4,TA5,TC5,TA8,TC8,TA9,TC9,TA0,TA6,TA7)
                       DECIMAL FLOAT (6) INIT (0) ;
                   /*   SIXTY MILLION      */
  3     1            DCL SM DECIMAL FLOAT (6) INIT (60000000) ; /* SIXTY MILLION */
  4     1            DCL ST DECIMAL FLOAT (6) INIT (6000) ;  /*  SIX THOUSAND  */
  5     1            DCL  AX CHAR (10) INIT ('----------|') ;
  6     1            DCL (AAC,AA1,AA3,AA4,AA5,AA6,AA7,AA8,AA9,AVG0,AVG1,AVG2,AVG4,AVG5,
                     AVG6,AVG7,AVG8,AVG9,AACC,AAC1,AA03,AAC4,AAC5,AA06,AA07,AAC8,AAC9,
                     MAXC,MAX1,MAX2,MAX4,MAX5,MAX6,MAX7,MAX8,MAX9,MIN0,MIN1,MIN3,MIN4,
                     MIN5,MIN6,MIN7,MIN8,MIN9) FLOAT DECIMAL (6) INIT (0) ;
  7     1            DCL (AV,A0,A1,A2,A3,A4,A5,A6,A7,A8,A9,N0,N1,N2,N3,N4,N5,N6,N7,N8,N9)
                       DECIMAL FLOAT (6) INIT (0) ;
  8     1            DCL FIVSEC FIXED BIN (16) ;
  9     1            DCL CAP DECIMAL FLOAT (6) ;
 10     1            DCL (C1,C2,C3,C4,C5,C8,C9) DECIMAL FLOAT (6) INIT (0) ;
 11     1                DCL F POINTER ;
 12     1            DCL (AVG00,AVG01,AVG02,AVG03,AVG04,AVG05,AVG06,AVG07,AVG08,AVG09,
                         MAXC0,MAX01,MAX02,MAX03,MAX04,MAX05,MAX06,MAXC7,MAXC8,MAX09,
                         MIN00,MIN01,MIN02,MIN03,MIN04,MIN05,MINC6,MINC7,MIN08,MIN09)
                       DECIMAL FLOAT (6) ;
 13     1            DCL BIGMAC DECIMAL FLOAT (6) INIT (9E50) ;
 14     1             DCL 1 CLTHEAD BASED (R) ,          /* CHECK 3608  *********   */
                          5 BILLS CHAR (340) ,
                          5 VALUES (52) FLOAT DECIMAL (6) ,
                          5 MCJUNK CHAR (3CEC) ;
 15     1            DCL PRC (28) LABEL , (STARSEC,STOPSEC,STOP,START) FIXED BIN (8) ,
                     ECF CHAR (1) INIT (' ') ,
                        (STARKEY,STOPKEY) CHAR (8) ;
 16     1            DCL  1 HEADER ,
                          5 KEYID CHAR (3) ,
                          5 MONTH CHAR (12) ,
                          5 DAY  CHAR  (2) ,
                          5 LABEL (0:3E) CHAR (7) ,
                          5 OVEN CHAR (4) ,
                          5 MRI  CHAR (3) ,
                          5 REM  CHAR (34) ,
                          5 KEYREC CHAR (7),
                          5 TEST FIXED BIN (15)  INIT (0) ,
                       MCVHEAD CHAR (340)  BASED (Q) ;
 17     1            DCL   CATHEAD CHAR (34C) DEFINED HEADER ;
 18     1             DCL INPUT FILE RECORD INPUT SEQUENTIAL BUFFERED ENVIRONMENT
                          (F(7712,1928)) ,
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STMT LEVEL NEST

                    OUTPUT FILE RECORD OUTPUT SEQUENTIAL BUFFERED ;
 19     1          DCL 1 INREC BASED (C) ,
                        5 JC CHAR (3) ,
                        5 HR CHAR (2) ,
                        5 MINUTE CHAR (2) ,
                        5 CTR CHAR (1) ,
                        5 SECREC (15),
                          10 SEC CHAR (2),
                          10 CH00 FIXED DECIMAL (7,1),
                          10 CH01 FIXED DECIMAL (7,1),
                          10 CH02 FIXED DECIMAL (7,1),
                          10 CH03 FIXED DECIMAL (7,3),
                          10 CH04 FIXED DECIMAL (7,2),
                          10 CH05 FIXED DECIMAL (7,1),
                          10 CH06 FIXED DECIMAL (7,3),
                          10 CH07 FIXED DECIMAL (7,2),
                          10 CH08 FIXED DECIMAL (7,4),
                          10 CH09 FIXED DECIMAL (7,1),
                          10 CH10 FIXED DECIMAL (7,2),
                          10 CH11 FIXED DECIMAL (7,0),
                          10 CH12 FIXED DECIMAL (7,1),
                          10 CH14 FIXED DECIMAL (7,2),
                          10 CH16 FIXED DECIMAL (7,4),
                          10 CH30 FIXED DECIMAL (7,3),
                          10 CH31 FIXED DECIMAL (7,1),
                          10 CH32 FIXED DECIMAL (7,2),
                          10 CH34 FIXED DECIMAL (7,1),
                          10 CH36 FIXED DECIMAL (7,3),
                          10 CH40 FIXED DECIMAL (7,1),
                          10 CH41 FIXED DECIMAL (7,3),
                          10 CH42 FIXED DECIMAL (7,1),
                          10 CH43 FIXED DECIMAL (7,1),
                          10 CH44 FIXED DECIMAL (7,3),
                          10 CH45 FIXED DECIMAL (7,3),
                          10 CH37 FIXED DECIMAL (7,1),
                          10 CH39 FIXED DECIMAL (7,1),
                          10 CH53 FIXED DECIMAL (7,1),
                          10 CH17 CHAR (1) ,
                          10 CH18 CHAR (1) ,
                          10 CH19 CHAR (1) ,
                          10 CH20 CHAR (1) ,
                          10 CH21 CHAR (1) ,
                          10 CH22 CHAR (1) ,
                          10 CH23 CHAR (1) ,
                          10 CH24 CHAR (1) ,
                          10 CH25 CHAR (1) ,
                          10 CH48 CHAR (1) ,
                      1 CLTREC BASED (R) ,
                        5 KEY CHAR (8) ,
                        5 SECREC (15) ,
                          10 CH00 DECIMAL FLOAT (6) ,
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STMT LEVEL NEST

```
                  1C CH01 DECIMAL FLOAT (6) ,
                  1C CH02 DECIMAL FLOAT (6) ,
                  1C CH03 DECIMAL FLOAT (6) ,
                  1C CH04 DECIMAL FLOAT (6) ,
                  1C CH05 DECIMAL FLOAT (6) ,
                  1C CH06 DECIMAL FLOAT (6) ,
                  1C CH07 DECIMAL FLOAT (6) ,
                  1C CH08 DECIMAL FLOAT (6) ,
                  1C CH09 DECIMAL FLOAT (6) ,
                  1C CH10 DECIMAL FLOAT (6) ,
                  1C CH11 DECIMAL FLOAT (6) ,
                  1C CH12 DECIMAL FLOAT (6) ,
                  1C CH14 DECIMAL FLOAT (6) ,
                  1C CH16 DECIMAL FLOAT (6) ,
                  1C CH30 DECIMAL FLOAT (6) ,
                  1C CH31 DECIMAL FLOAT (6) ,
                  1C CH33 DECIMAL FLOAT (6) ,
                  1C CH34 DECIMAL FLOAT (6) ,
                  1C CH36 DECIMAL FLOAT (6) ,
                  1C CH40 DECIMAL FLOAT (6) ,
                  1C CH41 DECIMAL FLOAT (6) ,
                  1C CH42 DECIMAL FLOAT (6) ,
                  1C CH43 DECIMAL FLOAT (6) ,
                  1C CH44 DECIMAL FLOAT (6) ,
                  1C CH45 DECIMAL FLOAT (6) ,
                  1C CH37 DECIMAL FLOAT (6) ,
                  1C CH39 DECIMAL FLOAT (6) ,
                  1C CH53 DECIMAL FLOAT (6) ,
                  1C FLOWS (14) ,  /* CH1,CH2,CH3,TOT,10 POLLUTANTS */
                     15 AF DECIMAL FLOAT (6) ,
                     15 SF DECIMAL FLOAT (6) ,
                  1C SEC CHAR (2) ,
                  1C CH17 CHAR (1) ,
                  1C CH18 CHAR (1) ,
                  1C CH19 CHAR (1) ,
                  1C CH20 CHAR (1) ,
                  1C CH21 CHAR (1) ,
                  1C CH22 CHAR (1) ,
                  1C CH23 CHAR (1) ,
                  1C CH24 CHAR (1) ,
                  1C CH25 CHAR (1) ,
                  1C CH48 CHAR (1) ,
               1 ALKEY CHAR (8) BASED (C) ,
                  AGRAPH (0:120)   BIT (8) ,
                  SGRAPH (0:120)   BIT (8) ,
                  ALINES      CHAR (121) DEFINED AGRAPH ,
                  SLINES      CHAR (121) DEFINED SGRAPH ,
            /* AS SIMPLE AS A B C                                          */
                  MARK (4) BIT (8) INIT ('11CC00C1'B,'11CC00C1'B,'11CC01C0'B,
                        'C1CCC000'B) ,
                  PIVOT FLOAT DECIMAL (6) INITIAL (0.89) ,
```

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STMT LEVEL NEST

                    STEKON FLOAT DECIMAL (6) ,
                     NEG   FLOAT DECIMAL (6) INITIAL (0.E9) ,
                     SMG   FLOAT DECIMAL (6) INITIAL (C.E9) ,
                     AT1   FLOAT DECIMAL (6) INITIAL (0),
                     AT2   FLOAT DECIMAL (6) INITIAL (C),
                     AT3   FLOAT DECIMAL (6) INITIAL (0),
                     AT1MIN FLOAT DECIMAL (6) ,
                     AT2MIN FLOAT DECIMAL (6) ,
                     AT3MIN FLOAT DECIMAL (6) ,
                     AT1MAX FLOAT DECIMAL (6) ,
                     AT2MAX FLOAT DECIMAL (6) ,
                     AT3MAX FLOAT DECIMAL (6) ,
                     ATMUP  FLOAT DECIMAL (6) ,
                     AFICT (3) FLOAT DECIMAL (6) INITIAL ((3) 0) ,
                     SFICT (3) FLOAT DECIMAL (6) INITIAL ((3) 0) ,
                   (ERRCODE,DAISEC,RECIN      ) FIXED BIN (31) INIT (C) ,
                     (I,J,K,L,C,ALARFLCK  ) FIXED BIN (16) INITIAL (C) ;
20     1           DCL (TEMP (3),PRES (3))  FIXED BIN (8) ,
                     NEGALM FIXED BIN (31) INIT (0) ,
                     PITKON (3) FLOAT DECIMAL (6) ,
                     (AVGTEMP(3),MAXTEMP(3),MINTEMP(3)) FLOAT DECIMAL (6) ,
                     (TA                                ) FLOAT DECIMAL (6) ,
                    1 OUTER BASED (R) ,
                       2 KEYS CHAR (8) ,
                       2 SECREC (15) ,
                            3C CHCMLY (29) ,
                               3C CHAN DECIMAL FLOAT (6) ,
                            3C COMPFL (14) ,      /* CP1,CP2,CP3,TCT,1C POLLUTANTS */
                               3C ACTFLCW DECIMAL FLOAT (6) ,
                               3C STDFLCW DECIMAL FLOAT (6) ,
                          2C SEC CHAR (2) ,
                             2C SHOWLY (1C) ,
                               3C SWTP CHAR (1) ,
                     LIM12CC DECIMAL FLOAT (6) INIT (1C.0) ,
                     BLANK7 CHAR (7) INIT ('       ') ,
                     WASH CHAR (1) INIT ('1') ;
21     1           OPEN FILE (REPC) OUTPUT STREAM PRINT PAGESIZE (66) LINESIZE (132),
                      FILE (C1)   OUTPUT STREAM PRINT PAGESIZE (66) LINESIZE (132),
                      FILE (C2)   OUTPUT STREAM PRINT PAGESIZE (66) LINESIZE (132),
                      FILE (C4)   OUTPUT STREAM PRINT PAGESIZE (66) LINESIZE (132),
                      FILE (SYSPRINT) OUTPUT STREAM PRINT LINESIZE (132) ;
22     1           ON ERROR BEGIN ; ERRCODE = ONCODE ;
25     2              PUT FILE (SYSPRINT) EDIT ('ERROR END ****** ERRCODE=',ERRCODE)
                        (PAGE,A,F(6)) ;
26     2              END ;
27     1           ON CONVERSION BEGIN ;
29     2              PUT FILE (SYSPRINT) EDIT ('CONVERSION ERROR ****** ERRCODE=',
                       CNCODE,CNSOURCE,CNCHAR,CNLOC) (PAGE,A,F(6),2(SKIP,A)) ;
30     2              ECF = 'Y' ;
31     2              GO TO ALTEST ;
32     2              END ;
```

```
STMT LEVEL NEST

 33     1           ON ENDFILE (INPUT) BEGIN ; EOF = '1' ; GO TO NUTEST ; END ;
 38     1          INITIAL:
                    ALINES,SLINES = BLANK7 ;
                    /* SINCE PRESSURE CHANNELS ARE ".01 IN." AND SC RT IS USED  THE
                    CONSTANT IS 17.4 INSTEAD OF 174.       */
 39     1                  WEG = 17.4 * FITCT * WEG * SQRT (29.92) ;
 40     1                  SKG = 17.4 * FITCT * SKG * SQRT (29.92) ;
 41     1                  STDKGA = 53C   / 29.92 ;
 42     1           PUT EDIT ('INITIAL CONSTANT VALUES','WEG =',WEG,'SKG =',SKG,
                    'STDKGA =',STDKGA) (SKIP(2),A,3(SKIP,A,F(15,6))) ;
 43     1           DO I = 1 TO 3 ;
 44     1     1     AVGTEMP (I) = 0 ; MAXTEMP (I) = -100 ; MINTEMP (I) = 99999 ; END ;
 48     1           PUT EDIT ('BIGMAC',BIGMAC) (SKIP(3),A,F(6C,2)) ;
 49     1             READ:
                       READ FILE (INPUT) SET (Q) ;
                       IF JC = 'KEY' THEN GO TO NUTEST ;
 50     1                  RECIN = RECIN + 1 ;
 52     1                  RECOUT = RECOUT + 1 ;
 53     1              IF  (NUKEY < STARKEY | NUKEY > STOPKEY) THEN GO TO READ ;
 55     1          IF STOP ¬= 15 THEN STOP =15;ELSE IF START ¬= 1 THEN START = 1 ;
 59     1                  OUTREC.KEY = NUKEY ;
 60     1                  LOCATE OUTREC FILE (OUTPUT) SET (R) ;
 61     1              IF  NUKEY = STARKEY THEN DO ;
 63     1     1                START = STARSEC ;
 64     1     1                                  END ;
 65     1                                   ELSE
 65     1                  IF NUKEY = STOPKEY THEN DO ;
 67     1     1               STOP = STOPSEC ;
 68     1     1                                  END ;
 69     1            IF INREC.QTR < '1' | INREC.QTR > '4' THEN DO ;  /* FIXUP KEY */
 71     1     1          IF INREC.SEC (1) = '0' | INREC.SEC (15) = '14' THEN
 72     1     1            INREC.QTR = '1' ;
 73     1     1       ELSE IF INREC.SEC (1) = '15' | INREC.SEC (15) = '29' THEN
 74     1     1              INREC.QTR = '2' ;
 75     1     1       ELSE IF INREC.SEC (1) = '30' | INREC.SEC (15) = '44' THEN
 76     1     1              INREC.QTR = '3' ;
 77     1     1       ELSE IF INREC.SEC (1) = '45' | INREC.SEC (15) = '59' THEN
 78     1     1              INREC.QTR = '4' ;
 79     1     1         ELSE PUT EDIT ('QTR ERROR',INREC.QTR,INREC.SEC (1) ,INREC.SEC(15),
                          NUKEY) (PAGE,5(SKIP,A)) ;
 80     1     1           END ;
 81     1                 DO I = START TO STOP ;
 82     1     1      IF I = STOP THEN FIVSEC = 0 ; ELSE
 84     1     1      FIVSEC = MOD (I,5) ;
 85     1     1       AF(I,4),SF(I,4) = 0 ;
 86     1     1             CATSEC = CATSEC + 1 ;
 87     1     1               IF INREC.SEC (I) ¬= '  ' THEN
 88     1     1                  DO ;
                     /*   CONVERT AND STORE */
 89     1     2                     OUTREC.SECREC (I) = INREC.SECREC (I), BY NAME ;
 90     1     2           GAP = 0 ;
                    /*  ALL FLOWS STORED IN CFM */
```

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STMT LEVEL NEST

                    /* ALL TEMP STORED IN DEGREES RANKINE  */
 91     1    2                 DO J = 1 TO NUMFLOW ;
 92     1    3                  CHAN (I,TEMP(J)) = CHAN (I,TEMP(J)) + 460 ; /* RANKINE*/
 93     1    3                  TN = (CHAN (I,TEMP(J)) * CHAN (I,PRES(J))) /
                                      OUTREC.CH14 (I) ;
 94     1    3                  IF TN < 0 THEN DO ;
 96     1    4                       TN = 0 ;
 97     1    4                       NEGNUM = NEGNUM + 1 ;
 98     1    4                            END ;
 99     1    3                  AF (I,J) = PITOT (J) * SQRT (TN) ;
100     1    3        IF AF (I,J) <= 10 THEN GAM = GAM + 1 ;    /* FLOW THRESHOLD */
102     1    3                  AF (I,4) = AF (I,4) + AF (I,J) ;
103     1    3                  AFTOT (J) = AFTOT (J) +  AF (I,J) ;
                        /* STD  FLOW  COMP  */
104     1    3                  SF (I,J) =(STDDEN * AF (I,J) * OUTREC.CH14 (I))
                                   / CHAN (I,TEMP(J)) ;
105     1    3                  SF (I,4) = SF (I,4) + SF (I,J) ;
106     1    3                  SFTOT (J) = SFTOT (J) + SF (I,J) ;
107     1    3                  AVGTEMP (J) = AVGTEMP (J) + CHAN (I,TEMP(J)) ;
108     1    3                  MAXTEMP (J) = MAX (CHAN (I,TEMP(J)),MAXTEMP (J)) ;
109     1    3                  MINTEMP (J) = MIN (CHAN (I,TEMP(J)),MINTEMP (J)) ;
110     1    3                       TN = (AF (I,J)  / LIM1200)  * 0.5 ;
111     1    3        IF TN < 0 THEN DO ;
113     1    4          PUT EDIT ('INDEX ERROR A',TN,I,J,AF (I,J)) (SKIP,A,4(F(20,4))) ;
114     1    4        TN=0 ; END ; ELSE IF TN> 120 THEN DO ;
118     1    4          PUT EDIT ('INDEX ERROR A',TN,I,J,AF (I,J)) (SKIP,A,4(F(20,4))) ;
119     1    4        TN = 120 ; END ;
121     1    3                  AGRAPH (TN) = AGRAPH (TN) | MARK (J) ;
122     1    3                       TN = (SF (I,J)  / LIM1200)  * 0.5 ;
123     1    3        IF TN < 0 THEN DO ;
125     1    4          PUT EDIT ('INDEX ERROR B',TN,I,J,SF (I,J)) (SKIP,A,4(F(20,4))) ;
126     1    4        TN= 0 ; END ; ELSE IF TN> 120 THEN DO ;
130     1    4          PUT EDIT ('INDEX ERROR B',TN,I,J,SF (I,J)) (SKIP,A,4(F(20,4))) ;
131     1    4        TN = 120 ; END ;
133     1    3                  SGRAPH (TN) = SGRAPH (TN) | MARK (J) ;
134     1    3                 END ;
135     1    2                       PUT FILE (G1) EDIT (OUTREC.SEC (I),WASH,ALINES)
                                     (SKIP,X(3),A,X(1),2(A)) ;
136     1    2                       PUT FILE (G2) EDIT (OUTREC.SEC (I),WASH,SLINES)
                                     (SKIP,X(3),A,X(1),2(A)) ;
137     1    2          AV = AV + SF (I,4) ;
138     1    2          IF GAM <= 0 THEN GAM = 1 ;          /* NO LOW FLOWS */
140     1    2            ELSE IF GAM = NUMFLOW THEN GAM = 0 ;     /* ALL LOW FLOWS */
142     1    2            ELSE DO ;
143     1    3                  GAM = 1 - (GAM / NUMFLOW) ;
144     1    3                  GAM = 1 / GAM ;
145     1    3                END ;
146     1    2                       ALINES,SLINES = BLANK7 ;
147     1    2          IF FINSEC = 0 THEN DO ;
149     1    3             AV = AV / 60 ;
150     1    3             PUT FILE (G4) EDIT  (OUTREC.SEC(I),AV) (SKIP,A,F(5)) ;
```

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STMT LEVEL NEST

151     1    3            IF = IF + AV ;
152     1    3          AV = 0 ;
153     1    3        END ;
154     1    2                IF LABEL (C) ¬= BLANK7 THEN DO ;
                           /*  NET GAS ADJUSTMENT  */
156     1    3                  TN = (100  - CLTREC.CHC0 (I)) / 100 ;
157     1    3                  CUTREC.CHC6 (I) = CLTREC.CHC6 (I) * TN ;
158     1    3                  CLTREC.CHC7 (I) = CUTREC.CHC7 (I) * TN ;
159     1    3                  CLTREC.CHC8 (I) = CLTREC.CHC8 (I) * TN ;
160     1    3                  CUTREC.CHC9 (I) = OUTREC.CHC9 (I) * TN ;
161     1    3                     END ;
                          /* CONTINUOUS GAS ANALYSIS                                    */
162     1    2                IF LABEL (I) ¬= BLANK7 THEN
163     1    2                  DO ;
164     1    3                    AF (I,6) = CLTREC.CH01 (I) * SF (I,4) ;
165     1    3                  SF (I,6) = AF (I,6) * GAM ;
166     1    3        AVG1 = AVG1 + AF (I,6) ;
167     1    3                  AVG1 = AVG1 + SF (I,6) ;
168     1    3                   MAX1 = MAX (MAX1,SF(I,6));
169     1    3                   MIN1 = MIN (MIN1,SF(I,6));
170     1    3        MAXC1 = MAX (MAXC1,AF(I,6)) ;
171     1    3        MINC1 = MIN (MINC1,AF(I,6)) ;
172     1    3        N1 = N1 + 1 ;
173     1    3        A1 = A1 + CLTREC.CHC1 (I) ;
174     1    3          C1 = C1 + CLTREC.CHC1 (I) * GAM ;
175     1    3        IF FIVSEC = 0 THEN DO ;
177     1    4        IF N1 ¬= 0 THEN DO ;
179     1    5       TA1 = TA1 + A1 ;   TC1 = TC1 + C1 ;
181     1    5          A1 = A1 / N1 ;
182     1    5           C1 = C1 / N1 ;
183     1    5        PUT FILE (G4) EDIT (A1,C1) (COL(012),2(F(8,1))) ;
184     1    5          A1 = 0 ; N1 = 0 ; C1 = 0 ;
187     1    5        END ; END ;
189     1    3                     END ;
                          /*  CHC3  */
190     1    2                     AF (I,8) = CLTREC.CH03 (I) * SF (I,4) ;
191     1    2                  SF (I,8) = AF (I,8) * GAM ;
192     1    2                  AVG3 = AVG3 + SF (I,8) ;
193     1    2                   MAX3 = MAX (MAX3,SF(I,8));
194     1    2                   MIN3 = MIN (MIN3,SF(I,8));
195     1    2        AVGC3 = AVGC3 + AF (I,8) ;
196     1    2        MAXC3 = MAX (MAXC3,AF(I,8)) ;
197     1    2        MINC3 = MIN (MINC3,AF(I,8)) ;
198     1    2        N3 = N3 + 1 ;
199     1    2        A3 = A3 + CLTREC.CHC3 (I) ;
200     1    2          C3 = C3 + CLTREC.CHC3 (I) * GAM ;
201     1    2        IF FIVSEC = 0 THEN DO ;
203     1    3        IF N3 ¬= 0 THEN DO ;
205     1    4       TA3 = TA3 + A3 ;   TC3 = TC3 + C3 ;
207     1    4          A3 = A3 / N3 ;
208     1    4           C3 = C3 / N3 ;
```

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STMT LEVEL NEST

209     1    4        PUT FILE (G4) EDIT (A3,C3) (COL(028),2(F(8,1))) ;
210     1    4          A3 = 0 ; N3 = 0 ; C3 = 0 ;
213     1    4        END ; END ;
                      /*   CHG4  */
215     1    2                    AF (I,9) = CUTREC.CHG4 (I) * SF (I,4) ;
216     1    2                SF (I,9) = AF (I,9) * GAM ;
217     1    2                AVG4 = AVG4 + SF (I,9) ;
218     1    2                 MIN4 = MIN (MIN4,SF(I,9)) ;
219     1    2                 MAX4 = MAX (MAX4,SF(I,9));
220     1    2        AVGG4 = AVG04 + AF (I,9) ;
221     1    2        MAXG4 = MAX (MAXG4,AF(I,9)) ;
222     1    2        MING4 = MIN (MING4,AF(I,9)) ;
223     1    2        N4 = N4 + 1 ;
224     1    2        A4 = A4 + CUTREC.CHG4 (I) ;
225     1    2          C4 = C4 + CUTREC.CHG4 (I) * GAM ;
226     1    2        IF FIVSEC = 0 THEN DO ;
228     1    3        IF N4 ¬= 0 THEN DO ;
230     1    4       TA4 = TA4 + A4 ;   TG4 = TG4 + G4 ;
232     1    4          A4 = A4 / N4 ;
233     1    4           G4 = G4 / N4 ;
234     1    4        PUT FILE (G4) EDIT (A4,G4) (COL(044),2(F(8,1))) ;
235     1    4          A4 = 0 ; N4 = 0 ; G4 = 0 ;
238     1    4        END ; END ;
240     1    2                 IF LABEL (5) ¬= BLANK7 THEN
241     1    2                    DO ;
242     1    3                     AF (I,10)= CUTREC.CHG5 (I) * SF (I,4) ;
243     1    3                SF (I,10)= AF (I,10)* GAM ;
244     1    3                AVG5 = AVG5 + SF (I,10) ;
245     1    3                 MAX5 = MAX (MAX5,SF(I,10));
246     1    3                 MIN5 = MIN (MIN5,SF(I,10));
247     1    3        AVGG5 = AVGG5 + AF (I,10) ;
248     1    3        MAXG5 = MAX (MAXG5,AF(I,10)) ;
249     1    3        MING5 = MIN (MING5,AF(I,10)) ;
250     1    3        N5 = N5 + 1 ;
251     1    3        A5 = A5 + CUTREC.CHG5 (I) ;
252     1    3          G5 = G5 + CUTREC.CHG5 (I) * GAM ;
253     1    3        IF FIVSEC = 0 THEN DO ;
255     1    4        IF N5 ¬= 0 THEN DO ;
257     1    5       TA5 = TA5 + A5 ;   TG5 = TG5 + G5 ;
259     1    5          A5 = A5 / N5 ;
260     1    5           G5 = G5 / N5 ;
261     1    5        PUT FILE (G4) EDIT (A5,G5) (COL(060),2(F(8,2))) ;
262     1    5          A5 = 0 ; N5 = 0 ; G5 = 0 ;
265     1    5        END ; END ;
267     1    3                    END ;
                     /*  CHG8  */
268     1    2                    AF (I,13)= CUTREC.CHG8 (I) * SF (I,4) ;
269     1    2                SF (I,13)= AF (I,13)* GAM ;
270     1    2                AVG8 = AVG8 + SF (I,13);
271     1    2                 MAX8 = MAX (MAX8,SF(I,13));
272     1    2                 MIN8 = MIN (MIN8,SF(I,13));
```

```
STMT LEVEL NEST

273     1    2        AVCCE = AVCC8 + AF (I,13) ;
274     1    2        MAXCE = MAX (MAXCE,AF(I,13)) ;
275     1    2        MINCE = MIN (MINCE,AF(I,13)) ;
276     1    2        NE = NE + 1 ;
277     1    2        AE = AE + CUTREC.CH08 (I) ;
278     1    2          CE = CE + CUTREC.CH08 (I) * GAM ;
279     1    2        IF FIVSEC = 0 THEN DO ;
281     1    3        IF NE ¬= 0 THEN DO ;
283     1    4       TAE = TA8 + A8 ;   TCE = TC8 + C8 ;
285     1    4          AE = AE / N8 ;
286     1    4           CE = CE / N8 ;
287     1    4        PUT FILE (G4) EDIT (AE,C8) (COL(076),2(F(8,2))) ;
288     1    4          AE = 0 ; N8 = 0 ; C8 = 0 ;
291     1    4        END ; END ;
                     /*  CH09  */
293     1    2                        AF (I,14)= CUTREC.CH09 (I) * SF (I,4) ;
294     1    2                  SF (I,14)= AF (I,14)* GAM ;
295     1    2                  AVG9 = AVG9 + SF (I,14);
296     1    2                   MAX9 = MAX (MAX9,SF(I,14));
297     1    2                   MIN9 = MIN (MIN9,SF(I,14));
298     1    2        AVGC9 = AVG09 + AF (I,14) ;
299     1    2        MAXC9 = MAX (MAXC9,AF(I,14)) ;
300     1    2        MINC9 = MIN (MIN09,AF(I,14)) ;
301     1    2        N9 = N9 + 1 ;
302     1    2        A9 = A9 + CUTREC.CH09 (I) ;
303     1    2          C9 = C9 + CUTREC.CH09 (I) * GAM ;
304     1    2        IF FIVSEC = 0 THEN DO ;
306     1    3        IF N9 ¬= 0 THEN DO ;
308     1    4       TA9 = TA9 + A9 ;   TC9 = TC9 + C9 ;
310     1    4          A9 = A9 / N9 ;
311     1    4           C9 = C9 / N9 ;
312     1    4        PUT FILE (G4) EDIT (A9,C9) (COL(052),2(F(8,1))) ;
313     1    4          A9 = 0 ; N9 = 0 ; C9 = 0 ;
316     1    4        END ; END ;
318     1    2                  IF LABEL (0) ¬= BLANK7 THEN
319     1    2                     DO;
320     1    3                        AF (I,5) = CUTREC.CH00 (I) * SF (I,4) ;
321     1    3                  SF (I,5) = AF (I,5) * GAM ;
322     1    3                  AVGC = AVGC + SF (I,5) ;
323     1    3                   MAXC = MAX (MAXC,SF(I,5));
324     1    3                   MINC = MIN (MINC,SF(I,5));
325     1    3        AVGCC = AVCC0 + AF (I,5) ;
326     1    3        MAXCC = MAX (MAXCC,AF(I,5)) ;
327     1    3        MINCC = MIN (MINCC,AF(I,5)) ;
328     1    3        NC = NC + 1 ;
329     1    3        AC = AC + CUTREC.CHCC (I) ;
330     1    3        IF FIVSEC = 0 THEN DO ;
332     1    4        IF NC ¬= 0 THEN DO ;
334     1    5       TAC = TAC + AC ;
335     1    5          AC = AC / NC ;
336     1    5        PUT FILE (G4) EDIT (AC) (COL(108),F(8,1)) ;
```

```
STMT LEVEL NEST

337     1    5        N6 = 0 ; A6 = 0 ;
335     1    5         END ; END ;
341     1    3                   END ;
                      /*  CHC6  */
342     1    2                      AF (I,11)= OUTREC.CHC6 (I) * SF (I,4) ;
343     1    2                   SF (I,11)= AF (I,11)* GAM ;
344     1    2                   AVG6 = AVG6 + SF (I,11);
345     1    2                    MAX6 = MAX (MAX6,SF(I,11));
346     1    2                    MIN6 = MIN (MIN6,SF(I,11));
347     1    2         AVGC6 = AVGC6 + AF (I,11) ;
348     1    2         MAXC6 = MAX (MAXC6,AF(I,11)) ;
349     1    2         MINC6 = MIN (MINC6,AF(I,11)) ;
350     1    2         N6 = N6 + 1 ;
351     1    2         A6 = A6 + OUTREC.CHC6 (I) ;
352     1    2         IF FIVSEC = 0 THEN DO ;
354     1    3         IF N6 ¬= 0 THEN DO ;
356     1    4        TA6 = TA6 + A6 ;
357     1    4           A6 = A6 / N6 ;
358     1    4         PUT FILE (G4) EDIT (A6) (COL(116),F(8,1)) ;
359     1    4        A6 = 0 ; N6 = 0 ;
361     1    4         END ; END ;
                      /*  CHC7  */
363     1    2                      AF (I,12)= OUTREC.CHC7 (I) * SF (I,4) ;
364     1    2                   SF (I,12)= AF (I,12)* GAM ;
365     1    2                   AVG7 = AVG7 + SF (I,12);
366     1    2                    MAX7 = MAX (MAX7,SF(I,12));
367     1    2                    MIN7 = MIN (MIN7,SF(I,12));
368     1    2         AVGC7 = AVGC7 + AF (I,12) ;
369     1    2         MAXC7 = MAX (MAXC7,AF(I,12)) ;
370     1    2         MINC7 = MIN (MINC7,AF(I,12)) ;
371     1    2         N7 = N7 + 1 ;
372     1    2         A7 = A7 + OUTREC.CHC7 (I) ;
373     1    2         IF FIVSEC = 0 THEN DO ;
375     1    3         IF N7 ¬= 0 THEN DO ;
377     1    4        TA7 = TA7 + A7 ;
378     1    4           A7 = A7 / N7 ;
379     1    4         PUT FILE (G4) EDIT (A7) (COL(124),F(8,1)) ;
380     1    4        A7 = 0 ; N7 = 0 ;
382     1    4         END ; END ;
384     1    2        END ;
                     /*   *****     SEC (I) = '  '  ?????   */
385     1    1        END ;
386     1             GO TO READ ;
387     1            ALTEST:
                       IF TEST > 1 THEN
388     1                GO ;
389     1    1             PUT FILE (REPO) EDIT ('TEST SUMMARY STATISTICS','TEST NUMBER',
                             TEST,RECIN,'RECORDS IN',DATSEC,'DATA SECONDS')
                             (PAGE,COL(60),A,COL(80),A,F(4),SKIP(3),2(F(12),X(2),A)) ;
390     1    1             DO I = 1 TO ALMFLDS ;
391     1    2             AFTOT (I) = AFTOT (I) / 60 ;
```

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STMT LEVEL NEST

392    1    2            SFTOT (I) = SFTOT (I) / 60 ;
393    1    2               AVGTEMP (I) = AVGTEMP (I) / DATSEC ;
394    1    2               PUT FILE (REPO) EDIT ('FLOW',I,'MIN TEMP',MINTEMP(I),
                               'AVG TEMP',AVGTEMP(I),'MAX TEMP',MAXTEMP(I),'TEMP CHAN #',
                                TEMP(I),'PRES CHAN #',PRES(I),'TOTAL VOLUME (CF)',
                          AFTOT(I),'TOTAL STD VOLUME (SCF)',SFTOT(I))
                                (SKIP(3),A,F(4),3(X(5),A,F(6)),SKIP,2(X(5),A,F(4)),
                                 SKIP,2(X(5),A,F(14,4))) ;
395    1    2               AVGTEMP (I) = 0 ; MAXTEMP (I) = -100 ; MINTEMP (I) = 99999 ;
398    1    2               AFTOT (I), SFTOT (I) = 0 ;
399    1    2            END ;
400    1    1          PUT FILE (SYSPRINT) EDIT ('TEST',TEST,'NEGATIVE VALUES =',NEGALM)
                            (SKIP(2),A,F(4),X(4),A,F(12)) ;
401    1    1          PUT FILE (REPO) EDIT ('CHAN','PCLL','MIN FLOW','AVG FLOW','MAX FLOW',
                          'TOT VOL')  ( SKIP(2),A,COL(7),A,COL(21),4(X(7),A)) ;
402    1    1            IF LABEL (1) ¬= BLANK7 THEN DO ;
404    1    2          AVG1 = AVGG1 / SM ;
405    1    2          AN1 = AVG1 / SM ;
406    1    2           AVG1 = AVG1 / DATSEC ;
407    1    2                AVGG1 = AVGG1 / DATSEC ;
408    1    2          PUT FILE (REPO) EDIT ('G1',LABEL(1),MING1,AVGG1,MAXG1,AVG1,MIN1,
                          AVG1,MAX1,AN1) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-6)),
                           E(15,4))) ;
409    1    2            END ;
410    1    1            IF LABEL (3) ¬= BLANK7 THEN DO ;
412    1    2          AVG3 = AVGG3 / SM ;
413    1    2          AN3 = AVG3 / SM ;
414    1    2           AVG3 = AVG3 / DATSEC ;
415    1    2                AVGG3 = AVGG3 / DATSEC ;
416    1    2          PUT FILE (REPO) EDIT ('G3',LABEL(3),MING3,AVGG3,MAXG3,AVG3,MIN3,
                          AVG3,MAX3,AN3) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-6)),
                           E(15,4))) ;
417    1    2            END ;
418    1    1            IF LABEL (4) ¬= BLANK7 THEN DO ;
420    1    2          AN4 = AVG4 / SM ;
421    1    2          AVG4 = AVGG4 / SM ;
422    1    2           AVG4 = AVG4 / DATSEC ;
423    1    2                AVGG4 = AVGG4 / DATSEC ;
424    1    2          PUT FILE (REPO) EDIT ('G4',LABEL(4),MING4,AVGG4,MAXG4,AVG4,MIN4,
                          AVG4,MAX4,AN4) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-6)),
                           E(15,4))) ;
425    1    2            END ;
426    1    1            IF LABEL (5) ¬= BLANK7 THEN DO ;
428    1    2          AVG5 = AVGG5 / ST ;
429    1    2          AN5 = AVG5 / ST ;
430    1    2           AVG5 = AVG5 / DATSEC ;
431    1    2                AVGG5 = AVGG5 / DATSEC ;
432    1    2          PUT FILE (REPO) EDIT ('G5',LABEL(5),MING5,AVGG5,MAXG5,AVG5,MIN5,
                          AVG5,MAX5,AN5) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-2)),
                           E(15,4))) ;
433    1    2            END ;
```

CALC: PROCEDURE OPTIONS(MAIN) ;

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STMT LEVEL NEST

434     1    1       AVG8 = AVGC8 / ST ;
435     1    1      AVE = AVG8 / ST ;
436     1    1       AVGE = AVGE / CATSEC ;
437     1    1              AVGC8 = AVGC8 / CATSEC ;
438     1    1      PUT FILE (REPC) EDIT ('CE',LABEL(8),MINC8,AVGC8,MAXC8,AVG8,MIN8,
                       AVGE,MAXE,AVE) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-2)),
                       E(15,4))) ;
439     1    1       AVG9 = AVGC9 / ST ;
440     1    1      AVS = AVG9 / ST ;
441     1    1       AVGS = AVGS / CATSEC ;
442     1    1              AVGC9 = AVGC9 / CATSEC ;
443     1    1      PUT FILE (REPC) EDIT ('CS',LABEL(9),MINC9,AVGC9,MAXC9,AVG9,MIN9,
                       AVGS,MAXS,AVS) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-2)),
                       E(15,4))) ;
444     1    1          IF LABEL(0) ¬= BLANK7 THEN GO ;
446     1    2       AVGC = AVGC / ST ;
447     1    2      AVC = AVGO / ST ;
448     1    2       AVCC = AVGC / CATSEC ;
449     1    2              AVGCO = AVGCC / CATSEC ;
450     1    2      PUT FILE (REPC) EDIT ('CC',LABEL(0),MINCO,AVGCC,MAXCO,AVGC,MINC,
                       AVGC,MAXC,AVC) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-2)),
                       E(15,4))) ;
451     1    2              END ;
452     1    1       AVG6 = AVGC6 / ST ;
453     1    1      AVE = AVG6 / ST ;
454     1    1       AVGE = AVGE / CATSEC ;
455     1    1              AVGC6 = AVGC6 / CATSEC ;
456     1    1      PUT FILE (REPC) EDIT ('C6',LABEL(6),MINC6,AVGC6,MAXC6,AVG6,MIN6,
                       AVGE,MAXE,AVE) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-2)),
                       E(15,4))) ;
457     1    1       AVG7 = AVGC7 / ST ;
458     1    1      AVT = AVG7 / ST ;
459     1    1       AVGT = AVG7 / CATSEC ;
460     1    1              AVGC7 = AVGC7 / CATSEC ;
461     1    1      PUT FILE (REPC) EDIT ('C7',LABEL(7),MINC7,AVGC7,MAXC7,AVG7,MIN7,
                       AVG7,MAX7,AVT) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15,8,-2)),
                       E(15,4))) ;
462     1    1       TA = (TF * EC) / CATSEC ;
463     1    1      TAC = TAC / CATSEC ;
464     1    1      TA1 = TA1 / CATSEC ;
465     1    1      TC1 = TC1 / CATSEC ;
466     1    1      TA3 = TA3 / CATSEC ;
467     1    1      TC3 = TC3 / CATSEC ;
468     1    1      TA4 = TA4 / CATSEC ;
469     1    1      TC4 = TC4 / CATSEC ;
470     1    1      TA5 = TA5 / CATSEC ;
471     1    1      TC5 = TC5 / CATSEC ;
472     1    1      TA6 = TA6 / CATSEC ;
473     1    1      TA7 = TA7 / CATSEC ;
474     1    1      TAE = TA8 / CATSEC ;
475     1    1      TCE = TC8 / CATSEC ;
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STMT LEVEL NEST

476    1    1     TAS = TAS / CATSEC ;
477    1    1     TCS = TCS / CATSEC ;
478    1    1      PUT FILE (G4) EDIT ('AVG',TN,TA1,TC1,TA3,TC3,TA4,TC4,TA5,TC5,TA8,
                      TC8,TA9,TC9,TAO,TA6,TA7) (SKIP(2),A,F(8),6(F(8,1)),4(F(8,2)),
                        5(F(6,1))) ;
479    1    1      PUT FILE (G4) EDIT ('TOT',TF,ANC1,AN1,ANC3,AN3,ANC4,AN4,ANC5,AN5,
                   ANC6,AN6,AN08,AN9,AN00,AN06,AN07) (SKIP(2),A,F(8),15(E(8,1,2))) ;
480    1    1       END ;
481    1           ANC1,AN1,ANC3,AN3,ANC4,AN4,ANC5,AN5,ANCC,ANC = C ;
482    1           TAC,TA1,TA3,TA4,TA5,TA6,TA7,TA8,TA9,TC1,TC3,TC4,TC5,TC8,TC9,TF = 0 ;
483    1             L = C ;   /*          ************************** */
484    1                       REGNUM,CATSEC,RECIN = 0 ;
485    1            AVGC0,AVGC1,AVGC2,AVG03,AVG04,AVGC5,AVG06,AVG07,AVG08,AVG0S = 0 ;
486    1            MAXC0,MAX01,MAX02,MAX03,MAX04,MAX05,MAX06,MAX07,MAX08,MAX0S =-100 ;
487    1            MINC0,MIN01,MIN02,MIN03,MIN04,MIN05,MIN06,MIN07,MIN08,MINCS = BIGMAC;
                   /*  *** STORE  HEADER DATA HERE */
488    1             CATHEAD = MOVHEAD ;
489    1            LOCATE OUTHEAD FILE (OUTFLT) ;
490    1              BILLS = MOVHEAD ;
                       /*  OTHER STATS ???       ********************     */
491    1             IF ECF = 'Y' THEN RETURN ;
493    1             PUT EDIT (KEYIC,MONTH,DAY,(LABEL(I) DO I = 0 TO 3E),OVEN,MRI,REM,
                        KEYREC,TEST) (PAGE,46(SKIP,A),F(6,2)) ;
494    1            PUT FILE (G1) EDIT ('TEST',TEST,'ACTUAL VOLUME FLOWS',
                     'C','100','200','300','400','500','600','700','800','900','1000',
                     '1100','1200','|',AX,AX,AX,AX,AX,AX,AX,AX,AX,AX,AX)
                      (PAGE,A,F(4),CCL(60),A,SKIP(2),
                       CCL(8),A,X(1),9(X(7),A),3(X(6),A),SKIP,CCL(8),13(A)) ;
495    1            PUT FILE (G2) EDIT ('TEST',TEST,'STANDARD VOLUME FLOWS',
                     'C','100','200','300','400','500','600','700','800','900','1000',
                     '1100','1200','|',AX,AX,AX,AX,AX,AX,AX,AX,AX,AX,AX)
                      (PAGE,A,F(4),CCL(60),A,SKIP(2),
                       CCL(8),A,X(1),9(X(7),A),3(X(6),A),SKIP,CCL(8),13(A)) ;
496    1           AVGC,AVG1,AVG3,AVG4,AVG5,AVG6,AVG7,AVG8,AVG9 = C ;
497    1           MAXC,MAX1,MAX3,MAX4,MAX5,MAX6,MAX7,MAX8,MAXS  = -100 ;
498    1           MINC,MIN1,MIN3,MIN4,MIN5,MIN6,MIN7,MIN8,MINS  = BIGMAC ;
499    1            GO TO PRC (TEST) ;
500    1            PRC(1):
                    PRC(2):
                            NUMFLOW = 3 ;
501    1                       TEMP (1) = 27; TEMP (2) = 28; TEMP (3) = 23;
504    1                       PRES (1) = 22; PRES (2) = 25; PRES (3) = 26;
507    1                       PITKON (1),PITKON (2),PITKON (3) = NEG ;
508    1                       STARSEC = 1 ;  STOPSEC = 15 ;
510    1                       STARKEY = '17016371' ; STOPKEY = '17016384' ;
512    1                       GO TO READER ;
513    1             PRC(3):     NUMFLOW = 2 ;
514    1                   TEMP (1) = 17;PRES(1)= 16 ; PITKON (1) = NEG ;   /* TEST  3 */
517    1                   TEMP (2) = 15;PRES(2)= 18 ; PITKON (2) = SKG ;   /* TEST  3 */
520    1                     STARKEY = '17211484' ; STOPKEY = '17211501' ; /* TEST 3 */
522    1                     STARSEC =  1 ;  STOPSEC = 12 ;          /* TEST 3  */
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CALC: PROCEDURE OPTIONS(MAIN) ;

STMT LEVEL NEST

524     1                 GO TO READER ;
525     1           PRC(4):     NUMFLOW = 2 ;
526     1                 TEMP (1) = 17;PRES(1)= 16 ; PITKON (1) = WEG ;   /* TEST  4 */
529     1                 TEMP (2) = 19;PRES(2)= 18 ; PITKON (2) = SKG ;   /* TEST  4 */
532     1                   STARKEY = '17210182' ; STOPKEY = '17310201' ; /* TEST 4 */
534     1                   STARSEC =  1 ;  STOPSEC = 11 ;          /* TEST 4  */
536     1                   GO TO READER ;
537     1           PRC(5):     NUMFLOW = 2 ;
538     1                 TEMP (1) = 17;PRES(1)= 16 ; PITKON (1) = WEG ;   /* TEST  5 */
541     1                 TEMP (2) = 19;PRES(2)= 18 ; PITKON (2) = SKG ;   /* TEST  5 */
544     1                   STARKEY = '17610C81' ; STOPKEY = '17610104' ; /* TEST 5 */
546     1                   STARSEC = 12 ;  STOPSEC = 14 ;          /* TEST 5  */
548     1                   GO TO READER ;
549     1           PRC(6):     NUMFLOW = 2 ;
550     1                 TEMP (1) = 17;PRES(1)= 16 ; PITKON (1) = WEG ;   /* TEST  6 */
553     1                 TEMP (2) = 19;PRES(2)= 18 ; PITKON (2) = SKG ;   /* TEST  6 */
556     1                   STARKEY = '17711C74' ; STOPKEY = '17711091' ; /* TEST 6 */
558     1                   STARSEC =  4 ;  STOPSEC = 10 ;          /* TEST 6  */
560     1                   GO TO READER ;
561     1           PRC(7):     NUMFLOW = 3 ;
562     1                 TEMP (1) = 23;PRES(1)= 16 ; PITKON (1) = SKG ;   /* TEST  7 */
565     1                 TEMP (2) = 17;PRES(2)= 26 ; PITKON (2) = SKG ;   /* TEST  7 */
568     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  7 */
571     1                   STARKEY = '17915224' ; STOPKEY = '17915243' ; /* TEST 7 */
573     1                   STARSEC = 10 ;  STOPSEC = 14 ;          /* TEST 7  */
575     1                   GO TO READER ;
576     1           PRC(8):     NUMFLOW = 3 ;
577     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  8 */
580     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  8 */
583     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  8 */
586     1                   STARKEY = '18011342' ; STOPKEY = '18011362' ; /* TEST 8 */
588     1                   STARSEC = 11 ;  STOPSEC = 14 ;          /* TEST 8  */
590     1                   GO TO READER ;
591     1           PRC(9):     NUMFLOW = 3 ;
592     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  9 */
595     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  9 */
598     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  9 */
601     1                   STARKEY = '18411434' ; STOPKEY = '18411462' ; /* TEST 9 */
603     1                   STARSEC =  7 ;  STOPSEC =  8 ;          /* TEST 9  */
605     1                   GO TO READER ;
606     1           PRC(10):    NUMFLOW = 3 ;
607     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = WEG ;   /* TEST  10*/
610     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = WEG ;   /* TEST  10*/
613     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = WEG ;   /* TEST  10*/
616     1                   STARKEY = '18515261' ; STOPKEY = '18515282' ; /* TEST 10*/
618     1                   STARSEC = 10 ;  STOPSEC = 11 ;          /* TEST 10 */
620     1                   GO TO READER ;
621     1           PRC(11):    NUMFLOW = 3 ;
622     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = WEG ;   /* TEST  11*/
625     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = WEG ;   /* TEST  11*/
628     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = WEG ;   /* TEST  11*/
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STMT LEVEL NEST

631     1                 STARKEY = '18615151' ; STOPKEY = '18615211' ; /* TEST 11*/
633     1                 STARSEC =  5 ;  STOPSEC =  6 ;          /* TEST 11 */
635     1                 GO TO READER ;
636     1           PRC(12):    NUMFLDS = 3 ;
637     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = NEG ;   /* TEST  12*/
640     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = NEG ;   /* TEST  12*/
643     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = NEG ;   /* TEST  12*/
646     1                 STARKEY = '19214021' ; STOPKEY = '19214074' ; /* TEST 12*/
648     1                 STARSEC = 13 ;  STOPSEC =  6 ;          /* TEST 12 */
650     1                 GO TO READER ;
651     1           PRC(13):    NUMFLDS = 2 ;
652     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  13*/
655     1                 TEMP (2) = 19;PRES(2)= 18 ; PITKON (2) = NEG ;   /* TEST  13*/
658     1                 STARKEY = '19309114' ; STOPKEY = '19309164' ; /* TEST 13*/
660     1                 STARSEC =  7 ;  STOPSEC = 14 ;          /* TEST 13 */
662     1                 GO TO READER ;
663     1           PRC(14):    NUMFLDS = 2 ;
664     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  14*/
667     1                 TEMP (2) = 19;PRES(2)= 18 ; PITKON (2) = NEG ;   /* TEST  14*/
670     1                 STARKEY = '19315163' ; STOPKEY = '19315192' ; /* TEST 14*/
672     1                 STARSEC =  1 ;  STOPSEC =  9 ;          /* TEST 14 */
674     1                 GO TO READER ;
675     1           PRC(15):    NUMFLDS = 2 ;
676     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  15*/
679     1                 TEMP (2) = 19;PRES(2)= 18 ; PITKON (2) = SKG ;   /* TEST  15*/
682     1                 STARKEY = '21812432' ; STOPKEY = '21812462' ; /* TEST 15*/
684     1                 STARSEC =  3 ;  STOPSEC = 14 ;          /* TEST 15 */
686     1                 GO TO READER ;
687     1           PRC(16):    NUMFLDS = 2 ;
688     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  16*/
691     1                 TEMP (2) = 19;PRES(2)= 18 ; PITKON (2) = SKG ;   /* TEST  16*/
694     1                 STARKEY = '21911041' ; STOPKEY = '21911073' ; /* TEST 16*/
696     1                 STARSEC =  4 ;  STOPSEC = 13 ;          /* TEST 16 */
698     1                 GO TO READER ;
699     1           PRC(17):    NUMFLDS = 3 ;
700     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  17*/
703     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  17*/
706     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  17*/
709     1                 STARKEY = '22011124' ; STOPKEY = '22011151' ; /* TEST 17*/
711     1                 STARSEC = 11 ;  STOPSEC =  9 ;          /* TEST 17 */
713     1                 GO TO READER ;
714     1           PRC(18):    NUMFLDS = 3 ;
715     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  18*/
718     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  18*/
721     1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  18*/
724     1                 STARKEY = '22115213' ; STOPKEY = '22115241' ; /* TEST 18*/
726     1                 STARSEC =  2 ;  STOPSEC =  1 ;          /* TEST 18 */
728     1                 GO TO READER ;
729     1           PRC(19):    NUMFLDS = 3 ;
730     1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  19*/
733     1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  19*/
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STMT LEVEL NEST

736   1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  19*/
739   1                   STARKEY = '22511111' ; STOPKEY = '22511152' ; /* TEST 19*/
741   1                   STARSEC =  5 ;  STOPSEC =  1 ;          /* TEST 19 */
743   1                   GO TO READER ;
744   1           PRO(20):    NUMFLD = 3 ;
745   1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  20*/
748   1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  20*/
751   1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  20*/
754   1                   STARKEY = '22611081' ; STOPKEY = '22611104' ; /* TEST 20*/
756   1                   STARSEC =  7 ;  STOPSEC =  1 ;          /* TEST 20 */
758   1                   GO TO READER ;
759   1           PRO(21):    NUMFLD = 3 ;
760   1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  21*/
763   1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  21*/
766   1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  21*/
769   1                   STARKEY = '22710582' ; STOPKEY = '22711031' ; /* TEST 21*/
771   1                   STARSEC =  1 ;  STOPSEC =  9 ;          /* TEST 21 */
773   1                   GO TO READER ;
774   1           PRO(22):    NUMFLD = 1 ;
775   1                 TEMP (1) = 19;PRES(1)= 18 ; PITKON (1) = SKG ;   /* TEST  22*/
778   1                   STARKEY = '22715371' ; STOPKEY = '22715392' ; /* TEST 22*/
780   1                   STARSEC =  5 ;  STOPSEC =  6 ;          /* TEST 22 */
782   1                   GO TO READER ;
783   1           PRO(23):    NUMFLD = 1 ;
784   1                 TEMP (1) = 19;PRES(1)= 18 ; PITKON (1) = SKG ;   /* TEST  23*/
787   1                   STARKEY = '22815154' ; STOPKEY = '22815181' ; /* TEST 23*/
789   1                   STARSEC =  6 ;  STOPSEC = 10 ;          /* TEST 23 */
791   1                   GO TO READER ;
792   1           PRO(24):    NUMFLD = 3 ;
793   1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  24*/
796   1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  24*/
799   1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  24*/
802   1                   STARKEY = '22914151' ; STOPKEY = '22914213' ; /* TEST 24*/
804   1                   STARSEC =  5 ;  STOPSEC =  6 ;          /* TEST 24 */
806   1                   GO TO READER ;
807   1           PRO(25):    NUMFLD = 3 ;
808   1                 TEMP (2) = 17;PRES(2)= 16 ; PITKON (2) = SKG ;   /* TEST  25*/
811   1                 TEMP (3) = 19;PRES(3)= 18 ; PITKON (3) = SKG ;   /* TEST  25*/
814   1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  25*/
817   1                   STARKEY = '23411123' ; STOPKEY = '23411152' ; /* TEST 25*/
819   1                   STARSEC =  1 ;  STOPSEC = 13 ;          /* TEST 25 */
821   1                   GO TO READER ;
822   1           PRO(26):    NUMFLD = 1 ;
823   1                 TEMP (1) = 19;PRES(1)= 18 ; PITKON (1) = SKG ;   /* TEST  26*/
826   1                   STARKEY = '23414054' ; STOPKEY = '23414123' ; /* TEST 26*/
828   1                   STARSEC =  1 ;  STOPSEC = 10 ;          /* TEST 26 */
830   1                   GO TO READER ;
831   1           PRO(27):    NUMFLD = 1 ;
832   1                 TEMP (1) = 23;PRES(1)= 26 ; PITKON (1) = SKG ;   /* TEST  27*/
835   1                   STARKEY = '23511393' ; STOPKEY = '23511452' ; /* TEST 27*/
837   1                   STARSEC =  1 ;  STOPSEC =  8 ;          /* TEST 27 */
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STMT LEVEL NEST

839     1                   GO TO READER ;
840     1             PRC(20):    NUMFLDS = 1 ;
841     1                   TEMP (1) = 19;PRES(1)= 18 ; PITCH (1) = SKG ;   /* TEST  20*/
844     1                     STARKEY = '23514C14' ; STOPKEY = '23514C42' ; /* TEST 20*/
846     1                     STARSEC =  1 ;  STOPSEC =  4 ;          /* TEST 20 */
848     1                   READER:
                          N2 = SUBSTR (STARKEY,8,1) ;
849     1                 N2 = (N2 - 1) * 15 + STARSEC - 1 ;
850     1                 PUT FILE (G4) EDIT ('COKE OVEN EMISSION REPORT','TEST',TEST,'OVEN',
                           OVEN,REM,'DATE',MONTH,DAY,', 1973','MRI TEST',MRI,'START TIME',
                         SUBSTR(STARKEY,4,2),':',SUBSTR(STARKEY,6,2),':',
                                        N2,'END','FIVE','FIVE SECOND AVERAGE','INC',
                        'SECOND','TOTAL',('-' DO I = 1 TO 116),'SEC','VOLUME',(LABEL (I) DO I =
                        1,3,4,5,6,9,0,6),SUBSTR(LABEL(7),1,5),'CND','FLOW',('MEAS','CORR' DO I
                           = 1 TO 6),
                           ('MEAS' DO I = 1 TO 3),' ')
                        (PAGE,COL(5C),A,SKIP(2),A,F(4),COL(7O),A,X(1),A,X(2),A,SKIP,A,X(1),A,
                        X(1),A,A,COL(7C),A,X(2),A,SKIP,A,X(2),4(A),P'99',SKIP(3),A,COL(7),A,
                           COL(6C),A,SKIP,A,COL(6),A,SKIP,COL(7),A,COL(15),11E(A),SKIP,A,
                           COL(6),A,COL(15),5(A,X(5)),A,X(5),2(A,X(1)),A,A,COL(7),A,
                           COL(16),15(A,X(4)),SKIP(2),55(A)) ;
851     1                     GO TO READ ;
852     1                  END CALC ;
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
7	AC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 325,325,324,335,335,336,338
7	A1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 173,173,179,181,181,183,184
7	A2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE)
7	A3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 195,195,205,207,207,209,210
7	A4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 224,224,230,232,232,234,235
7	A5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 251,251,257,259,259,261,262
7	A6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 351,351,356,357,357,358,359
7	A7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 372,372,377,378,378,379,380
7	A8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 277,277,283,285,285,287,288
7	A9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 302,302,308,310,310,312,313
20	ACTFLG	IN CCMPFL(14) IN SECREC(15) IN OUTFR,BASED(R),ALIGNED,DECIMAL, FLOAT(SINGLE)
15	AF	IN FLOWS(14) IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL, FLOAT(SINGLE) 85,99,100,102,102,102,103,104,110,113,118,164,165,166,170,171,190 191,195,196,197,215,216,220,221,222,242,243,247,248,249,266,269,273 274,275,293,294,298,299,300,320,321,325,326,327,342,343,347,348,349 363,364,368,369,370
15	AFTCT	(3)AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 103,103,391,391,394,398
15	AGRAFF	(0:120)AUTOMATIC,UNALIGNED,STRING(1),BIT 121,121
15	ALINES	AUTOMATIC,DEFINED,UNALIGNED,STRING(121),CHARACTER 38,135,146

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
6	ANC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 447,45C,481
6	ANCC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 44E,45C,479,481
6	ANC1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 404,408,479,481
6	ANC3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 412,416,479,481
6	ANC4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 421,424,479,481
6	ANC5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 428,432,479,481
6	ANC6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 452,456,479
6	ANC7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 457,461,479
6	ANC8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 434,438,479
6	ANC9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 439,443,479
6	AN1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 405,408,479,481
6	AN3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 413,416,479,481
6	AN4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 42C,424,479,481
6	AN5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 429,432,479,481
6	AN6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 453,456
6	AN7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 45E,461
6	AN8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 435,43E,479

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
6	ANS	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 44C,443,47S
19	AT1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE)
19	AT1MAX	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE)
19	AT1MIN	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE)
19	AT2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE)
19	AT2MAX	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE)
19	AT2MIN	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE)
19	AT3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE)
19	AT3MAX	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE)
19	AT3MIN	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE)
19	ATMUM	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE)
7	AV	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 137,137,149,149,15C,151,152
6	AVCC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 322,322,447,448,44E,45C,496
12	AVCC0	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 325,325,44E,44S,44S,45C,485
12	AVCC1	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 16E,16E,4C4,4C7,4C7,4C8,485
12	AVCC2	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 485
12	AVCC3	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 19S,19S,412,415,415,416,485
12	AVCC4	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 22C,22C,421,423,423,424,485
12	AVCC5	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 247,247,428,431,431,432,485
12	AVCC6	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 347,347,452,455,455,456,485

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
12	AVGC7	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 3EE,3E8,457,46C,46C,461,485
12	AVGCE	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 273,273,434,437,437,438,485
12	AVGCS	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 29E,298,439,442,442,443,485
6	AVG1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 167,167,405,406,4CE,4CE,496
6	AVG2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 192,192,413,414,414,416,496
6	AVG4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 217,217,420,422,422,424,496
6	AVG5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 244,244,429,430,430,432,496
6	AVG6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 344,344,453,454,454,456,496
6	AVG7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 365,365,458,459,459,461,496
6	AVG8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 27C,27C,435,436,436,438,496
6	AVG9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 295,295,440,441,441,443,496
2C	AVGTEMP	(3)AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 44,1C7,1C7,393,393,394,395
5	AX	AUTOMATIC,UNALIGNED,INITIAL,STRING(1C),CHARACTER 494,494,494,494,494,494,494,494,494,494,494,494,495,495,495,495,495 495,495,495,495,495,495,495
13	BIGMAC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 48,487,498
14	BILLS	IN OUTHEAD,BASED(R),UNALIGNED,STRING(340),CHARACTER 490
20	BLANK7	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 38,146,154,162,24C,318,402,41C,41E,426,444
1S	C	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(16,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
10	C1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 174,174,180,182,182,183,186
10	C2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE)
10	C3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 200,200,206,208,208,209,212
10	C4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 225,225,231,233,233,234,237
10	C5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 252,252,258,260,260,261,264
10	C8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 278,278,284,286,286,287,290
10	C9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 303,303,309,311,311,312,315
1	CALC	ENTRY,DECIMAL,FLOAT(SINGLE)
19	CHCC	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CHCC	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 156,320,329
19	CHC1	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CHC1	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 164,173,174
19	CHC2	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CHC2	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CHC3	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CHC3	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 190,199,200
19	CHC4	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
19	CHC4	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 215,224,225
19	CHC5	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CHC5	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 242,251,252

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	CHC6	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CHC6	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 157,157,342,351
19	CHC7	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
19	CHC7	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 158,158,363,372
19	CHC8	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,4)
19	CHC8	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 159,159,268,277,278
19	CHC9	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CHC9	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 160,160,293,302,303
19	CHCC	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
19	CHCC	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CHCD	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,0)
19	CHCD	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CHCE	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CHCE	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CHCF	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
19	CHCF	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE) 93,104
19	CHD0	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,4)
19	CHD0	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CHD1	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CHD1	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CHD2	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CHD2	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CHD3	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	CH19	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH20	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CH20	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH21	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CH21	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH22	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CH22	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH23	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CH23	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH24	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CH24	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH25	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CH25	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH30	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CH30	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH31	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CH31	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH32	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CH32	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH34	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CH34	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH36	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CH36	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH37	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CH37	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH35	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	CH39	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH4C	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CH4C	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH41	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CH41	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH42	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CH42	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH43	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CH43	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH44	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CH44	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH45	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,3)
19	CH45	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
19	CH4E	IN SECREC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CH4E	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CH53	IN SECREC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CH53	IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
20	CHAA	IN CHCVLY(29) IN SECREC(15) IN OUTER,BASED(R),ALIGNED,DECIMAL, FLOAT(SINGLE) 92,92,93,93,1C4,1C7,1CE,1C9
20	CHCVLY	(25)IN SECREC(15) IN OUTER,BASED(R),STRUCTURE
20	CCHFFL	(14)IN SECREC(15) IN OUTER,BASED(R),STRUCTURE
17	DATHEAD	AUTOMATIC,DEFINED,UNALIGNED,STRING(240),CHARACTER 48E
19	DATSEC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 86,86,385,393,406,407,414,415,422,423,430,431,436,437,441,442,448 449,454,455,459,4EC,4E2,4E3,4E4,4E5,4E6,4E7,4EE,4E9,47C,471,472,473 474,475,476,477,484

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
16	DAY	IN HEADER,AUTOMATIC,UNALIGNED,STRING(2),CHARACTER 493,85C
15	ECF	AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 30,35,491
19	ERRCODE	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 24,25
8	FIVSEC	AUTOMATIC,ALIGNED,BINARY,FIXED(16,0) 83,84,147,175,201,226,253,275,304,330,352,373
19	FLDNS	7141IN SECREC(15) IN OUTREC,BASED(P),STRUCTURE
	G1	FILE,EXTERNAL 21,135,464
	G2	FILE,EXTERNAL 21,136,465
	G4	FILE,EXTERNAL 21,150,182,209,234,261,287,312,336,356,379,478,479,850
9	GAP	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 90,101,101,136,139,140,141,142,143,144,144,165,174,191,200,216,225 243,252,269,278,294,303,321,343,364
16	HEADER	AUTOMATIC,STRUCTURE
19	HF	IN INREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
19	I	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(16,0) 43,44,45,46,81,82,84,85,85,87,89,89,92,92,93,93,93,99,100,102,102 102,103,104,104,104,104,105,105,105,106,107,108,109,110,113,113,118 118,122,125,125,130,130,135,136,137,155,156,157,157,158,158,159,159 160,160,164,164,164,165,165,166,167,166,169,170,171,173,174,190,190 190,191,191,192,193,194,195,196,197,199,200,215,215,215,216,216,217 218,219,220,221,222,224,225,242,242,242,243,243,244,245,246,247,248 249,251,252,268,268,268,269,269,270,271,272,273,274,275,277,278,293 293,293,294,294,295,296,297,298,299,300,302,303,320,320,320,321,321 322,323,324,325,326,327,329,342,342,342,343,343,344,345,346,347,348 349,351,363,363,363,364,364,365,366,367,368,369,370,372,390,391,391 392,392,393,393,394,394,394,394,394,394,394,395,396,397,398,398 493,493,850,850,850,850,850
38	INITIAL	STATEMENT LABEL CONSTANT
18	INPUT	FILE,EXTERNAL,RECORD,INPUT,SEQUENTIAL,BUFFERED,ENVIRONMENT(F(7712, 1928)) 23,49

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	INREC	BASED(Q),STRUCTURE
19	J	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(16,0) 51,52,52,93,53,99,59,1C0,1C2,1C3,1C3,1C3,1C4,1C4,1C4,1C5,1C6,1C6,1C6 107,107,107,10E,10E,1CE,1C9,1C9,1C9,110,113,113,118,118,121,122,125 125,13C,13C,133
19	JC	IN INREC,BASED(Q),UNALIGNED,STRING(3),CHARACTER 5C
19	K	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(16,0)
19	KEY	IN OUTREC,BASED(R),UNALIGNED,STRING(8),CHARACTER 59
16	KEYIC	IN HEADER,AUTOMATIC,UNALIGNED,STRING(3),CHARACTER 493
16	KEYREC	IN HEADER,AUTOMATIC,UNALIGNED,STRING(7),CHARACTER 493
20	KEYS	IN OUTER,BASED(R),UNALIGNED,STRING(8),CHARACTER
19	L	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(16,0) 483
16	LABEL	(0:38)IN HEADER,AUTOMATIC,UNALIGNED,STRING(7),CHARACTER 154,162,240,318,402,40E,41C,416,418,424,426,432,43E,443,444,45C,456 461,493,85C,85C
20	LIM12CC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 11C,122
19	MARK	(4)AUTOMATIC,UNALIGNED,INITIAL,STRING(8),BIT 121,133
	MAX	GENERIC,BUILT-IN FUNCTION 10E,16E,17C,193,19E,219,221,245,248,271,274,296,299,323,326,345,348 36E,369
6	MAX0	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 323,323,450,497
12	MAXCC	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 32E,326,450,486
12	MAXC1	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 17C,17C,4C8,486
12	MAXC2	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 48E

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
12	MAXC3	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 196,196,416,486
12	MAXC4	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 221,221,424,486
12	MAXC5	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 248,248,432,486
12	MAXC6	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 346,346,456,486
12	MAXC7	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 365,365,461,486
12	MAXC8	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 274,274,438,486
12	MAXC9	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 299,299,443,486
6	MAX1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 168,168,408,497
6	MAX3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 193,193,416,497
6	MAX4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 219,219,424,497
6	MAX5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 245,245,432,497
6	MAX6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 345,345,456,497
6	MAX7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 366,366,461,497
6	MAX8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 271,271,438,497
6	MAX9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 296,296,443,497
20	MAXTEMP	(3)AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 45,1CE,106,394,396
	MIN	GENERIC,BUILT-IN FUNCTION 109,169,171,194,197,218,222,246,249,272,275,297,300,324,327,346,349

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		367,37C
6	MINC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 324,324,450,498
12	MINCC	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 327,327,450,4E7
12	MINC1	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 171,171,4CE,4E7
12	MINC2	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 487
12	MINC3	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 197,197,416,4E7
12	MINC4	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 222,222,424,4E7
12	MINC5	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 249,249,432,4E7
12	MINC6	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 349,349,456,4E7
12	MINC7	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 37C,37C,461,4E7
12	MINC8	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 275,275,438,4E7
12	MINC9	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 30C,300,443,4E7
6	MIN1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 169,169,408,496
6	MIN3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 194,194,416,498
6	MIN4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 21E,218,424,498
6	MIN5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 24E,246,432,498
6	MIN6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 34E,34E,456,498
6	MIN7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		367,367,461,498
6	MIN8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 272,272,436,498
6	MIN9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 297,297,443,498
20	MINTEMP	(3)AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 46,109,109,394,397
19	MINUTE	IN INREC,BASED(C),UNALIGNED,STRING(2),CHARACTER
	MOD	GENERIC,BUILT-IN FUNCTION 84
14	MOJUNK	IN OUTHEAD,BASED(R),UNALIGNED,STRING(3060),CHARACTER
16	MONTH	IN HEADER,AUTOMATIC,UNALIGNED,STRING(12),CHARACTER 493,85C
16	MOVHEAD	BASED(C),UNALIGNED,STRING(240),CHARACTER 488,49C
16	MR1	IN HEADER,AUTOMATIC,UNALIGNED,STRING(3),CHARACTER 493,85C
7	N0	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 326,328,332,335,337
7	N1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 172,172,177,181,182,185
7	N2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 848,849,849,850
7	N3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 198,198,203,207,208,211
7	N4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 223,223,228,232,233,236
7	N5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 250,250,255,259,260,263
7	N6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 350,350,354,357,360
7	N7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 371,371,375,378,381

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
7	NE	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 276,276,281,285,286,289
7	NS	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 301,301,306,310,311,314
20	NEGALP	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 97,97,400,484
19	NUKEY	BASED(Q),UNALIGNED,STRING(8),CHARACTER 53,53,59,61,65,79
19	NUMFLDN	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(16,0) 91,140,143,390,500,513,525,537,549,561,576,591,606,621,636,651,663 675,687,699,714,729,744,759,774,783,792,807,822,831,840
387	NUTEST	STATEMENT LABEL CONSTANT 31,36,51
	ONCHAR	BUILT-IN FUNCTION 29
	ONCODE	BUILT-IN FUNCTION 24,29
	ONLOC	BUILT-IN FUNCTION 29
	ONSOURCE	BUILT-IN FUNCTION 29
20	OUTER	BASED(R),STRUCTURE
14	OUTHEAD	BASED(R),STRUCTURE 489
18	OUTPUT	FILE,EXTERNAL,RECORD,OUTPUT,SEQUENTIAL,BUFFERED 60,489
19	OUTREC	BASED(R),STRUCTURE 60
16	OVEN	IN HEADER,AUTOMATIC,UNALIGNED,STRING(4),CHARACTER 493,850
20	PITKEN	(3)AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 59,507,507,507,516,519,528,531,540,543,552,555,564,567,570,575,582 585,594,597,600,609,612,615,624,627,630,639,642,645,654,657,666,669 678,681,690,693,702,705,708,717,720,723,732,735,738,747,750,753,762 765,768,777,786,795,798,801,810,813,816,825,834,843

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	FITCT	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 39,4C
20 *********	PRES	(3)AUTOMATIC,ALIGNED,BINARY,FIXED(8,0) 53,394,5C4,5C5,5C6,515,516,527,53C,539,542,551,554,563,566,569,578 581,584,593,596,599,608,611,614,623,626,629,638,641,644,653,656,665 66E,677,68C,689,692,7C1,7C4,7C7,716,719,722,731,734,737,746,749,752 761,764,767,776,785,794,797,8CC,8C9,812,815,824,833,842
15	PPC	(2E)AUTOMATIC,INITIAL,LABEL 5CC,5CC,513,525,537,549,561,576,591,6C6,621,636,651,663,675,687,699 714,729,744,759,774,783,792,8C7,822,831,840,499
	Q	AUTOMATIC,ALIGNED,POINTER 49,5C,53,53,59,61,65,69,69,71,71,72,73,73,74,75,75,76,77,77,78,79,79 79,79,87,89,488,49C
19	QTF	IN INREC,BASED(Q),UNALIGNED,STRING(1),CHARACTER 69,69,72,74,76,78,79
11	R	AUTOMATIC,ALIGNED,POINTER 59,6C,6C,85,85,89,92,92,93,93,99,1CC,1C2,1C2,1C2,1C3,1C4,1C4,1C4 1C4,1C5,1C5,1C5,1C6,1C7,1CE,1C9,11C,113,11E,122,125,13C,135,13E,137 15C,156,157,157,158,158,159,159,16C,16C,164,164,164,165,165,166,167 16E,169,17C,171,173,174,19C,19C,19C,191,191,192,193,194,195,196,197 199,2CC,21E,21E,21E,216,216,217,21E,21E,22C,221,222,224,225,242,242 242,243,243,244,245,246,247,248,249,251,252,268,268,26E,269,269,270 271,272,273,274,275,277,27E,292,293,293,294,294,295,296,297,298,299 3CC,3C2,3C3,32C,32C,32C,321,321,322,323,324,325,326,327,329,342,342 342,342,343,344,345,346,347,34E,349,351,363,363,363,364,364,365,366 367,368,369,37C,372,485,49C
49	REAC	STATEMENT LABEL CONSTANT 54,386,851
84E	READER	STATEMENT LABEL CONSTANT 512,524,536,548,56C,575,59C,6C5,62C,635,65C,662,674,686,698,712,728 742,75E,773,7E2,791,E06,821,83C,839
19	RECIN	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 52,52,2E9,484
14	REM	IN HEADER,AUTOMATIC,UNALIGNED,STRING(34),CHARACTER 493,85C
	REPC	FILE,EXTERNAL 21,389,394,4C1,4CE,416,424,432,43E,443,45C,456,461
19	SEC	IN SECPEC(15) IN INREC,BASED(C),UNALIGNED,STRING(2),CHARACTER 71,71,73,73,75,75,77,77,79,79,87

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	SEC	IN SECREC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(2),CHARACTER 135,136,150
20	SEC	IN SECREC(15) IN OUTER,BASED(R),UNALIGNED,STRING(2),CHARACTER
19	SECREC	(15)IN INREC,BASED(Q),STRUCTURE 89
19	SECREC	(15)IN OUTREC,BASED(R),STRUCTURE 89
20	SECREC	(15)IN OUTER,BASED(R),STRUCTURE
19	SF	IN FLOWS(14) IN SECREC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL, FLOAT(SINGLE) 85,104,105,105,105,106,122,125,130,137,164,165,167,168,169,150,151 192,193,194,215,216,217,218,219,242,243,244,245,246,268,269,270,271 272,293,294,295,296,297,320,321,322,323,324,342,343,344,345,346,363 364,365,366,367
19	SFTOT	(3)AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 106,106,352,352,354,358
19	SGRAPH	(0:120)AUTOMATIC,UNALIGNED,STRING(8),BIT 133,132
19	SKG	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 40,40,42,519,531,543,555,564,567,570,579,582,585,594,597,600,654,666 678,681,690,693,702,705,708,717,720,723,732,735,738,747,750,753,762 765,768,777,786,795,798,801,810,813,816,825,834,843
19	SLINES	AUTOMATIC,DEFINED,UNALIGNED,STRING(121),CHARACTER 38,136,146
3	SP	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 404,405,412,413,420,421
	SQRT	GENERIC,BUILT-IN FUNCTION 39,40,99
4	ST	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 428,429,434,435,439,440,446,447,452,453,457,458
15	STARKEY	AUTOMATIC,UNALIGNED,STRING(8),CHARACTER 53,61,510,520,532,544,556,571,586,6C1,616,631,646,65E,67C,682,694 7C9,724,739,754,769,778,7E7,8C2,817,826,835,844,848,85C,85C
15 *********	STARSEC	AUTOMATIC,ALIGNED,BINARY,FIXED(8,0) 63,508,522,534,546,55E,573,58E,603,618,633,648,660,672,684,696,711 726,741,756,771,780,789,804,819,828,837,846,849

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
15	********* START	AUTOMATIC,ALIGNED,BINARY,FIXED(8,0) 57,58,63,81
20	STCFLCH	IN COMPFL(14) IN SECREC(15) IN OUTER,BASED(R),ALIGNED,DECIMAL, FLOAT(SINGLE)
19	STCHCH	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 41,42,104
15	********* STCP	AUTOMATIC,ALIGNED,BINARY,FIXED(8,0) 55,56,67,81,82
15	STCPKEY	AUTOMATIC,UNALIGNED,STRING(8),CHARACTER 53,65,511,521,533,545,557,572,587,602,617,632,647,659,671,683,695 710,725,740,755,770,779,788,803,818,827,836,845
15	********* STCPSEC	AUTOMATIC,ALIGNED,BINARY,FIXED(8,0) 67,509,523,535,547,559,574,585,604,619,634,649,661,673,685,697,712 727,742,757,772,781,790,805,820,829,838,847
	SUBSTR	GENERIC,BUILT-IN FUNCTION 648,850,850,850
20	SWCVLY	(10)IN SECREC(15) IN OUTER,BASED(R),STRUCTURE
20	SWTP	IN SWCVLY(10) IN SECREC(15) IN OUTER,BASED(R),UNALIGNED,STRING (1),CHARACTER
	SYSPRINT	FILE,EXTERNAL 21,25,29,42,48,79,113,118,125,130,400,493
2	TA0	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 334,334,463,463,478,482
2	TA1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 179,179,464,464,478,482
2	TA3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 205,205,466,466,478,482
2	TA4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 230,230,468,468,478,482
2	TA5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 257,257,470,470,478,482
2	TA6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 356,356,472,472,478,482
2	TA7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 377,377,473,473,478,482

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
2	TAE	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 283,283,474,474,478,482
2	TAS	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 30E,30E,47E,47E,478,482
2	TC1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 18C,18C,465,465,47E,482
2	TC3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 2C6,2C6,467,467,478,482
2	TC4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 231,231,469,469,478,482
2	TC5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 25E,25E,471,471,478,482
2	TC8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 284,284,475,475,478,482
2	TCS	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 309,309,477,477,478,482
2C	********* TEMP	(3)AUTOMATIC,ALIGNED,BINARY,FIXED(8,0) 92,92,93,104,107,108,109,394,501,502,503,514,517,526,529,538,541,550 552,562,565,568,577,580,583,592,595,598,607,610,613,622,625,628,637 64C,643,652,655,664,667,676,679,688,691,7CC,7C3,7C6,715,71E,721,730 733,736,745,748,751,760,763,766,775,784,793,796,799,808,811,814,823 832,841
16	********* TEST	IN HEADER,AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 387,389,400,493,494,495,499,850
2	TF	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 151,151,462,479,482
2C	TN	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 93,94,96,99,110,111,113,114,11E,11E,119,121,121,122,122,125,126,128 13C,131,133,133,156,157,15E,159,160,462,478.
14	VALUES	(52)IN OUTHEAD,BASED(R),ALIGNED,DECIMAL,FLOAT(SINGLE)
2C	VASP	AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 135,13E
19	VEC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 39,39,42,507,516,528,540,552,609,612,615,624,627,630,639,642,645,657 669

SYNTAX CHECK COMPLETED. COMPILATION CONTINUES.

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
19	AFTCT	12
19	AGRAPH	121
20	AVGTEMP	12
16	HEADER	240
19	INREC	1928
19	MARK	4
20	MAXTEMP	12
20	MINTEMP	12
20	OLTER	3600
14	OLTHEAD	3600
19	OUTREC	3600
20	PITKCN	12
20	PRES	6
19	PRC	224
19	SFTCT	12
19	SGRAPH	121
20	TEMP	6

STORAGE REQUIREMENTS.

THE STORAGE AREA FOR THE PROCEDURE LABELLED CALC IS 3028 BYTES LONG.

THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 23 IS 764 BYTES LONG.

THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 28 IS 812 BYTES LONG.

THE STORAGE AREA FOR THE ON UNIT AT STATEMENT NO. 34 IS 760 BYTES LONG.

THE PROGRAM CSECT IS NAMED CALC AND IS 38328 BYTES LONG.

THE STATIC CSECT IS NAMED ***CALC# AND IS 4897 BYTES LONG.

STATISTICS SOURCE RECORDS = 640,PROC TEXT STMNTS = 852,OBJECT BYTES = 38328

COMPILER DIAGNOSTICS.

ERRORS.

IEM1105I 15 THE DATA CHARACTERISTICS OF SLINES DECLARED IN STATEMENT NUMBER 15 DO NOT MATCH THOSE OF THE DEFINING BASE.

IEM1105I 15 THE DATA CHARACTERISTICS OF ALINES DECLARED IN STATEMENT NUMBER 15 DO NOT MATCH THOSE OF THE DEFINING BASE.

IEM1104I 17 THE DEFINING OF DATHEAD DECLARED IN STATEMENT NUMBER 17 INVOLVES DATA NOT ALLOWED FOR STRING CLASS OVERLAY DEFINING.

WARNINGS.

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS. SYSIN/SYSPRINT HAS BEEN ASSUMED IN EACH CASE.

IEM1790I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS 41, 848.

IEM3858I COMPILER CORE REQUIREMENT EXCEEDED SIZE GIVEN. AUXILIARY STORAGE USED.

END OF DIAGNOSTICS.

AUXILIARY STORAGE WILL NOT BE USED FOR DICTIONARY WHEN SIZE = 104K

COMPILE TIME 1.32 MINS

Continuous Results

The following tables contain the data reduction results in five second intervals from the continuous gas program. Column one gives the ending second for each five second interval. The start time is listed in the heading. The second column is the total volume of emissions in scf for each five second interval. The remaining 15 columns give the average constituent concentrations over each five second interval. The corrected concentrations were determined using equation (10). The row marked "avg." gives the average concentration of each constituent for columns 3 through 17 and the average volume flow in scfm in column two. Row "Tot." gives the total volume (scf) emitted of each constituent and column two of that row gives the total volume from all points measured during the given test. The second set of tables give the calculated volume flow for each of the five constituents per location monitored for each test. They were calculated using the measured and corrected concentrations and the assumption that constituent flow is proportional to volume flow. The average volume emitted per test was determined using these charts.

COKE OVEN EMISSION REPORT

TEST 2
DATE JUNE 19, 1973
START TIME 16:37:00

OVEN 3-3 MRI ACTIVATED MANUALLY - BEAT BOOM
MRI TEST W1

END SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NO2		% THC		% CO		% CO2		% H2O	% H2 *	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
04	22	176.6	264.8	0.0	0.0	0.0	0.0	0.52	0.78	0.38	0.57	0.0	0.0	0.2	0.0	18.3
09	14	118.4	206.6	0.0	0.0	0.0	0.0	1.18	2.13	0.45	0.80	0.0	0.0	0.2	0.0	18.5
14	9	87.2	226.0	0.0	0.0	0.0	0.0	0.90	2.40	0.34	0.92	0.0	0.0	0.2	0.0	18.9
19	8	60.3	156.9	0.2	0.3	0.0	0.0	0.50	1.32	0.23	0.61	0.0	0.0	0.3	0.0	19.2
24	7	49.8	132.5	0.8	2.2	0.0	0.0	0.24	0.63	0.19	0.52	0.0	0.0	0.3	0.0	19.5
29	4	36.6	96.7	0.4	0.0	0.0	0.0	0.12	0.30	0.19	0.45	0.0	0.0	0.3	0.0	19.8
34	9	34.2	102.7	0.1	0.2	0.0	0.0	0.06	0.18	0.17	0.51	0.0	0.0	0.2	0.0	19.9
39	1	24.2	15.0	0.2	0.0	0.0	0.0	0.00	0.00	0.16	0.11	0.0	0.0	0.3	0.0	19.9
44	5	30.2	75.4	0.2	0.6	0.0	0.0	0.00	0.00	0.15	0.41	0.0	0.0	0.6	0.0	19.8
49	5	10.6	25.4	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.35	0.0	0.0	1.1	0.0	19.8
54	8	11.2	33.6	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.41	0.0	0.0	1.2	0.0	19.8
59	8	7.4	22.1	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.41	0.0	0.0	1.2	0.0	19.8
04	7	5.4	16.2	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.42	0.0	0.0	1.1	0.0	19.8
09	6	4.0	12.0	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.41	0.0	0.0	1.1	0.0	19.9
14	5	1.5	4.6	0.0	0.0	0.0	0.0	0.00	0.00	0.13	0.40	0.0	0.0	1.1	0.0	20.0
19	6	0.0	0.0	0.4	1.2	0.0	0.0	0.00	0.00	0.14	0.43	0.0	0.0	1.1	0.0	20.1
24	7	1.8	5.3	0.2	0.6	0.0	0.0	0.00	0.00	0.14	0.42	0.0	0.0	1.1	0.0	20.1
29	6	0.0	0.0	0.2	0.6	0.0	0.0	0.00	0.00	0.14	0.41	0.0	0.0	1.2	0.0	20.3
34	6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.15	0.46	0.0	0.0	1.2	0.0	20.3
39	5	2.0	6.0	0.2	0.6	0.0	0.0	0.00	0.00	0.14	0.42	0.0	0.0	1.2	0.0	20.2
44	6	0.8	2.4	0.2	0.6	0.0	0.0	0.00	0.00	0.12	0.37	0.0	0.0	1.2	0.0	20.3
49	6	0.2	0.6	0.2	0.6	0.0	0.0	0.00	0.00	0.13	0.39	0.0	0.0	1.2	0.0	20.3
54	6	2.8	8.4	0.2	0.6	0.0	0.0	0.00	0.00	0.15	0.45	0.0	0.0	1.2	0.0	20.3
59	7	1.6	4.8	0.0	0.0	0.0	0.0	0.00	0.00	0.13	0.39	0.0	0.0	1.2	0.0	20.3
AVG	86	27.8	59.9	0.1	0.3	0.0	0.0	0.15	0.32	0.18	0.46	0.0	0.0	0.6	0.0	19.8
TOT	171			1.9E-05	5.1E-05	0.0E+00	0.0E+00	4.3E-01	8.1E-01	3.7E-01	8.6E-01	0.0E+00	0.0E+00	1.3E+00	0.0E+00	3.4E+01

COKE OVEN EMISSION REPORT

TEST 3
DATE JUNE 21, 1973
START TIME 11:48:45

OVEN 3-8 DIFF. PRES. PITOT PLUGGED
PRI TEST W2

ENDING SECOND	FIVE SECOND TOTAL VOLUME FLOW	PPM SO2 MEAS	PPM SO2 CORR	PPM NO MEAS	PPM NO CORR	PPM NO2 MEAS	PPM NO2 CORR	% THC MEAS	% THC CORR	% CO MEAS	% CO CORR	% CO2 MEAS	% CO2 CORR	% H2O MEAS	% H2 * MEAS	% O2 D MEAS
FIVE SECOND AVERAGE																
49	27	13.5	13.5	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	4.0	0.0	19.1
54	27	31.0	31.0	0.0	0.0	0.0	0.0	0.00	0.00	0.15	0.15	0.3	0.3	4.3	0.0	19.0
59	27	39.2	39.2	0.0	0.0	0.0	0.0	0.00	0.00	0.26	0.26	0.3	0.3	4.4	0.0	18.8
04	27	53.8	53.8	0.0	0.0	0.0	0.0	0.00	0.00	0.40	0.40	0.4	0.4	4.6	0.0	18.7
09	27	66.2	66.2	0.0	0.0	0.0	0.0	0.00	0.00	0.50	0.50	0.4	0.4	5.0	0.0	18.5
14	27	83.6	83.6	0.0	0.0	0.0	0.0	0.00	0.00	0.53	0.53	0.4	0.4	5.0	0.0	18.5
19	27	97.5	97.5	0.0	0.0	0.0	0.0	0.00	0.00	0.56	0.56	0.3	0.3	5.2	0.0	18.4
24	27	110.2	110.2	0.0	0.0	0.0	0.0	0.00	0.00	0.61	0.61	0.3	0.3	5.3	0.0	18.4
29	27	134.9	134.9	0.0	0.0	0.0	0.0	0.00	0.00	0.79	0.79	0.3	0.3	5.3	0.0	18.2
34	26	158.9	158.9	0.0	0.0	0.0	0.0	0.00	0.00	0.94	0.94	0.4	0.4	5.6	0.0	18.0
39	26	167.9	167.9	0.0	0.0	0.0	0.0	0.00	0.00	1.15	1.15	0.5	0.5	5.7	0.0	17.9
44	26	186.2	186.2	0.0	0.0	0.0	0.0	0.00	0.00	1.49	1.49	0.5	0.5	6.0	0.0	17.6
49	26	203.8	203.8	0.0	0.0	0.0	0.0	0.00	0.00	1.58	1.58	0.6	0.6	6.4	0.0	17.3
54	26	197.6	197.6	0.0	0.0	0.0	0.0	0.00	0.00	1.29	1.29	0.4	0.4	6.4	0.0	17.3
59	26	175.7	175.7	0.0	0.0	0.0	0.0	0.00	0.00	1.02	1.02	0.4	0.4	6.2	0.0	17.5
04	26	160.6	160.6	0.0	0.0	0.0	0.0	0.00	0.00	1.18	1.18	0.5	0.5	5.6	0.0	17.6
09	26	146.9	146.9	0.0	0.0	0.0	0.0	0.00	0.00	1.15	1.15	0.4	0.4	5.4	0.0	17.6
11	11	156.1	156.1	0.0	0.0	0.0	0.0	0.00	0.00	0.99	0.99	0.3	0.3	5.3	0.0	17.7
AVG	318	120.1	120.1	0.0	0.0	0.0	0.0	0.00	0.00	0.81	0.81	0.4	0.4	5.2	0.0	18.1
TOT	461			0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E+00	3.7E+00	1.8E+00	1.8E+00	2.5E+01	4.0E-03	8.4E+01

COKE OVEN EMISSION REPORT

TEST 4
DATE JUNE 22, 1973
START TIME 10:18:15

OVEN 3-3 DIFF. PRES. PITOT PLUGGED
PRI TEST W3

ENDING SECOND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 *	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
19	24	3.3	3.3	0.1	0.1	0.0	0.0	0.00	0.00	0.04	0.04	0.1	0.1	1.4	0.0	19.3
24	24	13.0	13.0	0.3	0.3	0.0	0.0	0.00	0.00	0.03	0.03	0.1	0.1	1.4	0.0	19.3
29	24	19.2	19.2	0.6	0.6	0.0	0.0	0.00	0.00	0.06	0.06	0.2	0.2	1.4	0.0	19.3
34	24	11.1	11.1	0.6	0.6	0.1	0.1	0.00	0.00	0.10	0.10	0.2	0.2	1.5	0.0	19.1
39	24	24.0	24.0	0.8	0.8	0.1	0.1	0.00	0.00	0.09	0.09	0.2	0.2	1.6	0.0	19.1
44	24	25.7	25.7	0.9	0.9	0.0	0.0	0.00	0.00	0.07	0.07	0.2	0.2	1.5	0.0	19.1
49	24	25.1	25.1	0.9	0.9	0.0	0.0	0.00	0.00	0.09	0.09	0.1	0.1	1.6	0.0	19.1
54	24	26.8	26.8	0.9	0.9	0.0	0.0	0.00	0.00	0.06	0.06	0.2	0.2	1.6	0.0	19.2
59	24	25.7	25.7	0.9	0.9	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	1.5	0.0	19.2
04	24	26.6	26.6	0.9	0.9	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	1.6	0.0	19.2
09	24	38.2	38.2	0.9	0.9	0.0	0.0	0.00	0.00	0.07	0.07	0.1	0.1	1.6	0.2	19.2
14	24	37.8	37.8	0.9	0.9	0.0	0.0	0.00	0.00	0.20	0.20	0.3	0.3	1.6	0.0	19.1
19	24	37.7	37.7	0.9	0.9	0.0	0.0	0.00	0.00	0.34	0.34	0.3	0.3	1.7	0.0	18.8
24	24	28.8	28.8	0.9	0.9	0.0	0.0	0.00	0.00	0.32	0.32	0.3	0.3	1.7	0.0	18.7
29	24	35.0	35.0	0.9	0.9	0.0	0.0	0.00	0.00	0.19	0.19	0.2	0.2	1.5	0.0	18.8
34	24	29.8	29.8	0.9	0.9	0.0	0.0	0.00	0.00	0.11	0.11	0.2	0.2	1.8	0.0	18.9
39	24	30.8	30.8	0.9	0.9	0.0	0.0	0.00	0.00	0.09	0.09	0.2	0.2	1.7	0.0	19.0
44	24	30.4	30.4	0.9	0.9	0.0	0.0	0.00	0.00	0.05	0.05	0.1	0.1	1.7	0.0	19.0
49	24	35.1	35.1	0.9	0.9	0.0	0.0	0.00	0.00	0.04	0.04	0.2	0.2	1.7	0.0	19.1
54	24	19.4	19.4	0.9	0.9	0.0	0.0	0.00	0.00	0.04	0.04	0.2	0.2	1.7	0.0	19.3
59	24	18.3	18.3	0.9	0.9	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	1.7	0.0	19.4
04	24	33.4	33.4	0.7	0.7	0.0	0.0	0.00	0.00	0.05	0.05	0.1	0.1	1.7	0.0	19.5
09	24	25.1	25.1	0.7	0.7	0.0	0.0	0.00	0.00	0.04	0.04	0.1	0.1	1.7	0.0	19.5
10	5	28.0	28.0	0.1	0.1	0.0	0.0	0.00	0.00	0.04	0.04	0.2	0.2	1.7	0.0	19.4
AVG	284	26.3	26.3	0.8	0.8	0.0	0.0	0.00	0.00	0.10	0.10	0.2	0.2	1.6	0.0	19.1
TOT	550			4.3E-04	4.3E-04	3.8E-06	3.8E-06	0.0E+00	0.0E+00	5.4E-01	5.4E-01	9.0E-01	9.0E-01	9.0E+00	4.8E-02	1.1E+02

COKE OVEN EMISSION REPORT

TEST 5
DATE JUNE 25, 1973
START TIME 16:08:11

OVEN 3-6
PRI TEST W4

END SEC	FIVE SECOND TOTAL VOLUME	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 *	% O2 D
ND	FLOW	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
14	4	C.C	C.C	0.0	0.0	0.0	0.0	C.CO	0.00	0.C4	0.07	0.0	0.0	0.6	0.0	19.7
19	4	C.C	C.C	0.0	0.0	C.C	0.0	0.00	0.00	0.02	0.04	0.0	0.0	0.6	0.0	19.7
24	20	27.8	27.8	0.0	0.C	1.6	1.6	C.00	0.00	0.09	0.09	0.3	0.3	0.6	0.0	19.6
29	21	55.C	55.C	0.C	0.0	21.8	21.8	C.00	0.00	0.22	C.22	0.4	0.4	C.6	0.0	19.3
34	20	97.3	97.3	0.C	0.C	31.5	31.5	0.00	0.00	0.21	0.21	0.1	0.1	0.8	0.0	19.2
39	18	66.2	66.2	0.C	0.0	25.5	25.5	C.00	0.00	0.18	C.18	0.3	0.3	0.9	0.0	19.2
44	21	63.3	63.3	C.C	0.C	21.3	21.3	C.00	0.00	0.21	0.21	0.0	0.0	C.6	C.0	19.0
49	21	88.9	88.9	0.0	0.C	25.0	25.0	C.CO	0.00	0.32	C.32	0.0	0.0	0.8	0.0	19.2
54	20	125.C	125.C	0.C	0.C	31.0	31.0	0.00	0.00	0.38	C.38	0.0	0.0	0.9	C.0	19.1
59	20	142.0	142.C	0.0	0.0	28.2	28.2	C.00	0.00	0.39	0.39	0.0	0.0	0.9	0.0	19.2
04	19	142.9	142.9	0.C	0.0	22.1	22.1	0.00	0.00	0.37	0.37	0.0	0.0	0.9	0.0	19.2
09	21	163.9	163.9	C.C	0.C	17.5	17.5	0.00	0.00	0.52	0.52	0.0	0.0	1.0	C.0	19.1
14	23	189.9	189.9	0.C	0.0	21.7	21.7	C.CO	0.00	0.83	C.83	0.C	C.C	1.1	0.0	18.6
19	22	203.C	203.C	2.8	2.8	24.2	24.2	0.00	0.00	1.01	1.01	0.0	0.C	1.3	0.0	18.2
24	17	184.4	184.4	26.9	26.9	17.3	17.3	0.CO	0.00	C.81	0.81	0.0	0.0	1.4	0.0	18.1
29	33	206.4	206.4	44.7	44.7	10.7	10.7	0.00	0.00	0.80	0.80	0.0	0.C	1.3	0.0	18.2
34	55	418.8	418.8	47.5	47.5	24.2	24.2	C.00	0.00	1.59	1.59	0.0	0.0	1.2	0.0	17.0
39	52	654.6	654.6	32.0	32.0	40.0	40.0	0.00	0.00	2.C2	2.02	0.C	0.0	1.9	0.5	15.6
44	42	821.C	821.C	17.9	17.9	47.5	47.5	0.00	0.00	1.88	1.88	0.2	0.2	2.7	1.0	15.0
49	28	808.4	808.4	32.7	32.7	39.7	39.7	0.00	0.00	1.23	1.23	0.0	0.0	2.9	0.2	15.8
54	34	742.6	742.6	41.1	41.1	22.7	22.7	0.00	0.00	0.84	0.84	0.1	C.1	2.4	C.0	16.8
59	48	787.4	787.4	19.9	19.9	22.3	22.3	C.CO	C.CO	1.43	1.43	0.0	0.0	1.8	0.0	16.6
04	49	807.C	807.C	9.1	9.1	30.7	30.7	0.00	0.00	1.50	1.5C	0.C	0.0	2.1	0.1	16.0
09	35	711.6	711.6	3.3	3.3	25.2	25.2	C.00	0.00	0.82	0.82	0.0	0.0	2.6	C.0	16.8
14	30	635.8	635.8	2.6	2.6	14.7	14.7	0.00	0.00	0.44	0.44	0.C	0.C	2.1	0.0	17.8
19	28	598.6	598.6	6.5	6.5	9.3	9.3	0.00	0.00	0.30	0.30	0.0	0.0	1.5	0.0	18.4
24	37	593.C	593.C	2.2	2.2	16.7	16.7	0.CO	0.CC	0.34	0.34	0.0	0.0	1.1	0.0	18.6
29	39	603.8	603.8	0.2	0.2	13.3	13.3	0.00	0.00	0.48	0.48	0.C	0.C	1.2	C.0	18.4
34	30	592.5	592.5	6.9	6.9	13.7	13.7	0.00	0.00	0.35	0.35	0.0	0.0	1.3	0.0	18.5
39	30	605.6	605.6	15.8	15.8	10.0	10.0	0.00	0.00	0.31	C.31	0.0	0.C	1.3	0.0	18.7
44	48	675.1	675.1	16.2	16.2	15.2	15.2	C.CO	0.00	0.48	0.48	0.C	0.0	1.3	C.C	18.5
49	53	785.C	785.C	33.7	33.7	27.5	27.5	C.00	0.CC	0.69	C.69	0.0	0.C	1.7	0.0	18.0
54	51	907.6	907.6	56.9	56.9	34.8	34.8	0.00	0.00	0.76	C.76	0.C	0.C	2.1	0.0	17.7
58	44	1088.1	1088.1	61.7	61.7	47.9	47.9	0.CO	0.CO	1.C6	1.C6	0.0	0.0	2.2	0.0	17.3
AVG	371	427.9	427.9	14.C	14.C	22.2	22.2	0.00	0.00	0.68	0.68	0.0	0.C	1.4	0.1	18.1
TOT	1038			2.0E-02	2.0E-C2	2.6E-02	2.6E-C2	C.CE+CC	0.0E+00	8.7E+CC	8.7E+00	3.5E-01	3.5E-01	1.6E+C1	8.3E-01	1.8E+02

COKE OVEN EMISSION REPORT

TEST 6
DATE JUNE 26, 1973
START TIME 11:07:48

COVEN 3-10
PRI TEST #5

END OF SEC	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 *	% O2
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
49	12	0.0	0.0	0.0	0.0	22.1	22.1	0.00	0.00	0.58	0.58	3.5	3.5	2.2	0.0	18.9
54	27	0.0	0.0	0.0	0.0	43.9	43.9	0.26	0.26	0.79	0.79	2.5	2.5	2.2	0.0	19.2
59	21	0.0	0.0	0.0	0.0	58.5	58.5	0.52	0.52	0.94	0.94	1.7	1.7	2.1	0.0	19.7
04	21	0.0	0.0	0.0	0.0	49.5	49.5	0.54	0.54	0.90	0.90	1.2	1.2	2.3	0.0	20.5
09	19	0.0	0.0	0.0	0.0	35.5	35.5	0.54	0.54	0.87	0.87	0.9	0.9	2.9	0.0	20.9
14	16	0.0	0.0	0.0	0.0	21.6	21.6	0.50	0.50	0.84	0.84	0.7	0.7	3.4	0.0	21.2
19	17	0.0	0.0	0.0	0.0	11.0	11.0	0.50	0.50	0.81	0.81	0.6	0.6	3.4	0.0	21.4
24	20	0.0	0.0	0.0	0.0	13.2	13.2	0.64	0.64	0.85	0.85	0.6	0.6	3.3	0.0	21.6
29	23	0.0	0.0	12.4	12.4	18.3	18.3	0.82	0.82	0.93	0.93	0.6	0.6	3.3	0.0	21.5
34	29	0.0	0.0	37.4	37.4	20.2	20.2	1.02	1.02	1.00	1.00	1.1	1.1	3.6	0.0	21.0
39	44	116.0	116.0	37.6	37.6	60.4	60.4	0.96	0.96	1.14	1.14	3.5	3.5	4.2	0.0	18.8
44	55	249.2	249.2	33.0	33.0	100.2	100.2	1.02	1.02	1.53	1.53	7.2	7.2	6.2	0.0	12.5
49	54	293.6	293.6	25.0	25.0	103.8	103.8	1.84	1.84	2.15	2.15	8.1	8.1	8.8	0.0	7.2
54	44	290.7	290.7	17.7	17.7	78.8	78.8	1.58	1.58	1.91	1.91	7.9	7.9	10.3	0.0	5.8
59	63	166.4	166.4	11.8	11.8	48.8	48.8	0.70	0.70	1.19	1.19	5.9	5.9	10.4	0.0	8.2
04	39	88.4	88.4	7.8	7.8	17.3	17.3	0.34	0.34	0.85	0.85	4.2	4.2	9.2	0.0	12.3
09	37	44.0	44.0	8.4	8.4	1.4	1.4	0.20	0.20	0.73	0.73	3.7	3.7	7.9	0.0	14.1
AVG	396	76.1	76.1	11.7	11.7	42.2	42.2	0.73	0.73	1.08	1.08	3.2	3.2	5.1	0.0	16.7
TOT	542			8.3E-03	8.3E-03	2.7E-02	2.7E-02	4.5E+00	4.5E+00	6.5E+00	6.5E+00	2.3E+01	2.3E+01	3.3E+01	0.0E+00	7.9E+01

COKE OVEN EMISSION REPORT

TEST 7 — OVEN 3-8
DATE JUNE 28, 1973 — MRI TEST W6
START TIME 15:22:54

ENDING SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2			% H2 *	% C2 O
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
54	18	282.0	282.0	41.1	41.1	6.0	6.0	0.70	0.70	1.41	1.41	1.0	1.0		0.0	17.5
59	98	404.9	404.9	50.2	50.2	11.4	11.4	0.96	0.96	2.37	2.37	2.7	2.7		0.0	15.8
04	28	522.2	522.2	27.3	27.3	89.2	89.2	0.90	0.90	2.88	2.88	2.5	2.5		0.0	14.0
09	18	483.6	483.6	4.2	4.2	296.4	296.4	0.44	0.44	1.70	1.70	1.5	1.5		0.0	15.2
14	14	379.8	379.8	0.7	0.7	483.8	483.8	0.20	0.20	0.71	0.71	0.3	0.3		0.0	17.1
19	16	359.4	359.4	0.0	0.0	355.6	355.6	0.06	0.06	0.38	0.38	0.1	0.1		0.0	18.0
24	16	314.4	314.4	0.0	0.0	123.4	123.4	0.00	0.00	0.25	0.25	0.0	0.0		0.0	18.5
29	14	291.1	291.1	0.0	0.0	70.4	70.4	0.00	0.00	0.17	0.17	0.0	0.0		0.0	18.7
34	15	278.4	278.4	0.0	0.0	50.8	50.8	0.00	0.00	0.14	0.14	0.0	0.0		0.0	18.9
39	16	278.2	337.3	3.9	4.4	40.0	48.2	0.00	0.00	0.13	0.16	0.0	0.0		0.0	18.9
44	21	256.2	256.2	20.8	20.8	33.8	33.8	0.00	0.00	0.18	0.18	0.1	0.1		0.0	19.0
49	35	317.2	317.2	39.3	39.3	29.0	29.0	0.00	0.00	0.27	0.27	0.9	0.9		0.0	18.4
54	46	473.4	667.5	49.5	69.5	33.2	46.8	0.02	0.03	0.56	0.79	3.0	4.2		0.0	16.2
59	46	584.4	584.4	48.9	48.9	56.0	56.0	0.48	0.48	1.15	1.15	5.1	5.1		0.0	13.0
04	45	647.4	647.4	49.1	49.1	92.2	92.2	1.22	1.22	1.82	1.82	5.8	5.8		0.0	10.7
09	48	673.2	673.2	41.4	41.4	124.8	124.8	1.04	1.04	1.71	1.71	6.3	6.3		0.0	9.7
14	41	646.9	646.9	35.7	35.7	150.6	150.6	0.44	0.44	1.12	1.12	6.0	6.0		0.0	10.1
19	50	577.2	577.2	39.8	39.8	154.1	154.1	1.52	1.52	1.18	1.18	3.8	3.8		0.0	12.0
24	57	557.0	557.0	42.7	42.7	129.9	129.9	4.64	4.64	1.67	1.67	2.4	2.4		0.0	13.0
29	68	620.2	620.2	49.6	49.6	122.7	122.7	6.34	6.34	1.94	1.94	1.7	1.7		0.0	13.5
34	55	719.3	719.3	56.7	56.7	111.0	111.0	5.96	5.96	1.94	1.94	1.7	1.7		0.0	13.6
39	48	804.4	804.4	61.5	61.5	103.4	103.4	5.54	5.54	1.88	1.88	1.6	1.6		0.0	13.8
43	47	857.5	857.5	52.2	52.2	106.8	106.8	5.72	5.72	1.99	1.99	1.6	1.6		0.0	14.1
AVG	465	496.9	508.4	30.5	31.4	124.9	125.9	1.57	1.57	1.18	1.19	2.1	2.2	0.0	0.0	15.1
TOT	859			3.5E-02	3.6E-02	8.7E-02	8.7E-02	1.9E+01	1.9E+01	1.3E+01	1.3E+01	2.3E+01	2.3E+01	0.0E+00	0.0E+00	1.2E+02

COKE OVEN EMISSION REPORT

TEST 8
DATE JUNE 29, 1973
START TIME 11:34:25

OVEN 3-8
PRI TEST W7

END ING SEC ND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
				PPM HC		PPM NOX				% CO		% CO2		% H2O	% H2 +	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
29	49			70.8	76.5	0.0	0.0			0.20	0.21	0.1	0.1	0.6	0.0	18.7
34	55			57.1	57.1	10.4	10.4			0.91	0.91	1.4	1.4	0.8	0.0	17.7
39	12			33.8	40.2	115.4	143.3			1.03	1.22	1.0	1.2	1.3	0.0	16.6
44	6			21.2	31.0	143.1	204.9			0.66	0.96	0.5	0.7	1.4	0.0	16.9
49	8			13.8	22.4	76.4	128.1			0.46	0.75	0.0	0.0	1.2	0.0	17.4
54	8			9.2	17.2	41.7	76.1			0.37	0.68	0.0	0.0	1.4	0.0	17.7
59	8			6.2	9.4	23.7	35.5			0.30	0.45	0.0	0.0	1.2	0.0	18.0
04	11			4.4	6.6	17.3	25.9			0.30	0.45	0.0	0.0	0.8	0.0	18.2
09	9			4.3	8.2	12.6	22.6			0.30	0.54	0.0	0.0	1.1	0.0	18.2
14	12			2.5	3.8	10.8	16.2			0.28	0.42	0.0	0.0	1.1	0.0	18.4
19	10			4.0	6.1	6.7	14.2			0.28	0.55	0.0	0.0	1.2	0.0	18.5
24	17			67.4	76.2	5.5	6.6			0.29	0.35	0.0	0.0	0.9	0.0	18.5
29	37			221.0	221.0	7.0	7.0			0.36	0.36	0.0	0.0	0.7	0.0	18.4
34	103			299.4	299.4	34.9	34.9			1.72	1.72	1.3	1.3	1.2	0.0	16.5
39	78			336.0	336.0	118.7	118.7			3.34	3.34	3.2	3.2	2.9	0.0	11.9
44	96			274.0	274.0	144.3	144.3			3.23	3.23	4.1	4.1	4.4	0.1	9.1
49	73			214.4	214.4	128.3	128.3			3.22	3.22	4.5	4.5	5.2	0.2	7.5
54	67			181.0	199.8	117.9	129.8			2.58	2.84	4.1	4.5	5.3	0.0	7.8
59	71			155.5	155.5	113.9	113.9			2.46	2.46	4.0	4.0	5.1	0.0	8.5
04	62			142.4	142.4	105.7	105.7			1.65	1.65	3.0	3.0	4.4	0.0	10.0
09	57			159.4	174.3	93.9	103.5			1.49	1.63	1.4	1.6	3.7	0.0	11.5
14	49			160.1	209.3	101.7	131.7			1.68	2.19	0.6	0.8	3.6	0.0	12.3
19	65			109.9	109.9	110.0	110.0			1.37	1.37	0.6	0.6	3.5	0.0	12.8
24	59			66.0	66.0	102.1	102.1			1.11	1.11	0.4	0.4	2.9	0.0	13.2
28	45			46.0	46.0	80.3	80.3			0.79	0.79	0.0	0.0	2.5	0.0	14.2
AVG	517	0.0	0.0	106.5	112.6	66.6	79.8	0.00	0.00	1.22	1.34	1.2	1.3	2.3	0.0	14.7
TOT	1069			1.8E-01	1.8E-01	9.0E-02	9.4E-02	0.0E+00	0.0E+00	1.9E+01	2.0E+01	2.1E+01	2.2E+01	3.2E+01	2.9E-01	1.4E+02

COKE OVEN EMISSION REPORT

TEST 9
DATE JULY 03, 1973
START TIME 11:43:51

OVEN 3-10
PRI TEST WS

END ING SEC ND	FIVE SECOND TOTAL VOLUME FLOW	PPM NO MEAS	PPM NO CORR	PPM NOX MEAS	PPM NOX CORR	% THC * MEAS	% THC * CORR	% CO MEAS	% CO CORR	% CO2 MEAS	% CO2 CORR	% H2O * MEAS	% H2 * MEAS	% O2 D MEAS
		FIVE SECOND AVERAGE												
54	20			0.0	0.0	3.5	5.3	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	20.0
59	13			0.1	0.1	3.2	4.9	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	20.0
04	8			0.0	0.0	3.0	5.5	0.00	0.00	0.04	0.08	0.0	0.0	0.5	0.0	20.0
09	1			0.1	0.1	4.0	4.3	0.00	0.00	0.04	0.04	0.0	0.0	0.5	0.0	19.9
14	6			0.0	0.1	4.3	9.1	0.00	0.00	0.07	0.14	0.0	0.0	0.5	0.0	19.9
19	4			0.0	0.0	3.5	6.7	0.00	0.00	0.07	0.11	0.0	0.0	0.4	0.0	19.9
24	5			0.0	0.0	3.6	8.2	0.00	0.00	0.02	0.05	0.0	0.0	0.4	0.0	19.9
29	4			0.0	0.1	3.5	6.5	0.00	0.00	0.03	0.05	0.0	0.0	0.4	0.0	19.9
34	3			0.1	0.3	2.0	2.5	0.00	0.00	0.04	0.03	0.0	0.0	0.4	0.0	19.9
39	11			0.0	0.0	2.3	3.4	0.00	0.00	0.03	0.05	0.0	0.0	0.3	0.0	19.9
44	8			0.0	0.0	4.2	12.5	0.00	0.00	0.05	0.15	0.0	0.0	0.3	0.0	19.9
49	9			0.0	0.0	3.0	4.4	0.00	0.00	0.04	0.07	0.0	0.0	0.3	0.0	19.9
54	17			0.0	0.0	3.1	4.6	0.00	0.00	0.03	0.05	0.0	0.0	0.4	0.0	19.9
59	12			0.0	0.0	2.5	5.0	0.00	0.00	0.03	0.07	0.0	0.0	0.3	0.0	19.9
04	52			0.0	0.0	3.1	3.1	0.00	0.00	0.05	0.05	0.0	0.0	0.3	0.0	19.9
09	67			0.0	0.0	3.2	3.2	0.00	0.00	0.03	0.03	0.0	0.0	0.3	0.0	19.9
14	66			0.0	0.0	1.4	2.1	0.00	0.00	0.03	0.05	0.0	0.0	0.2	0.0	19.9
19	35			0.0	0.0	1.0	1.0	0.00	0.00	0.04	0.04	0.0	0.0	0.2	0.0	19.9
24	25			0.0	0.0	2.2	3.4	0.00	0.00	0.04	0.06	0.0	0.0	0.2	0.0	19.9
29	29			0.1	0.1	0.8	1.2	0.00	0.00	0.04	0.06	0.0	0.0	0.2	0.0	20.0
34	21			0.0	0.0	1.2	1.8	0.00	0.00	0.03	0.04	0.0	0.0	0.2	0.0	19.9
39	31			0.0	0.0	0.4	0.6	0.00	0.00	0.04	0.06	0.0	0.0	0.2	0.0	20.0
44	49			0.0	0.0	2.0	3.1	0.00	0.00	0.04	0.06	0.0	0.0	0.2	0.0	19.9
49	50			0.1	0.2	1.0	1.6	0.00	0.00	0.05	0.07	0.0	0.0	0.2	0.0	20.0
54	61			0.5	0.7	0.4	0.7	0.00	0.00	0.04	0.06	0.0	0.0	0.2	0.0	20.0
59	68			0.9	1.3	0.8	1.2	0.00	0.00	0.05	0.07	0.0	0.0	0.2	0.0	20.0
04	64			1.4	1.4	0.6	0.6	0.00	0.00	0.11	0.11	0.0	0.0	0.2	0.0	19.9
09	52			1.9	2.8	2.2	3.4	0.00	0.00	0.07	0.11	0.0	0.0	0.2	0.0	19.9
14	62			2.0	3.1	2.7	4.1	0.00	0.00	0.10	0.15	0.0	0.0	0.3	0.0	19.8
19	51			2.4	2.4	7.2	7.2	0.00	0.00	0.13	0.13	0.0	0.0	0.4	0.0	19.8
22	21			2.3	3.5	3.0	4.5	0.00	0.00	0.12	0.18	0.0	0.0	0.4	0.0	19.7
AVG	366	0.0	0.0	0.4	0.5	2.5	4.0	0.00	0.00	0.05	0.07	0.0	0.0	0.3	0.0	19.9
TOT	927			5.9E-04	7.8E-04	2.0E-03	2.7E-03	0.0E+00	0.0E+00	5.2E-01	7.0E-01	0.0E+00	0.0E+00	2.4E+00	0.0E+00	1.8E+02

CCRE EVEN EMISSION REPORT

TEST 10
DATE JULY C4, 1973
START TIME 15:26:05

CVEN 3-11
PRI TEST M1C

END SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 *	% C2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
09	1	C.C	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.03	0.08	0.0	0.0	6.6	0.0	16.7
14	7	C.C	C.C	0.0	0.0	C.C	0.0	0.00	0.00	0.05	0.13	0.0	0.0	5.2	0.0	16.9
19	7	0.0	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.01	0.03	0.0	0.0	4.2	0.0	16.9
24	23	C.C	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.05	0.0	0.0	4.1	0.0	16.6
29	22	7.2	9.0	0.0	0.0	2.4	3.4	0.00	0.00	0.31	0.37	0.0	0.0	4.9	0.0	16.0
34	19	65.3	88.9	0.0	0.0	41.0	58.8	0.00	0.00	0.68	0.95	0.0	0.0	4.6	0.0	15.3
39	17	112.7	169.0	C.C	0.0	83.6	125.4	0.00	0.00	0.82	1.24	0.0	0.1	4.6	0.0	14.7
44	15	163.6	273.2	0.0	0.0	95.3	153.0	0.00	0.00	0.80	1.28	0.0	0.0	4.7	0.0	14.6
49	25	149.5	180.8	C.C	0.0	87.0	103.9	0.00	0.00	0.68	0.81	0.1	0.1	4.7	0.0	16.2
54	27	147.4	164.1	0.0	0.0	74.8	82.6	0.00	0.00	0.71	0.78	0.0	0.0	4.6	0.0	16.2
59	26	109.4	119.3	0.0	0.0	63.4	70.0	0.00	0.00	0.61	0.66	0.0	0.0	5.0	0.0	16.1
04	31	99.5	99.5	0.0	0.0	54.4	54.4	0.00	0.00	0.63	0.63	0.1	0.1	5.1	0.0	16.1
09	38	170.3	170.3	0.0	0.0	50.4	50.4	0.00	0.00	0.72	0.72	0.2	0.2	4.8	0.0	16.2
14	40	229.5	229.5	0.0	0.0	56.5	56.5	0.00	0.00	1.02	1.02	0.8	0.8	5.4	0.0	15.6
19	41	276.5	276.5	0.0	0.0	74.0	74.0	0.00	0.00	1.78	1.78	1.4	1.4	5.8	0.0	13.7
24	41	367.3	367.3	0.0	0.0	106.2	106.2	0.00	0.00	2.63	2.63	1.8	1.8	6.6	0.0	11.7
29	36	391.9	391.9	0.0	0.0	120.5	120.5	0.00	0.00	2.80	2.80	1.6	1.6	8.0	0.0	11.0
34	32	441.2	441.2	0.0	0.0	110.4	110.4	0.00	0.00	1.96	1.96	1.0	1.0	8.6	0.0	11.4
39	31	410.3	410.3	0.0	0.0	95.7	95.7	0.00	0.00	1.10	1.10	0.6	0.6	8.0	0.0	12.4
44	38	370.7	370.7	0.0	0.0	75.2	75.2	0.00	0.00	0.92	0.92	0.1	0.1	6.9	0.0	13.5
49	32	445.4	445.4	0.0	0.0	72.6	72.6	0.00	0.00	1.38	1.38	0.3	0.3	6.3	0.0	12.6
54	31	454.2	454.2	0.0	0.0	74.2	74.2	0.00	0.00	1.35	1.35	1.6	1.6	6.7	0.0	12.6
59	22	370.7	370.7	0.0	0.0	61.6	61.6	0.00	0.00	0.80	0.80	1.3	1.3	7.2	0.0	13.5
04	30	298.3	298.3	0.0	0.0	44.0	44.0	0.00	0.00	0.47	0.47	0.9	0.9	6.7	0.0	13.5
09	30	236.6	236.6	0.0	0.0	33.5	33.5	0.00	0.00	0.29	0.29	1.5	1.5	6.1	0.0	13.6
14	31	244.8	244.8	0.0	0.0	31.6	31.6	0.00	0.00	0.40	0.40	1.8	1.8	5.8	0.0	14.1
19	28	223.1	223.1	0.0	0.0	33.4	33.4	0.00	0.00	0.47	0.47	1.5	1.9	5.7	0.0	13.7
24	30	246.4	246.4	0.0	0.0	37.5	37.5	0.00	0.00	0.54	0.54	2.0	2.0	6.2	0.0	13.6
25	6	210.0	210.0	0.0	0.0	40.0	40.0	0.00	0.00	0.53	0.53	2.0	2.0	6.2	0.0	13.6
AVG	336	221.8	230.9	0.0	0.0	57.9	63.4	0.00	0.00	0.88	0.94	0.7	0.7	5.8	0.0	14.4
TOT	767			0.0E+00	0.0E+00	4.9E-02	5.1E-02	0.0E+00	0.0E+00	7.8E+00	8.1E+00	6.4E+00	6.4E+00	4.6E+01	0.0E+00	1.1E+02

COKE OVEN EMISSION REPORT

TEST 11
DATE JULY 05, 1973
START TIME 15:19:04

OVEN 3-8 GAS LEAKS
MRI TEST W11

END SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 *	% C2 O
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
04	5	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	0.5	0.0	18.9
09	24	5.4	5.4	0.1	0.1	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	0.5	0.0	18.9
14	24	36.4	37.6	10.6	10.9	0.0	0.0	0.00	0.00	0.12	0.13	0.1	0.1	0.5	0.0	18.4
19	47	163.7	163.7	56.8	56.8	0.1	0.1	0.56	0.56	0.93	0.93	0.9	0.9	0.7	0.0	17.9
24	49	354.0	354.0	135.6	135.6	2.0	2.0	1.54	1.54	2.09	2.09	1.4	1.4	1.7	0.0	16.2
29	45	573.1	573.1	96.7	96.7	273.2	273.2	1.88	1.88	2.37	2.37	1.5	1.5	3.3	0.0	15.0
34	42	579.0	579.0	59.7	59.7	365.4	365.4	0.68	0.68	1.06	1.06	1.9	1.9	4.4	0.0	14.8
39	48	426.0	426.0	38.5	38.5	228.6	228.6	0.16	0.16	0.43	0.43	1.2	1.2	4.1	0.0	15.8
44	46	343.3	343.3	26.8	26.8	135.7	135.7	0.10	0.10	0.34	0.34	0.7	0.7	3.1	0.0	16.5
49	44	310.8	310.8	20.9	20.9	95.5	95.5	0.14	0.14	0.32	0.32	0.4	0.4	2.3	0.0	17.6
54	44	289.3	289.3	18.4	18.4	74.9	74.9	0.16	0.16	0.32	0.32	0.3	0.3	1.8	0.0	17.7
59	44	282.2	282.2	15.9	15.9	64.3	64.3	0.20	0.20	0.33	0.33	0.2	0.2	1.5	0.0	18.2
04	44	271.4	271.4	14.4	14.4	57.0	57.0	0.20	0.20	0.34	0.34	0.2	0.2	1.4	0.0	18.2
09	47	274.2	274.2	17.4	17.4	55.0	55.0	0.14	0.14	0.31	0.31	0.1	0.1	1.3	0.0	18.3
14	44	296.5	296.5	34.7	34.7	52.9	52.9	0.56	0.56	0.54	0.54	0.3	0.3	1.3	0.0	18.3
19	35	456.0	456.0	29.0	29.0	51.4	51.4	3.18	3.18	1.50	1.50	1.3	1.3	1.6	0.0	16.7
24	32	510.5	510.5	15.9	15.9	84.9	84.9	3.58	3.58	1.41	1.41	1.4	1.4	3.0	0.0	15.5
29	20	432.5	477.5	32.6	35.9	104.6	116.6	1.72	1.92	0.70	0.77	0.7	0.7	3.8	0.0	15.9
34	24	439.9	481.9	49.0	53.9	47.0	51.4	2.22	2.43	0.60	0.66	0.4	0.4	3.2	0.0	16.5
39	42	577.7	577.7	51.7	51.7	37.5	37.5	5.12	5.12	1.12	1.12	0.8	0.8	2.7	0.0	16.1
44	32	654.1	717.7	45.2	49.4	56.0	62.4	6.82	7.53	1.54	1.70	1.4	1.6	3.3	0.0	15.0
49	29	619.2	619.2	37.0	37.0	64.8	64.8	6.28	6.28	1.53	1.53	1.3	1.3	4.1	0.0	13.9
54	35	580.4	580.4	23.8	23.8	55.7	55.7	3.52	3.52	1.06	1.06	1.3	1.3	4.2	0.0	14.4
59	30	501.8	501.8	11.4	11.4	52.8	52.8	1.34	1.34	0.59	0.59	1.3	1.3	3.9	0.0	14.9
04	20	415.0	581.0	6.4	8.9	49.6	69.1	0.46	0.64	0.31	0.43	0.9	1.2	3.4	0.0	15.9
05	4	275.0	562.5	4.8	7.1	40.0	60.0	0.20	0.30	0.23	0.35	0.4	0.6	3.0	0.0	17.0
AVG	443	388.0	402.6	34.8	35.4	82.7	84.6	1.66	1.72	0.82	0.84	0.8	0.9	2.5	0.0	16.5
TOT	901			3.4E-02	3.5E-02	8.0E-02	8.1E-02	1.4E+01	1.4E+01	7.6E+00	7.7E+00	7.5E+00	7.7E+00	2.2E+01	0.0E+00	1.5E+02

CCKE CVEA EMISSION REPORT

TEST 12
LATE JULY 11, 1973
START TIME 14:02:12

CVEA 3-9
MPI TEST

ENL ING SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 *	% C2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
14	15	15.0	25.0	12.0	19.2	0.0	0.0	0.00	0.00	0.07	0.12	0.0	0.0	1.7	0.0	19.5
19	36	0.0	0.0	13.0	13.0	5.0	5.0	0.00	0.00	0.12	0.12	0.1	0.1	1.7	0.0	19.4
24	38	24.2	24.2	9.2	9.2	48.8	48.8	0.18	0.18	0.43	0.43	0.7	0.7	1.8	0.0	19.0
29	39	97.3	97.3	5.5	5.5	106.4	106.4	0.58	0.58	0.80	0.80	1.0	1.0	2.3	0.0	18.2
34	37	121.2	121.2	4.6	4.6	116.6	116.6	0.76	0.76	0.91	0.91	0.8	0.8	2.9	0.0	17.8
39	41	136.4	136.4	3.6	3.6	102.1	102.1	0.80	0.80	0.93	0.93	0.8	0.8	3.2	0.0	17.7
44	34	176.8	176.8	3.8	3.8	93.2	93.2	0.84	0.84	0.97	0.97	0.6	0.6	3.3	0.0	17.7
49	39	163.4	163.4	4.1	4.1	85.8	85.8	0.96	0.96	1.00	1.00	0.5	0.5	3.3	0.0	17.6
54	39	149.4	149.4	4.7	4.7	85.4	85.4	1.18	1.18	1.14	1.14	0.6	0.6	3.3	0.0	17.5
59	29	161.5	256.1	12.2	21.3	87.8	140.7	1.48	2.39	1.31	2.10	0.6	1.0	3.4	0.0	17.3
04	36	145.3	165.0	30.3	35.6	83.2	100.2	1.82	2.15	1.40	1.68	0.6	0.8	3.6	0.0	17.0
09	51	206.6	206.6	37.6	37.6	86.2	86.2	2.82	2.82	1.80	1.80	1.0	1.0	3.7	0.6	16.5
14	47	335.0	335.0	38.7	38.7	109.0	109.0	4.24	4.24	2.47	2.47	1.5	1.5	4.3	2.2	15.0
19	40	385.3	385.3	36.5	36.5	113.3	113.3	5.64	5.64	2.82	2.82	2.0	2.0	5.4	6.5	13.5
24	36	426.5	426.5	33.7	33.7	103.0	103.0	5.98	5.98	2.61	2.61	2.0	2.0	6.3	7.1	12.8
29	33	378.6	378.6	33.3	33.3	90.6	90.6	5.70	5.70	2.19	2.19	1.7	1.7	6.5	5.2	12.9
34	31	364.3	367.7	33.0	36.3	73.5	81.5	5.48	6.05	1.66	2.07	1.4	1.5	6.1	3.9	13.5
39	32	454.1	454.1	32.5	32.5	66.8	66.8	4.16	4.16	1.53	1.53	1.3	1.3	5.8	1.8	14.0
44	26	460.2	597.5	24.2	32.0	62.0	80.9	2.70	3.56	1.22	1.60	1.5	1.9	5.7	0.1	14.2
49	30	415.0	415.0	12.0	12.0	61.2	61.2	1.70	1.70	0.56	0.56	1.4	1.4	5.7	0.0	14.5
54	24	331.8	366.5	4.6	5.4	53.5	59.2	0.70	0.79	0.57	0.64	0.7	0.8	5.5	0.0	15.3
59	32	234.1	234.1	1.5	1.5	35.8	35.8	0.14	0.14	0.25	0.25	0.0	0.0	4.6	0.0	16.6
04	25	162.0	162.0	1.8	1.8	21.5	21.5	0.00	0.00	0.16	0.16	0.0	0.0	3.6	0.0	17.7
09	25	100.1	100.1	15.7	15.7	12.1	12.1	0.00	0.00	0.11	0.11	0.0	0.0	2.9	0.0	18.4
14	34	71.5	71.5	29.5	29.5	7.8	7.8	0.00	0.00	0.12	0.12	0.0	0.0	2.4	0.0	18.7
19	32	127.2	127.2	25.7	25.7	19.2	19.2	0.40	0.40	0.30	0.30	0.3	0.3	2.3	0.0	18.4
24	26	238.0	238.0	13.3	14.6	55.6	61.3	0.92	1.02	0.54	0.60	0.9	0.9	2.7	0.0	17.4
29	25	244.2	244.2	15.0	15.0	57.4	57.4	0.50	0.50	0.43	0.43	0.6	0.6	3.5	0.0	17.0
34	28	186.5	186.5	34.3	34.3	34.8	34.8	0.16	0.16	0.25	0.25	0.2	0.2	3.6	0.0	17.5
39	33	193.8	193.8	43.2	43.2	27.1	27.1	0.24	0.24	0.23	0.23	0.2	0.2	3.1	0.0	17.8
44	32	220.4	220.4	26.4	26.4	52.2	52.2	0.48	0.48	0.41	0.41	0.5	0.5	3.0	0.0	17.3
49	25	267.6	267.6	18.0	18.0	75.3	75.3	0.46	0.46	0.48	0.48	1.1	1.1	3.6	0.0	16.5
54	28	296.3	296.3	37.7	37.7	61.4	61.4	0.18	0.18	0.32	0.32	0.4	0.4	4.0	0.0	16.7
59	34	293.5	293.5	54.5	54.5	40.8	40.8	0.32	0.32	0.24	0.24	0.4	0.4	3.6	0.0	17.4
04	34	396.2	396.2	55.2	55.2	65.3	65.3	1.06	1.06	0.48	0.48	1.2	1.2	3.2	0.0	17.1
09	34	503.6	503.6	34.5	34.5	100.4	100.4	1.32	1.32	0.70	0.70	1.7	1.7	3.5	0.0	16.2
14	27	542.4	653.1	18.0	21.4	109.2	130.4	0.88	1.01	0.67	0.78	1.8	2.1	4.5	0.0	15.7
19	29	466.1	516.5	24.0	25.5	80.1	88.8	0.32	0.37	0.45	0.50	1.1	1.2	4.7	0.0	16.2
24	36	377.2	377.2	36.7	36.7	46.4	46.4	0.20	0.20	0.26	0.26	0.6	0.6	4.0	0.0	17.1
29	35	373.3	373.3	29.7	29.7	44.2	44.2	0.24	0.24	0.26	0.26	0.8	0.8	3.3	0.0	17.6
34	27	376.2	376.2	13.4	13.4	59.4	59.4	0.26	0.26	0.30	0.30	1.3	1.3	3.1	0.0	17.3
39	24	339.0	437.2	4.1	4.5	54.2	69.5	0.08	0.10	0.27	0.34	1.0	1.2	3.3	0.0	17.4
44	25	278.4	338.1	0.7	0.5	37.0	45.4	0.00	0.00	0.18	0.22	0.5	0.6	3.1	0.0	17.9
49	26	261.5	317.4	0.0	0.0	17.1	21.6	0.00	0.00	0.11	0.14	0.2	0.2	2.7	0.0	18.4
54	25	225.2	271.4	3.9	4.9	8.8	10.7	0.00	0.00	0.10	0.11	0.0	0.0	2.2	0.0	18.9
59	25	205.0	225.3	5.0	5.5	7.4	8.2	0.00	0.00	0.10	0.11	0.0	0.0	1.9	0.0	19.0
04	27	253.2	304.4	6.8	8.0	12.6	15.4	0.00	0.00	0.10	0.13	0.2	0.2	1.8	0.0	19.1
09	22	246.4	246.2	2.8	4.1	20.0	27.5	0.00	0.00	0.15	0.20	0.4	0.5	1.9	0.0	18.9
14	25	229.8	252.6	0.7	0.5	19.5	22.0	0.00	0.00	0.13	0.14	0.3	0.4	2.0	0.0	18.5
19	25	210.8	210.8	0.0	0.0	14.1	14.1	0.00	0.00	0.10	0.10	0.1	0.1	2.0	0.0	19.0
24	26	216.0	216.0	0.7	0.7	10.3	10.3	0.00	0.00	0.11	0.11	0.1	0.1	1.9	0.0	19.1
29	23	184.8	202.5	12.1	13.8	7.5	8.6	0.00	0.00	0.11	0.12	0.1	0.1	1.8	0.0	19.1
34	31	137.0	153.1	23.2	27.0	7.1	7.5	0.00	0.00	0.08	0.09	0.0	0.0	1.8	0.0	19.1
39	29	171.5	205.2	28.8	34.2	18.0	21.8	0.02	0.02	0.17	0.20	0.4	0.5	1.8	0.0	18.8
44	28	240.1	265.2	12.8	16.2	52.8	64.4	0.10	0.12	0.28	0.34	1.1	1.3	2.0	0.0	18.3
49	21	230.4	276.6	9.9	11.8	58.0	70.0	0.08	0.10	0.25	0.30	0.9	1.1	2.5	0.0	17.9
54	25	225.6	247.2	9.1	10.1	35.2	39.2	0.00	0.00	0.16	0.18	0.4	0.5	2.2	0.0	18.3
59	27	215.6	215.6	5.2	5.2	24.6	24.6	0.00	0.00	0.15	0.15	0.3	0.3	2.4	0.0	18.6
04	27	195.2	195.2	1.5	1.5	23.5	23.5	0.00	0.00	0.15	0.15	0.2	0.3	2.2	0.0	18.7
09	25	188.6	188.6	0.2	0.2	17.7	17.7	0.00	0.00	0.09	0.09	0.0	0.0	2.1	0.0	18.8
14	20	224.2	314.8	0.0	0.0	9.4	12.9	0.00	0.00	0.10	0.14	0.1	0.2	2.0	0.0	19.0
19	30	173.8	193.0	0.0	0.0	6.0	6.9	0.00	0.00	0.11	0.12	0.0	0.1	1.8	0.0	19.0
24	27	169.8	181.8	0.0	0.0	5.1	5.6	0.00	0.00	0.07	0.08	0.1	0.1	1.8	0.0	19.1
29	14	163.3	357.1	0.0	0.0	4.4	10.4	0.00	0.00	0.05	0.21	0.0	0.1	1.8	0.0	19.2
34	19	188.5	382.4	0.0	0.0	4.2	8.3	0.00	0.00	0.07	0.15	0.0	0.0	1.7	0.0	19.3
39	24	148.0	178.5	0.0	0.0	4.3	5.1	0.00	0.00	0.08	0.10	0.0	0.0	1.7	0.0	19.3
44	22	135.4	154.3	0.0	0.0	4.0	4.4	0.00	0.00	0.08	0.09	0.0	0.0	1.7	0.0	19.4
49	5	89.4	133.2	0.0	0.0	4.0	5.9	0.00	0.00	0.07	0.11	0.0	0.1	1.7	0.0	19.4
50	0	131.4	0.0	0.0	0.0	3.4	0.0	0.00	0.00	0.08	0.00	0.0	0.0	1.7	0.0	19.4
AVG	351	239.0	265.0	15.6	16.5	46.1	49.6	0.83	0.87	0.55	0.59	0.6	0.7	3.1	0.4	17.5
TOT	1962	..		3.5E-02	3.6E-02	1.0E-01	1.1E-01	2.0E+01	2.0E+01	1.3E+01	1.3E+01	1.3E+01	1.4E+01	6.4E+01	1.1E+01	3.4E+02

CCKE EVEN EMISSION REPORT

TEST 14
DATE JULY 12, 1973
START TIME (CUMULATIVE)

CVBA 3-15
PRE TEST

CYC INC	FIVE SECOND INCREMENTAL VOLUME	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 +	% C2 C
CYC NO	FLOW	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
99	7	7.6	10.4	7.0	0.0	1.1	2.2	0.00	0.00	0.05	0.11	0.0	0.0	1.7	0.0	19.4
99	11	3.0	0.0	0.0	0.0	1.1	2.2	0.00	0.00	0.07	0.13	0.0	0.0	1.7	0.0	19.4
14	11	3.5	7.5	0.0	0.1	1.1	2.2	0.00	0.00	0.09	0.18	0.0	0.1	1.7	0.0	19.7
99	11	0.0	0.0	0.2	0.3	1.1	2.2	0.00	0.00	0.12	0.23	0.0	0.0	1.7	0.0	19.6
14	15	0.5	0.5	0.1	0.2	2.2	2.4	0.00	0.00	0.14	0.17	0.1	0.1	1.7	0.0	19.6
19	19	5.8	6.8	0.1	0.1	4.7	5.7	0.06	0.10	0.17	0.21	0.0	0.0	1.8	0.0	19.5
24	8	15.6	15.4	0.0	0.1	4.5	8.1	0.00	0.00	0.14	0.25	0.0	0.0	1.8	0.0	19.5
29	9	24.1	46.2	0.0	0.0	1.9	3.1	0.00	0.00	0.11	0.22	0.0	0.1	1.8	0.0	19.5
34	12	17.3	23.2	0.0	0.0	1.1	1.3	0.00	0.00	0.07	0.05	0.0	0.0	1.7	0.0	19.6
39	4	16.2	32.3	0.0	0.0	1.1	2.2	0.00	0.00	0.07	0.14	0.0	0.0	1.7	0.0	19.6
44	4	13.8	11.5	0.0	0.1	1.1	1.3	0.00	0.00	0.07	0.09	0.0	0.0	1.7	0.0	19.6
49	5	22.5	45.9	0.2	0.4	1.1	2.2	0.14	0.28	0.13	0.26	0.0	0.0	1.7	0.0	19.6
54	10	34.5	34.7	0.2	0.2	2.4	2.6	0.74	0.82	0.35	0.44	0.1	0.1	1.7	0.0	19.5
59	9	66.6	103.6	0.2	0.3	8.8	14.5	1.56	2.52	0.77	1.23	0.1	0.2	1.8	0.0	19.0
64	6	81.6	103.1	0.2	0.4	5.6	19.1	2.10	4.20	0.91	1.81	0.1	0.2	1.5	0.0	18.7
69	1	63.1	24.6	0.2	0.1	6.5	3.5	2.62	0.88	0.77	0.33	0.1	0.1	1.5	0.0	18.5
74	2	33.6	56.5	0.2	0.3	2.9	3.9	1.46	2.24	0.52	0.86	0.1	0.1	1.5	0.0	18.6
79	14	71.7	118.6	23.0	31.4	1.8	1.8	1.20	1.92	0.38	0.62	0.0	0.0	1.8	0.0	18.6
84	14	74.2	76.3	51.1	51.1	1.1	1.1	2.12	2.12	0.43	0.43	0.1	0.1	1.8	0.0	18.8
89	43	117.0	130.0	41.1	45.4	10.0	11.4	8.18	9.84	1.16	1.39	0.3	0.3	2.0	5.3	18.2
94	42	346.6	346.5	22.6	22.6	44.3	44.3	13.00	13.00	1.65	1.65	0.5	0.5	2.8	17.5	18.6
99	28	454.8	454.8	8.4	8.4	47.2	47.2	9.36	9.36	1.52	1.52	0.4	0.4	4.4	18.2	18.7
99	20	455.1	455.1	0.2	0.2	30.4	30.4	5.08	5.08	0.61	0.61	0.1	0.1	5.3	7.2	18.1
99	15	454.5	454.5	0.2	0.2	15.5	15.5	2.60	2.60	0.52	0.52	0.1	0.1	4.8	0.9	17.8
99	14	334.3	334.3	0.2	0.2	6.1	6.1	1.32	1.32	0.30	0.30	0.0	0.0	3.8	0.0	17.8
99	10	267.8	267.8	0.2	0.2	1.9	1.9	0.70	0.70	0.20	0.20	0.0	0.0	3.1	0.0	18.4
99	11	264.8	264.8	0.2	0.2	1.1	1.1	0.38	0.38	0.15	0.15	0.0	0.0	2.7	0.0	18.7
99	14	212.4	212.4	3.2	3.2	1.1	1.1	0.22	0.22	0.12	0.12	0.0	0.0	2.4	0.0	18.9
14	37	207.3	207.3	19.7	19.7	1.1	1.1	0.28	0.28	0.11	0.11	0.0	0.0	2.3	0.0	19.1
19	53	242.6	242.6	73.4	73.4	8.4	8.4	1.64	1.64	0.25	0.25	0.0	0.0	2.3	0.0	19.1
24	47	128.4	128.4	107.5	120.2	33.5	50.4	3.26	4.72	0.54	0.78	0.0	0.1	2.7	0.1	18.7
29	71	569.6	569.6	26.3	26.3	50.6	50.6	3.68	3.98	0.68	0.68	0.0	0.0	3.5	1.0	18.2
34	46	219.3	219.3	40.5	40.5	61.8	61.8	4.30	4.30	0.71	0.71	0.1	0.1	4.0	2.1	17.8
39	90	805.3	805.3	54.5	54.5	62.7	62.7	3.58	3.58	0.60	0.60	0.0	0.0	4.4	1.1	17.7
44	56	598.4	598.4	52.6	52.6	89.6	89.6	5.44	5.64	0.82	0.82	0.1	0.1	4.4	3.9	17.7
49	56	1242.5	1724.2	30.1	42.6	135.2	189.8	6.86	9.62	1.06	1.48	0.1	0.2	4.8	8.2	18.5
54	41	1445.1	1445.1	12.5	12.5	148.4	148.4	5.76	5.76	0.55	0.55	0.1	0.1	5.1	7.4	18.8
59	72	1500.2	1500.2	1.0	1.0	159.5	159.5	3.30	3.30	0.28	0.58	0.0	0.0	5.1	2.0	17.0
64	29	1427.2	1427.2	0.2	0.2	146.5	146.5	1.74	1.74	0.32	0.32	0.0	0.0	4.9	0.8	17.8
69	25	1261.8	1261.8	0.1	0.1	111.7	111.7	0.92	0.92	0.15	0.15	0.0	0.0	3.9	0.0	18.4
74	25	1146.8	1146.8	0.2	0.2	90.5	90.5	0.62	0.62	0.15	0.15	0.0	0.0	2.9	0.0	18.2
79	21	1058.0	1058.0	0.2	0.2	77.2	77.2	0.64	0.64	0.16	0.16	0.0	0.0	2.5	0.0	18.9
84	14	526.4	526.4	0.2	0.2	76.7	76.7	0.60	0.60	0.16	0.16	0.0	0.0	2.2	0.0	15.3
89	18	999.8	1431.2	0.2	0.3	65.7	103.7	0.44	0.68	0.15	0.24	0.0	0.0	2.2	0.0	19.2
94	23	812.3	812.3	0.1	0.1	55.8	55.8	0.26	0.26	0.12	0.12	0.0	0.0	2.2	0.0	19.3
99	17	771.7	771.7	0.2	0.2	45.8	45.8	0.20	0.20	0.05	0.05	0.0	0.0	2.1	0.0	19.2
44	17	713.4	713.4	0.1	0.1	38.6	38.6	0.14	0.14	0.05	0.05	0.0	0.0	2.1	0.0	19.4
49	14	667.0	667.0	0.2	0.2	35.5	35.5	0.10	0.10	0.08	0.08	0.0	0.0	2.0	0.0	19.3
54	17	627.2	627.2	0.2	0.2	34.6	34.6	0.10	0.10	0.06	0.06	0.0	0.0	2.0	0.0	19.2
59	17	575.0	575.0	0.2	0.2	29.4	29.4	0.00	0.00	0.06	0.06	0.0	0.0	2.0	0.0	19.3
64	6	715.6	715.1	0.2	0.2	28.5	40.1	0.00	0.00	0.05	0.05	0.0	0.0	1.9	0.0	18.6
69	1	462.5	565.6	0.2	0.4	26.4	52.8	0.00	0.00	0.05	0.11	0.0	0.0	1.9	0.0	19.4
74	1	476.4	572.5	0.1	0.2	25.5	51.8	0.00	0.00	0.06	0.11	0.0	0.0	1.9	0.0	18.6
79	6	455.6	365.2	0.0	0.0	24.0	20.0	0.00	0.00	0.08	0.06	0.0	0.0	1.9	0.0	19.5
84	3	432.7	0.0	0.1	0.0	22.2	0.0	0.00	0.00	0.06	0.00	0.0	0.0	1.9	0.0	19.5
89	5	426.6	0.0	0.0	0.0	20.7	0.0	0.00	0.00	0.04	0.00	0.0	0.0	1.9	0.0	19.5
94	3	418.2	0.0	0.0	0.0	18.8	0.0	0.00	0.00	0.05	0.00	0.0	0.0	1.9	0.0	19.5
99	6	353.4	0.0	0.1	0.0	16.2	0.0	0.00	0.00	0.04	0.00	0.0	0.0	2.0	0.0	19.1
44	3	378.3	0.0	0.0	0.0	17.8	0.0	0.00	0.00	0.06	0.00	0.0	0.0	1.9	0.0	19.5
49	0	33.2	0.0	0.0	0.0	17.5	0.0	0.00	0.00	0.07	0.00	0.0	0.0	1.9	0.0	19.5
54	3	342.4	0.0	0.0	0.0	15.8	0.0	0.00	0.00	0.05	0.00	0.0	0.0	1.9	0.0	19.5
59	4	305.7	0.0	0.2	0.0	14.9	0.0	0.00	0.00	0.07	0.00	0.0	0.0	1.9	0.0	18.4
AVG	132	442.7	425.8	9.3	10.0	32.6	33.8	1.57	1.73	0.34	0.39	0.0	0.1	2.5	1.2	18.7
TOT	11431			2.6E-02	2.6E-02	5.9E-02	6.3E-02	3.6E+01	3.9E+01	6.2E+00	6.9E+00	7.8E-01	8.7E-01	3.1E+01	2.9E+01	2.2E+02

COKE OVEN EMISSION REPORT

TEST 14
DATE JULY 12, 1973
START TIME 15:16:30

OVEN 3-6 GUIDE GAS PROBE PLUGGED
PRI TEST

END SEC	FIVE SECOND TOTAL VOLUME	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2 *	% O2 D
ND	FLOW	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
34	8	26.2	52.3	0.0	0.0	2.8	5.6	0.00	0.00	0.03	0.06	0.1	0.2	1.5	0.0	19.1
39	11	62.4	124.8	0.0	0.0	2.6	5.3	0.00	0.00	0.04	0.08	0.1	0.2	1.5	0.0	19.1
44	11	66.5	133.0	0.0	0.0	3.8	7.6	0.00	0.00	0.05	0.10	0.2	0.3	2.0	0.0	18.6
49	9	59.6	119.3	0.0	0.0	13.0	25.9	0.00	0.00	0.10	0.21	0.2	0.4	2.0	0.0	17.6
54	10	91.3	182.6	0.0	0.0	24.2	48.4	0.00	0.00	0.15	0.30	0.3	0.6	2.0	0.0	17.8
59	9	91.2	182.4	0.0	0.0	30.8	61.5	0.00	0.00	0.19	0.38	0.1	0.2	2.2	0.0	17.3
04	10	82.3	164.6	0.0	0.0	32.7	65.4	0.00	0.00	0.21	0.43	0.1	0.1	2.2	0.0	18.3
09	11	57.5	57.5	0.0	0.0	28.8	28.8	0.00	0.00	0.21	0.21	0.1	0.1	2.2	0.0	18.7
14	8	51.1	102.2	0.0	0.0	24.6	49.1	0.02	0.04	0.20	0.40	0.0	0.0	2.2	0.0	19.4
19	9	55.3	110.6	0.0	0.0	22.0	43.9	0.00	0.00	0.20	0.40	0.0	0.0	2.2	0.0	19.5
24	11	64.8	129.6	0.0	0.0	20.6	41.2	0.00	0.00	0.18	0.36	0.0	0.0	2.2	0.0	19.4
29	12	50.4	100.8	0.0	0.0	17.0	34.1	0.00	0.00	0.15	0.29	0.0	0.0	2.1	0.0	19.6
34	12	46.2	88.4	0.0	0.0	11.6	21.1	0.00	0.00	0.13	0.23	0.0	0.0	2.1	0.0	19.6
39	10	53.3	53.3	0.0	0.0	8.8	8.8	0.00	0.00	0.11	0.11	0.0	0.0	2.0	0.0	19.6
44	10	62.8	62.8	0.0	0.0	7.0	7.0	0.00	0.00	0.09	0.09	0.0	0.0	2.0	0.0	19.1
49	10	78.0	78.0	0.0	0.0	6.6	6.6	0.00	0.00	0.09	0.09	0.0	0.0	2.0	0.0	19.4
54	10	59.4	59.4	0.0	0.0	6.6	6.6	0.00	0.00	0.11	0.11	0.0	0.0	2.0	0.0	19.3
59	8	71.2	129.7	0.0	0.0	7.0	12.4	0.00	0.00	0.14	0.26	0.0	0.0	2.0	0.0	19.1
04	7	75.0	150.0	0.0	0.0	5.0	10.0	0.00	0.00	0.14	0.29	0.0	0.1	2.0	0.0	18.9
09	6	78.2	156.5	0.0	0.0	5.5	11.0	0.06	0.12	0.11	0.21	0.0	0.0	2.0	0.0	18.8
14	6	77.6	155.3	0.0	0.0	5.8	11.6	0.18	0.36	0.12	0.24	0.0	0.0	2.0	0.0	18.8
19	9	38.2	66.7	0.0	0.0	5.4	9.9	0.10	0.18	0.12	0.22	0.0	0.0	2.0	0.0	18.9
24	10	44.4	44.4	0.0	0.0	4.7	4.7	0.10	0.10	0.12	0.12	0.0	0.0	2.0	0.0	19.3
29	10	51.4	51.4	0.0	0.0	4.3	4.3	0.04	0.04	0.09	0.09	0.0	0.0	2.1	0.0	19.3
34	10	35.5	35.5	0.0	0.0	3.8	3.8	0.00	0.00	0.08	0.08	0.0	0.0	2.0	0.0	19.2
39	10	30.1	30.1	0.0	0.0	3.1	3.1	0.00	0.00	0.07	0.07	0.0	0.0	2.0	0.0	19.0
44	9	50.5	50.5	0.0	0.0	2.8	2.8	0.00	0.00	0.07	0.07	0.0	0.0	2.0	0.0	19.8
49	9	56.0	56.0	0.0	0.0	2.8	2.8	0.00	0.00	0.07	0.07	0.0	0.0	2.0	0.0	19.7
54	10	85.6	85.6	0.0	0.0	3.3	3.3	0.00	0.00	0.06	0.06	0.0	0.0	2.1	0.0	19.6
59	10	85.7	137.4	0.0	0.0	3.5	6.6	0.00	0.00	0.06	0.10	0.0	0.0	2.1	0.0	19.9
04	7	73.3	146.6	0.0	0.0	3.5	7.8	0.00	0.00	0.06	0.11	0.0	0.1	2.1	0.0	19.8
09	7	91.0	181.9	0.0	0.0	3.0	6.0	0.00	0.00	0.05	0.11	0.0	0.0	2.1	0.0	19.9
14	8	94.0	187.9	0.0	0.0	3.0	6.1	0.00	0.00	0.06	0.12	0.0	0.0	2.0	0.0	19.8
19	7	109.9	219.8	0.0	0.0	2.8	5.6	0.00	0.00	0.04	0.08	0.0	0.0	2.1	0.0	19.7
23	5	76.6	153.3	0.0	0.0	4.1	8.3	0.00	0.00	0.04	0.09	0.0	0.0	2.0	0.0	19.9
AVG	111	65.2	109.4	0.0	0.0	5.7	16.8	0.01	0.02	0.11	0.18	0.0	0.1	2.1	0.0	19.2
TOT	321			0.0E+00	0.0E+00	3.2E-03	5.5E-03	4.0E-02	6.2E-02	3.5E-01	5.7E-01	1.2E-01	2.2E-01	6.6E+00	2.9E-03	6.1E+01

CCRE CVEN EMISSION REPORT

TEST 15
DATE AUGUST 06, 1973
START TIME 12:43:17

CVEN 3-6
PRI TEST

ENDING SECOND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O *	% H2 *	% O2 D
SECOND		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
19	25	37.0	37.0	0.1	0.1	0.0	0.0	0.00	0.00	0.05	0.05	0.0	0.0	5.7	0.0	18.7
24	41	29.3	29.3	0.2	0.2	0.0	0.0	0.00	0.00	0.04	0.04	0.0	0.0	5.7	0.0	18.8
29	41	27.2	27.2	0.2	0.2	0.0	0.0	0.00	0.00	0.05	0.05	0.0	0.0	5.6	0.0	18.8
34	43	27.0	27.0	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.07	0.0	0.0	5.6	0.0	18.7
39	42	38.4	38.4	0.1	0.1	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	5.7	0.0	18.8
44	42	31.9	31.9	0.4	0.4	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	5.6	0.0	18.7
49	43	29.0	29.0	0.2	0.2	0.0	0.0	0.00	0.00	0.07	0.07	0.0	0.0	5.6	0.0	18.7
54	43	33.7	33.7	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	5.6	0.0	18.7
59	44	23.9	23.9	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.07	0.0	0.0	5.5	0.0	18.7
04	46	38.3	38.3	0.2	0.2	0.0	0.0	0.00	0.00	0.05	0.05	0.0	0.0	5.5	0.0	18.6
09	49	45.5	45.5	0.6	0.6	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	5.5	0.0	18.7
14	50	34.1	34.1	0.5	0.5	0.0	0.0	0.00	0.00	0.07	0.07	0.0	0.0	5.5	0.0	18.2
19	50	47.2	47.2	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.10	0.0	0.0	5.5	0.0	18.3
24	51	58.6	58.6	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.10	0.0	0.0	5.5	0.0	18.7
29	52	70.2	70.2	0.0	0.0	0.1	0.1	0.00	0.00	0.10	0.10	0.0	0.0	5.6	0.0	18.6
34	51	62.3	62.3	0.4	0.4	1.2	1.2	0.00	0.00	0.08	0.08	0.0	0.0	5.6	0.0	18.7
39	50	72.0	72.0	0.3	0.3	2.2	2.2	0.00	0.00	0.08	0.08	0.0	0.0	5.6	0.0	18.6
44	49	67.9	67.9	0.3	0.3	1.8	1.8	0.00	0.00	0.08	0.08	0.0	0.0	5.6	0.0	18.6
49	50	75.8	75.8	0.6	0.6	1.0	1.0	0.00	0.00	0.06	0.06	0.0	0.0	5.6	0.0	18.6
54	50	77.3	77.3	0.2	0.2	0.6	0.6	0.00	0.00	0.08	0.08	0.0	0.0	5.6	0.0	18.6
59	48	85.4	85.4	0.0	0.0	0.7	0.7	0.00	0.00	0.05	0.05	0.0	0.0	5.6	0.0	18.4
04	49	54.5	54.5	0.0	0.0	0.2	0.2	0.00	0.00	0.07	0.07	0.0	0.0	5.6	0.0	18.5
09	49	60.1	60.1	0.0	0.0	0.2	0.2	0.00	0.00	0.09	0.09	0.0	0.0	5.6	0.0	18.2
14	44	58.2	58.2	0.0	0.0	0.1	0.1	0.00	0.00	0.06	0.06	0.0	0.0	5.6	0.0	18.3
19	37	71.4	85.6	0.4	0.6	0.6	0.8	0.00	0.00	0.07	0.09	0.0	0.0	5.5	0.0	18.5
24	42	67.8	67.8	0.5	0.5	1.0	1.0	0.00	0.00	0.08	0.08	0.0	0.0	5.5	0.0	18.7
29	42	56.9	56.9	0.7	0.7	1.0	1.0	0.00	0.00	0.07	0.07	0.0	0.0	5.5	0.0	18.7
34	41	55.7	55.7	0.5	0.5	1.6	1.6	0.00	0.00	0.05	0.05	0.0	0.0	5.5	0.0	18.6
39	36	72.6	85.1	0.5	0.6	1.2	1.4	0.00	0.00	0.08	0.10	0.0	0.0	5.5	0.0	18.5
44	38	233.9	233.9	0.6	0.6	1.0	1.0	0.10	0.10	0.08	0.08	0.0	0.0	5.5	0.0	18.6
49	43	205.1	205.1	0.5	0.5	0.8	0.8	0.20	0.20	0.13	0.13	0.0	0.0	5.5	0.0	18.6
54	41	29.0	29.0	0.8	0.8	0.1	0.1	0.14	0.14	0.11	0.11	0.0	0.0	5.4	0.0	18.6
59	42	0.0	0.0	0.9	0.9	0.1	0.1	0.14	0.14	0.09	0.09	0.0	0.0	5.4	0.0	18.7
04	41	0.0	0.0	0.9	0.9	0.0	0.0	0.26	0.26	0.11	0.11	0.0	0.0	5.4	0.0	18.6
09	41	0.0	0.0	0.8	0.8	0.0	0.0	0.40	0.40	0.17	0.17	0.0	0.0	5.5	0.0	18.6
14	41	0.0	0.0	0.9	0.9	0.0	0.0	0.48	0.48	0.14	0.14	0.0	0.0	5.4	0.0	18.5
19	41	0.0	0.0	0.8	0.8	0.0	0.0	0.44	0.44	0.12	0.12	0.0	0.0	5.5	0.0	18.5
24	39	0.0	0.0	0.7	0.7	0.0	0.0	0.32	0.32	0.11	0.11	0.0	0.0	5.6	0.0	18.6
28	31	0.0	0.0	0.3	0.3	0.3	0.3	0.22	0.22	0.09	0.09	0.0	0.0	5.5	0.0	18.6
AVG	530	51.1	51.8	0.4	0.4	0.4	0.4	0.07	0.07	0.08	0.08	0.0	0.0	5.5	0.0	18.6
TOT	1697			6.0E-04	6.0E-04	7.0E-04	7.1E-04	1.1E+00	1.1E+00	1.4E+00	1.4E+00	0.0E+00	0.0E+00	9.4E+01	0.0E+00	3.2E+02

COKE OVEN EMISSION REPORT

TEST 16
DATE AUGUST 07, 1973
START TIME 11:04:03

OVEN 3-4 #2 PROBE & THERMOCOUPLE DATA DEF
PRI TEST

END SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2			% H2 +	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
04	23	3.1	3.1	0.0	0.0	2.5	2.5	0.00	0.00	0.06	0.06	0.0	0.0		0.0	19.9
09	56	3.7	3.7	0.0	0.0	3.1	3.1	0.00	0.00	0.06	0.06	0.0	0.0		0.0	19.9
14	54	10.2	10.2	0.0	0.0	4.5	4.5	0.00	0.00	0.08	0.08	0.0	0.0		0.0	20.0
19	51	13.9	13.9	0.0	0.0	6.1	6.1	0.00	0.00	0.09	0.09	0.0	0.0		0.0	20.0
24	58	18.5	18.5	0.0	0.0	6.9	6.9	0.00	0.00	0.10	0.10	0.0	0.0		0.0	20.0
29	60	18.4	18.4	0.0	0.0	7.1	7.1	0.00	0.00	0.12	0.12	0.0	0.0		0.0	20.0
34	60	18.9	18.9	0.0	0.0	7.2	7.2	0.00	0.00	0.11	0.11	0.0	0.0		0.0	20.0
39	59	17.3	17.3	0.0	0.0	7.0	7.0	0.00	0.00	0.12	0.12	0.0	0.0		0.1	20.1
44	62	17.5	17.5	0.0	0.0	6.5	6.5	0.00	0.00	0.11	0.11	0.0	0.0		0.0	20.1
49	63	17.5	17.5	0.0	0.0	6.3	6.3	0.00	0.00	0.12	0.12	0.0	0.0		0.0	20.1
54	62	17.7	17.7	0.0	0.0	6.0	6.0	0.00	0.00	0.13	0.13	0.0	0.0		0.0	20.1
59	61	15.5	15.5	0.0	0.0	5.7	5.7	0.00	0.00	0.12	0.12	0.0	0.0		0.0	20.0
04	61	16.5	16.5	0.0	0.0	8.9	8.9	0.02	0.02	0.13	0.13	0.0	0.0		0.1	20.0
09	57	23.7	23.7	0.0	0.0	16.7	16.7	0.20	0.20	0.22	0.22	0.0	0.0		0.1	19.9
14	55	51.7	51.7	0.7	0.7	24.9	24.9	0.30	0.30	0.28	0.28	0.0	0.0		0.1	19.8
19	59	94.7	94.7	6.2	6.2	34.6	34.6	0.30	0.30	0.35	0.35	0.0	0.0		0.1	19.7
24	56	128.2	128.2	4.9	4.9	40.0	40.0	0.22	0.22	0.39	0.39	0.0	0.0		0.1	19.6
29	58	131.9	131.9	2.2	2.2	29.9	29.9	0.12	0.12	0.30	0.30	0.0	0.0		0.1	19.6
34	57	107.8	107.8	0.1	0.1	19.3	19.3	0.02	0.02	0.19	0.19	0.0	0.0		0.1	19.7
39	58	84.5	84.5	0.0	0.0	12.3	12.3	0.00	0.00	0.13	0.13	0.0	0.0		0.0	19.8
44	59	68.5	68.5	0.0	0.0	8.3	8.3	0.00	0.00	0.09	0.09	0.0	0.0		0.0	19.9
49	60	56.5	56.5	0.0	0.0	6.7	6.7	0.00	0.00	0.08	0.08	0.0	0.0		0.0	20.0
54	61	47.6	47.6	0.0	0.0	6.3	6.3	0.00	0.00	0.08	0.08	0.0	0.0		0.1	20.0
59	59	42.7	42.7	0.0	0.0	5.4	5.4	0.00	0.00	0.09	0.09	0.0	0.0		0.1	20.0
04	58	37.9	37.9	0.0	0.0	4.5	4.5	0.00	0.00	0.06	0.06	0.0	0.0		0.1	20.0
09	61	32.1	32.1	0.0	0.0	4.3	4.3	0.00	0.00	0.08	0.08	0.0	0.0		0.0	20.0
14	60	31.0	31.0	0.0	0.0	5.1	5.1	0.00	0.00	0.08	0.08	0.0	0.0		0.0	20.1
19	61	33.1	33.1	0.0	0.0	6.4	6.4	0.00	0.00	0.09	0.09	0.0	0.0		0.0	20.0
24	59	37.1	37.1	0.0	0.0	7.1	7.1	0.00	0.00	0.11	0.11	0.0	0.0		0.1	20.0
29	59	41.8	41.8	2.4	2.4	9.1	9.1	0.22	0.22	0.15	0.15	0.0	0.0		0.1	19.9
34	59	54.8	54.8	4.0	4.0	14.0	14.0	1.24	1.24	0.39	0.39	0.0	0.0		0.1	19.6
39	57	87.4	87.4	2.6	2.6	15.7	15.7	2.98	2.98	0.81	0.81	0.0	0.0		0.1	19.0
44	58	109.3	109.3	1.1	1.1	13.4	13.4	2.80	2.80	0.82	0.82	0.0	0.0		0.1	18.6
49	53	116.4	116.4	0.0	0.0	13.3	13.3	2.10	2.10	0.63	0.63	0.0	0.0		0.1	18.7
54	57	118.5	118.5	0.0	0.0	11.7	11.7	1.38	1.38	0.46	0.46	0.0	0.0		0.1	19.0
59	58	115.5	115.5	0.0	0.0	10.1	10.1	0.70	0.70	0.25	0.25	0.0	0.0		0.2	19.3
04	58	110.1	110.1	0.0	0.0	8.6	8.6	0.30	0.30	0.20	0.20	0.0	0.0		0.1	19.5
09	59	103.1	103.1	0.0	0.0	9.4	9.4	0.10	0.10	0.14	0.14	0.0	0.0		0.1	19.8
14	59	100.5	100.5	0.0	0.0	9.7	9.7	0.00	0.00	0.13	0.13	0.0	0.0		0.1	19.9
19	61	96.5	96.5	0.0	0.0	8.7	8.7	0.00	0.00	0.13	0.13	0.0	0.0		0.0	20.0
24	60	90.7	90.7	0.0	0.0	7.9	7.9	0.00	0.00	0.08	0.08	0.0	0.0		0.0	20.0
29	59	86.7	86.7	2.1	2.1	8.6	8.6	0.00	0.00	0.10	0.10	0.0	0.0		0.0	19.8
34	58	86.6	86.6	2.9	2.9	14.3	14.3	0.00	0.00	0.13	0.13	0.0	0.0		0.0	19.8
39	45	95.8	95.8	0.5	0.5	16.9	16.9	0.00	0.00	0.16	0.16	0.0	0.0		0.1	19.6
42	6	97.8	155.6	0.0	0.0	12.4	24.8	0.00	0.00	0.14	0.29	0.0	0.0		0.0	19.7
AVG	691	60.7	62.0	0.7	0.7	11.1	11.2	0.30	0.30	0.20	0.20	0.0	0.0	0.0	0.1	19.8
TOT	2533	1.5E-01	1.5E-01	1.7E-03	1.7E-03	2.8E-02	2.8E-02	7.4E+00	7.4E+00	5.0E+00	5.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+00	5.0E+02

COKE OVEN EMISSION REPORT

TEST 17
DATE AUGUST 06, 1972
START TIME 11:12:55

OVEN 3-4 EARLY PART OF TEST NOT RECORDED
PRI TEST

EAC INC SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O *	% H2 *	% C2 C
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
59	64	3.1	3.1	0.0	0.0	4.3	4.3	0.00	0.00	0.05	0.05	0.0	0.0	1.4	0.1	18.8
04	66	10.9	10.9	0.0	0.0	8.0	8.0	0.06	0.06	0.11	0.11	0.1	0.1	1.5	0.1	18.7
09	66	22.7	22.7	0.0	0.0	14.6	14.6	0.14	0.14	0.14	0.14	0.1	0.1	1.6	0.1	18.8
14	60	41.5	45.9	0.0	0.0	16.5	18.0	0.20	0.22	0.17	0.18	0.1	0.1	1.6	0.1	17.8
19	60	62.0	66.2	0.0	0.0	17.7	19.3	0.20	0.22	0.17	0.19	0.1	0.1	1.6	0.1	17.6
24	62	79.5	79.5	0.0	0.0	20.2	20.2	0.22	0.22	0.18	0.18	0.1	0.1	1.6	0.1	18.7
29	67	92.9	92.9	0.0	0.0	20.8	20.8	0.28	0.28	0.21	0.21	0.1	0.1	1.7	0.1	18.6
34	68	99.3	99.3	0.0	0.0	19.7	19.7	0.20	0.20	0.20	0.20	0.1	0.1	1.8	0.3	18.6
39	76	104.0	104.0	0.0	0.0	21.2	21.2	0.18	0.18	0.18	0.18	0.1	0.1	1.9	0.1	18.6
44	75	101.0	101.0	0.0	0.0	19.1	19.1	0.10	0.10	0.15	0.15	0.1	0.1	1.9	0.1	18.5
49	72	89.8	89.8	0.0	0.0	18.8	18.8	0.00	0.00	0.10	0.10	0.1	0.1	1.9	0.1	18.9
54	66	74.4	74.4	0.0	0.0	16.0	16.0	0.00	0.00	0.08	0.08	0.1	0.1	1.8	0.1	17.9
59	66	66.0	66.0	0.0	0.0	12.4	12.4	0.10	0.10	0.09	0.09	0.1	0.1	1.7	0.1	17.5
04	70	65.0	65.0	0.0	0.0	6.6	6.6	0.14	0.14	0.10	0.10	0.1	0.1	1.7	0.1	19.0
09	75	65.7	65.7	0.4	0.4	6.0	6.0	0.20	0.20	0.10	0.10	0.1	0.1	1.7	0.1	18.9
14	70	70.5	70.5	2.9	2.9	7.7	7.7	0.52	0.52	0.19	0.19	0.2	0.2	1.7	0.1	18.9
19	68	82.9	82.9	5.4	5.4	14.1	14.1	1.36	1.36	0.40	0.40	0.4	0.4	1.8	0.1	18.6
24	63	117.9	140.6	6.0	7.3	15.1	18.1	3.56	4.23	0.96	1.14	0.5	0.6	2.0	0.1	17.9
29	71	163.7	163.7	4.1	4.1	15.0	15.0	5.24	5.24	1.32	1.32	0.6	0.6	2.4	0.1	17.0
34	76	202.2	202.2	3.1	3.1	13.1	13.1	5.10	5.10	1.31	1.31	0.4	0.4	2.9	0.1	16.1
39	74	212.1	212.1	2.9	2.9	13.5	13.5	3.32	3.32	0.85	0.85	0.3	0.3	3.0	0.1	16.5
44	70	215.8	215.8	3.9	3.9	14.5	14.5	2.50	2.50	0.61	0.61	0.2	0.2	2.8	0.1	16.9
49	68	231.7	231.7	2.8	2.8	16.6	16.6	2.42	2.42	0.51	0.51	0.2	0.2	2.7	0.1	17.6
54	68	283.6	283.6	0.9	0.9	17.0	17.0	2.70	2.70	0.56	0.56	0.2	0.2	2.8	0.1	17.8
59	72	341.2	341.2	0.0	0.0	12.4	12.4	1.84	1.84	0.40	0.40	0.1	0.1	3.1	0.1	18.0
04	66	343.8	343.8	0.0	0.0	10.5	10.5	0.90	0.90	0.21	0.21	0.1	0.1	2.9	0.1	18.3
08	54	317.7	317.7	0.0	0.0	7.8	7.8	0.50	0.50	0.13	0.13	0.1	0.1	2.5	0.1	18.6
AVG	823	130.8	131.8	1.2	1.2	14.1	14.3	1.19	1.22	0.35	0.36	0.2	0.2	2.1	0.1	18.1
TOT	1837			2.2E-03	2.3E-03	2.6E-02	2.6E-02	2.2E+01	2.3E+01	6.6E+00	6.7E+00	3.2E+00	3.2E+00	3.6E+01	1.8E+00	3.3E+02

CCKE CVEN EMISSICN REPCRT

TEST 18
DATE AUGUST CS, 1S73
START TIME 15:21:31

CVEN 3-3 #3 SENSER BURNED OUT
MRI TEST

ENDING SECOND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NC		PPM NOX		% THC		% CO		% CO2		% H2C + % H2		% O2 D
SECND		MEAS	CCRR	MEAS	CCRR	MEAS	CORR	MEAS	CORR	MEAS	CCRR	MEAS	CORR	MEAS		MEAS
34	28	0.0	C.C	0.0	0.C	2.8	5.0	C.00	0.00	0.03	0.06	0.0	0.0	1.4	0.0	19.1
39	45	0.0	0.0	0.0	0.0	3.4	3.4	0.00	0.00	0.06	0.06	0.1	0.1	1.4	0.0	19.2
44	43	7.3	5.1	0.C	0.C	5.4	7.0	0.00	0.00	0.09	0.12	0.2	0.3	1.4	0.0	18.9
49	31	21.2	38.5	0.0	0.0	9.5	17.4	0.00	0.00	0.11	0.20	0.2	0.4	1.4	0.0	18.9
54	31	19.E	35.2	1.3	2.2	11.2	20.2	0.00	0.00	0.13	0.23	0.2	0.4	1.6	0.0	18.7
59	35	22.5	33.7	1.8	2.7	18.3	27.4	C.00	0.00	0.13	0.20	0.3	0.4	1.6	0.0	19.0
04	39	41.7	54.E	0.3	0.4	24.4	31.7	0.00	0.00	0.26	0.33	0.4	0.5	1.6	0.0	18.9
09	31	51.3	117.5	0.C	0.0	21.E	48.5	0.00	0.00	0.26	0.58	0.3	0.7	1.7	0.0	18.8
14	29	46.8	126.7	0.C	0.0	16.1	43.9	0.00	0.00	0.22	0.59	0.2	0.5	1.8	0.0	18.9
19	43	42.5	51.2	0.C	C.C	13.4	16.2	0.00	0.00	0.15	0.18	0.2	0.2	1.7	0.0	19.0
24	47	51.4	77.1	0.0	0.0	12.E	18.9	0.00	0.00	0.14	0.21	0.2	0.3	1.6	0.0	19.0
29	35	54.E	82.2	0.0	0.0	11.8	17.8	0.00	0.00	0.15	0.23	0.2	0.3	1.6	0.0	19.0
34	45	51.2	56.5	0.C	0.C	12.3	13.5	0.C0	0.00	0.12	0.13	0.2	0.2	1.6	0.0	18.6
39	45	47.5	61.5	0.C	0.0	16.1	21.0	0.00	0.00	0.16	0.20	0.2	0.3	1.E	0.0	18.8
44	38	48.E	72.2	C.C	0.C	15.0	28.5	C.06	0.09	0.21	0.31	0.2	0.3	1.6	0.0	18.4
49	35	52.1	72.5	0.C	0.0	19.3	27.0	0.08	0.12	0.20	0.28	0.2	0.3	1.6	0.0	18.6
54	34	57.C	74.E	0.C	0.C	17.9	23.2	0.00	0.00	0.21	0.27	0.2	0.3	1.6	0.0	18.4
59	34	62.1	55.1	C.C	0.0	17.0	25.5	C.00	0.00	0.17	0.25	0.2	0.3	1.6	0.0	18.5
04	40	61.E	52.4	0.0	0.C	14.9	22.4	0.00	0.00	0.14	0.21	0.2	0.3	1.E	0.0	18.6
09	37	55.5	83.3	0.0	0.C	10.0	15.0	0.00	0.00	0.12	0.18	0.2	0.3	1.7	0.0	18.7
14	36	46.9	70.4	0.0	0.0	7.7	11.6	0.00	0.00	0.C7	0.11	0.1	0.1	1.6	0.0	19.0
19	36	39.3	58.9	0.0	C.C	6.E	9.9	0.00	0.00	0.04	0.06	0.1	0.1	1.6	0.0	18.9
24	36	36.0	54.1	0.0	0.0	12.1	18.2	0.00	0.00	0.06	0.09	0.1	0.1	1.5	0.0	19.0
29	34	36.E	55.2	0.C	0.C	15.6	23.4	0.08	0.12	0.17	0.26	0.1	0.1	1.5	0.0	19.0
34	36	43.1	64.6	0.0	0.C	18.2	27.3	C.16	0.24	0.21	0.32	0.1	0.1	1.5	0.0	18.9
39	40	5C.5	75.7	0.0	0.0	18.E	27.9	0.20	0.30	0.23	0.35	0.2	0.3	1.7	0.0	18.8
44	34	6C.2	9C.3	0.C	0.C	17.9	26.8	C.14	0.21	0.23	0.34	0.2	0.3	1.7	0.0	18.9
49	38	67.8	1C1.E	0.0	0.0	15.1	22.6	0.10	0.15	0.19	0.28	0.2	0.3	1.8	0.0	18.8
54	43	77.2	115.E	0.C	0.C	15.5	23.2	0.18	0.27	0.24	0.36	0.2	0.3	1.7	0.0	18.9
59	39	92.5	13E.7	0.0	0.0	19.1	28.6	0.52	0.78	0.37	0.55	0.2	0.3	1.7	0.0	18.7
00	7	104.4	156.E	C.C	0.C	18.5	27.8	0.60	0.90	0.42	0.63	0.2	0.3	1.9	0.0	18.5
AVG	449	45.5	69.7	0.1	0.2	14.2	21.9	0.05	0.08	0.16	0.26	0.2	0.3	1.6	0.0	18.8
TOT	1123	-	-	1.2E-04	1.8E-04	1.6E-02	2.4E-02	6.2E-01	9.3E-01	1.8E+00	2.8E+00	2.1E+00	3.1E+00	1.8E+01	0.0E+00	2.1E+02

COKE OVEN EMISSION REPORT

TEST 19 OVEN 3-5
DATE AUGUST 13, 1973 PPI TEST A1
START TIME 11:11:04

END ING SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% O2 C
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
04	2	20.6	61.6	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.11	0.0	0.0	2.4	0.0	15.4
09	9	22.9	66.6	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.21	0.0	0.0	2.6	0.0	19.4
14	7	11.8	35.4	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.19	0.0	0.0	2.6	0.0	19.5
19	7	15.5	46.6	0.0	0.0	0.0	0.0	0.00	0.00	0.11	0.32	0.0	0.0	2.6	0.0	19.4
24	7	12.1	36.4	0.0	0.0	0.0	0.0	0.00	0.00	0.08	0.24	0.0	0.0	2.6	0.0	19.4
29	3	11.1	33.5	0.0	0.0	0.0	0.0	0.00	0.00	0.05	0.14	0.0	0.0	2.6	0.0	19.4
34	2	18.3	36.6	0.0	0.0	0.1	0.1	0.00	0.00	0.05	0.06	0.0	0.0	2.6	0.0	19.4
39	7	22.6	67.5	0.0	0.0	0.0	0.0	0.00	0.00	0.09	0.28	0.0	0.0	2.7	0.0	19.4
44	4	18.2	35.6	0.0	0.0	0.0	0.0	0.00	0.00	0.09	0.23	0.0	0.0	2.7	0.0	19.5
49	0	18.3	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.00	0.0	0.0	2.6	0.0	19.5
54	0	10.4	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.05	0.00	0.0	0.0	2.7	0.0	19.4
59	2	4.7	4.5	0.0	0.0	0.0	0.0	0.00	0.00	0.08	0.09	0.0	0.0	2.7	0.0	19.4
04	6	16.5	50.6	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.21	0.0	0.0	2.6	0.0	19.5
09	6	14.7	44.2	0.0	0.0	0.0	0.0	0.00	0.00	0.08	0.24	0.0	0.0	2.6	0.0	19.5
14	7	15.3	46.6	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.29	0.0	0.0	2.6	0.0	19.5
19	5	15.3	46.6	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.29	0.0	0.0	2.6	0.0	19.5
24	5	14.3	44.2	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.31	0.0	0.0	2.6	0.0	19.4
29	6	20.6	61.6	0.0	0.0	0.0	0.0	0.00	0.00	0.09	0.28	0.0	0.0	2.5	0.0	19.4
34	6	23.6	70.8	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.22	0.0	0.0	2.5	0.0	19.4
39	6	24.4	73.2	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.29	0.0	0.0	2.5	0.0	19.4
44	7	21.2	63.6	0.0	0.0	0.0	0.0	0.00	0.00	0.08	0.23	0.0	0.0	2.5	0.0	19.5
49	6	24.3	73.0	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.22	0.0	0.0	2.5	0.0	19.4
54	7	12.0	36.1	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.19	0.0	0.0	2.6	0.0	19.5
59	3	26.0	45.4	0.0	0.0	0.6	1.9	0.00	0.00	0.06	0.14	0.0	0.0	2.6	0.0	19.5
04	6	22.0	66.1	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.21	0.0	0.0	2.6	0.0	19.5
09	7	16.5	49.4	0.0	0.0	0.0	0.0	0.00	0.00	0.08	0.24	0.0	0.0	2.4	0.0	19.6
14	8	12.0	36.5	0.3	0.6	0.0	0.0	0.00	0.00	0.07	0.22	0.1	0.3	2.4	0.0	19.6
19	12	18.6	55.5	5.0	15.1	1.6	5.3	0.50	1.50	0.22	0.67	0.1	0.3	2.4	0.0	19.6
24	10	56.4	170.1	9.0	27.1	7.8	23.4	2.86	8.58	0.90	2.70	0.4	1.2	2.5	0.0	19.3
29	11	115.6	346.5	11.6	34.8	12.0	35.9	6.22	18.66	1.76	5.28	0.7	2.0	3.0	0.0	18.4
34	9	194.2	582.7	16.9	50.7	22.5	37.4	7.00	21.00	2.29	6.86	0.9	2.6	3.7	0.0	17.3
35	8	241.0	723.1	20.3	60.8	13.7	41.1	7.00	21.00	2.44	7.33	0.9	2.6	4.2	0.2	16.4
44	7	297.4	892.3	35.5	46.6	14.2	42.5	7.00	21.00	2.36	7.07	0.9	2.6	4.8	0.7	15.9
49	7	364.4	1093.2	8.2	24.6	11.7	35.0	6.96	20.88	2.16	6.49	0.8	2.3	5.1	1.0	15.8
54	8	381.6	1144.7	4.1	12.2	11.3	33.8	6.82	20.46	1.66	4.98	0.6	1.7	5.3	0.1	16.0
59	7	360.8	1082.4	1.4	4.2	9.0	27.0	4.50	13.50	1.05	3.16	0.5	1.4	5.0	0.0	16.7
04	6	342.3	1027.0	0.4	1.1	7.6	23.5	2.44	7.32	0.60	1.80	0.3	0.9	4.5	0.0	17.5
09	7	290.1	870.4	0.0	0.0	5.5	17.7	1.36	4.08	0.38	1.14	0.1	0.3	4.0	0.0	18.1
14	6	285.6	857.0	0.0	0.0	3.6	11.7	0.76	2.28	0.25	0.76	0.1	0.3	3.7	0.0	18.5
19	6	249.6	748.7	0.0	0.0	3.3	10.0	0.42	1.26	0.20	0.59	0.1	0.3	3.5	0.0	18.8
24	6	225.7	677.0	0.0	0.0	1.9	5.6	0.24	0.72	0.16	0.49	0.1	0.3	3.4	0.0	18.9
29	6	209.6	628.8	0.0	0.0	1.5	5.7	0.20	0.60	0.12	0.37	0.1	0.3	3.4	0.0	18.9
34	14	207.7	311.6	0.0	0.0	5.6	8.5	0.34	0.51	0.15	0.25	0.1	0.1	3.4	0.0	18.9
39	8	228.1	684.2	0.0	0.0	9.5	28.5	0.52	1.56	0.28	0.85	0.1	0.3	3.4	0.0	18.9
44	9	235.8	428.4	0.0	0.0	9.2	16.5	0.50	0.90	0.32	0.56	0.1	0.2	3.4	0.0	18.8
45	15	234.2	420.3	0.0	0.0	8.6	15.7	0.42	0.78	0.30	0.54	0.2	0.3	3.5	0.0	18.8
54	12	235.6	707.3	0.0	0.0	8.4	25.3	0.50	0.90	0.21	0.64	0.2	0.6	3.2	0.0	18.9
59	14	223.8	671.3	0.0	0.0	4.9	14.8	0.14	0.42	0.16	0.43	0.1	0.3	3.2	0.0	18.9
04	16	204.1	612.2	0.0	0.0	3.2	9.7	0.02	0.06	0.07	0.20	0.0	0.0	3.1	0.0	19.1
09	15	191.0	573.0	0.0	0.0	1.8	5.5	0.00	0.00	0.11	0.32	0.1	0.3	3.0	0.0	19.1
14	24	177.1	265.6	0.0	0.0	1.2	1.9	0.00	0.00	0.07	0.11	0.1	0.1	3.0	0.0	19.1
15	4	149.0	223.5	0.0	0.0	0.5	0.8	0.00	0.00	0.07	0.10	0.1	0.1	3.0	0.0	19.1
AVG	93	120.1	333.0	1.8	5.5	3.4	9.7	1.12	3.33	0.41	1.17	0.2	0.4	3.1	0.0	18.9
TOT	390	5.6E-02	1.5E-01	8.1E-04	2.4E-03	1.6E-03	4.4E-03	4.7E+00	1.4E+01	1.7E+00	4.9E+00	6.9E-01	2.0E+00	1.2E+01	1.5E-01	7.3E+01

CCKE CVEN EMISSION REPORT

TEST 20
CATE AUGUST 14, 1973
START TIME 11:0E:C6

CVEN 3-4
MRI TEST K2

END SEC NC	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SC2		PPM NC		PPM NOX		% THC		% CC		% CO2		% H2C *	% H2	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
09	5	6.5	15.6	0.0	C.C	4.9	7.4	0.00	0.00	0.00	0.00	0.0	0.0	2.2	0.0	19.4
14	13	18.7	56.C	0.0	0.0	5.0	15.0	0.00	0.00	0.C0	0.01	0.0	0.0	2.2	0.0	19.4
19	15	31.2	9E.5	0.C	0.C	8.8	26.5	0.00	0.00	0.02	0.06	0.C	0.0	2.2	0.0	19.4
24	12	51.3	154.C	0.C	0.C	28.7	86.1	0.02	0.06	0.10	0.30	0.0	0.0	2.4	0.0	19.3
29	13	73.E	221.3	0.0	0.0	55.6	166.9	0.16	0.48	0.23	0.69	0.0	0.C	2.6	0.0	19.1
34	13	9E.2	29?.E	0.0	0.C	62.0	186.0	0.20	0.60	0.30	0.91	0.8	2.3	2.8	0.0	18.9
39	12	124.E	374.3	0.3	1.C	65.6	196.7	0.20	0.60	0.27	0.81	0.5	1.5	3.0	0.0	18.9
44	8	142.9	42E.E	C.9	2.7	70.2	210.5	0.30	0.90	0.25	0.74	0.4	1.2	3.0	0.0	18.8
49	5	183.E	214.1	1.0	1.3	64.5	81.4	0.24	0.36	0.23	0.29	0.3	0.3	3.0	0.0	18.9
54	3	191.7	237.5	0.2	C.E	4E.7	64.9	0.16	0.24	0.20	0.24	0.2	0.2	3.C	0.0	19.0
59	2	181.6	9E.0	0.0	0.C	31.3	15.0	0.06	0.00	0.08	0.04	0.1	0.1	2.8	0.0	19.1
04	7	157.4	3E1.C	0.C	0.0	19.4	48.4	0.00	0.00	0.C2	0.06	0.1	0.2	2.5	0.0	19.1
09	2	139.4	165.E	0.C	0.C	11.6	14.4	0.C0	0.00	0.01	0.01	0.1	0.1	2.5	0.0	19.2
14	6	114.C	28C.6	0.0	0.0	10.1	23.8	0.00	0.00	0.02	0.06	0.1	0.2	2.4	0.0	19.2
19	12	106.C	257.5	0.C	C.C	9.7	23.3	0.00	0.00	0.01	0.01	0.1	0.2	2.3	0.0	19.3
24	7	99.2	179.3	0.C	0.0	11.4	19.E	0.C0	0.00	0.C1	0.01	0.1	0.2	2.4	0.0	19.2
29	8	93.0	155.1	0.C	0.0	1C.9	19.4	0.00	0.00	0.00	0.00	0.1	0.2	2.3	0.0	19.3
34	15	95.6	2E6.E	0.0	0.C	9.5	29.8	0.00	0.00	0.00	0.01	0.2	0.6	2.4	0.0	19.3
39	2	83.7	53.E	0.C	0.0	9.6	6.3	0.00	0.00	0.00	0.00	0.2	C.1	2.3	0.0	19.4
44	15	81.2	243.6	0.C	0.C	9.7	29.2	0.00	0.00	0.01	0.02	0.1	0.3	2.4	0.0	19.4
49	15	79.8	239.3	0.C	0.0	9.C	27.1	C.C0	0.00	0.C0	0.01	0.1	0.3	2.4	0.0	19.3
54	16	75.2	225.6	0.C	C.C	8.5	25.4	0.00	0.00	0.01	0.02	0.1	0.3	2.4	C.0	19.3
59	1	80.2	46.9	0.0	0.0	9.1	5.5	0.00	0.00	0.C0	0.00	0.1	0.1	2.4	0.0	19.3
04	9	81.8	2C1.C	0.C	0.0	16.3	39.6	0.00	0.00	0.00	0.00	0.1	0.2	2.4	C.C	19.3
09	8	82.3	246.E	0.0	C.C	14.5	43.6	0.00	0.00	0.C0	C.C0	0.1	0.3	2.4	0.0	19.3
14	14	82.8	246.3	0.C	0.0	16.6	49.9	0.00	0.00	0.C1	0.04	0.1	0.3	2.4	C.0	19.3
19	7	99.E	165.4	C.C	C.C	12.5	24.7	0.34	0.24	0.03	0.00	0.1	0.2	2.4	C.0	19.2
24	4	117.C	139.E	0.C	0.0	11.9	15.4	1.42	1.80	0.26	0.37	0.2	0.2	2.5	0.0	19.1
29	14	125.1	375.4	C.C	0.C	11.8	35.4	1.16	3.48	0.40	1.20	0.2	0.6	2.7	0.0	19.0
34	16	110.1	33C.4	0.0	C.C	8.1	24.4	0.44	1.32	0.18	C.54	0.2	0.6	2.8	0.0	18.9
39	12	112.C	336.1	0.C	0.C	5.3	16.0	0.10	0.30	0.06	0.1E	0.1	0.3	2.7	0.0	19.0
44	3	103.E	124.E	0.0	0.C	6.3	7.5	0.00	0.00	0.01	0.02	0.1	0.1	2.5	0.0	19.1
45	0	107.C	C.C	0.C	0.0	5.5	0.0	0.00	0.00	0.04	C.00	0.1	C.0	2.5	0.0	19.0
AVG	111	101.4	215.2	0.1	C.2	21.2	45.5	0.15	0.32	0.C9	0.21	0.1	0.4	2.5	0.0	19.2
TOT	296			2.1E-05	6.2E-05	6.2E-03	1.8E-02	4.3E-01	1.3E+00	2.7E-01	8.1E-01	4.5E-01	1.4E+00	7.5E+00	0.0E+00	5.7E+01

CCKE CVEN EPISSICN PEFCRT

TFST c1
LFTE AUGUST 15, 1973
STAPT TIMF 10:56:15

OVEN 3-3 FLCh STOPPED ON #3
PRI TEST K3

ENC SEC NE	FIVE SECCNC TOTAL VCLUME FLCw	FIVE SECCNC AVERAGE														
		PPM SCX		PPM NO		PPM NOX		% THC		% CC		% CO2		% H2C	% H2	% O2
		MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	MEAS	MEAS
19	73	8.4	8.4	2.1	2.1	0.8	0.8	0.00	0.00	0.09	0.09	0.1	0.1	2.2	C.C	19.6
24	79	24.3	24.3	3.0	3.0	5.7	5.7	0.02	0.02	0.19	0.19	0.5	0.5	2.2	0.0	19.5
29	74	69.4	69.4	2.9	2.9	32.2	32.2	0.22	0.22	0.52	0.52	1.1	1.1	2.4	0.0	19.2
34	74	85.7	85.7	2.5	2.5	42.6	42.6	0.30	0.30	0.58	0.58	0.9	0.9	2.9	C.C	18.6
39	74	119.9	119.9	0.4	0.4	74.3	74.3	0.30	0.30	0.49	0.49	0.6	0.6	3.1	0.0	18.2
44	76	136.8	136.8	0.0	0.0	75.6	75.6	0.30	0.30	0.41	0.41	0.3	0.3	3.0	C.C	18.3
49	75	132.8	132.8	0.0	0.0	66.1	66.1	0.22	0.22	0.35	0.35	0.2	0.2	2.8	0.0	18.9
54	75	126.3	126.3	0.0	0.0	52.4	52.4	0.20	0.20	0.28	0.28	0.2	0.2	2.7	C.C	19.1
59	75	130.7	130.7	0.0	0.0	34.1	34.1	0.34	0.34	0.41	0.41	0.2	0.2	2.5	C.C	19.2
04	75	135.2	135.2	0.0	0.0	30.8	30.8	0.56	0.56	0.52	0.52	0.2	0.2	2.6	0.0	19.2
09	73	165.3	165.3	0.7	0.7	35.8	35.8	1.16	1.16	0.82	0.82	0.3	0.3	2.7	0.0	19.0
14	68	247.4	247.4	2.1	2.1	52.0	52.0	1.40	1.40	0.88	0.88	0.3	0.3	2.9	0.0	18.8
19	69	316.6	316.6	0.0	0.0	63.4	63.4	1.28	1.28	0.75	0.75	0.3	0.3	3.1	C.C	18.7
24	70	340.4	340.4	0.4	0.4	57.4	57.4	1.14	1.14	0.63	0.63	0.2	0.2	3.1	0.0	18.7
29	68	336.5	336.5	3.1	3.1	43.4	43.4	1.76	1.76	0.50	0.50	0.3	0.3	3.0	0.0	18.7
34	69	380.1	380.1	7.3	7.3	40.3	40.3	2.52	2.52	1.07	1.07	0.3	0.3	3.1	C.C	18.5
39	67	513.5	513.5	6.1	6.1	46.5	46.5	4.74	4.74	1.70	1.70	0.5	0.5	3.5	0.0	17.8
44	65	625.7	625.7	3.7	3.7	56.2	56.2	4.22	4.22	1.41	1.41	0.4	0.4	4.0	C.C	17.8
49	71	675.6	675.6	5.8	5.8	45.6	45.6	3.16	3.16	0.55	0.55	0.3	0.3	4.0	0.0	17.9
54	74	644.8	644.8	12.6	12.6	28.9	28.9	4.10	4.10	1.04	1.04	0.3	0.3	3.7	C.C	18.1
59	74	617.5	617.5	19.9	19.9	24.8	24.8	6.80	6.80	1.70	1.70	0.5	0.5	3.7	0.0	17.9
04	73	623.1	623.1	28.5	28.5	24.4	24.4	6.94	6.94	2.27	2.27	0.6	0.6	4.0	C.C	17.0
09	80	667.1	667.1	31.9	31.9	24.1	24.1	6.96	6.96	2.51	2.51	0.9	0.9	4.8	2.9	16.1
14	79	753.9	753.9	33.0	33.0	22.9	22.9	6.56	6.96	2.53	2.53	0.9	0.9	5.5	C.C	15.6
19	76	816.8	816.8	34.2	34.2	24.8	24.8	6.98	6.98	2.44	2.44	0.8	0.8	5.5	7.1	15.5
24	73	885.5	885.5	35.1	35.1	27.0	27.0	6.96	6.96	2.33	2.33	0.8	0.8	6.1	6.9	15.4
29	64	952.7	952.7	37.3	37.3	30.4	30.4	6.96	6.96	2.16	2.16	0.8	0.8	6.1	6.5	15.5
34	57	1024.8	1024.8	40.5	40.5	38.3	38.3	7.00	7.00	2.05	2.05	0.8	0.8	6.2	5.5	15.6
39	43	1107.2	1107.2	43.8	43.8	34.5	34.5	6.92	6.92	1.97	1.97	0.7	0.7	6.2	5.4	15.8
44	37	1236.8	1236.8	46.8	46.8	35.6	35.6	6.94	6.94	2.04	2.04	0.7	0.7	6.4	6.2	15.8
49	45	1380.0	1380.0	48.5	48.5	42.7	42.7	6.58	6.58	2.14	2.14	0.7	0.7	6.7	7.7	15.7
54	46	1512.4	1512.4	49.7	49.7	49.8	49.8	6.94	6.94	2.19	2.19	0.8	0.8	6.9	9.0	15.5
59	60	1651.8	1651.8	50.5	50.5	57.9	57.9	6.92	6.92	2.23	2.23	0.7	0.7	7.1	8.9	15.2
04	60	1793.0	1793.0	50.4	50.4	66.9	66.9	6.92	6.92	2.10	2.10	0.6	0.6	7.2	8.5	15.3
09	80	1956.6	1956.6	52.8	52.8	78.8	78.8	7.00	7.00	2.05	2.05	0.7	0.7	7.5	8.1	15.4
14	85	2156.0	2156.0	54.0	54.0	104.6	104.6	7.00	7.00	2.02	2.02	0.6	0.6	7.5	7.8	15.5
19	72	2371.1	2371.1	47.1	47.1	146.8	146.8	7.00	7.00	2.06	2.06	0.6	0.6	6.7	8.2	15.4
24	69	2586.5	2586.5	40.3	40.3	205.2	205.2	7.00	7.00	2.05	2.05	0.7	0.7	6.8	9.1	15.4
29	72	2756.7	2756.7	46.5	46.5	246.9	246.9	7.00	7.00	1.78	1.78	0.6	0.6	6.6	5.3	15.6
34	70	2932.8	2932.8	35.2	35.2	278.9	278.9	6.94	6.94	1.65	1.65	0.6	0.6	6.3	3.5	15.9
39	69	3113.7	3113.7	28.5	28.5	313.5	313.5	6.94	6.94	1.72	1.72	0.5	0.5	6.1	3.1	16.1
44	70	3252.5	3252.5	28.1	28.1	318.6	318.6	6.94	6.94	1.43	1.43	0.4	0.4	6.0	1.1	16.3
49	72	3380.4	3380.4	22.5	22.5	318.8	318.8	6.92	6.92	1.38	1.38	0.4	0.4	5.7	0.2	16.6
54	71	3471.3	3471.3	13.6	13.6	319.0	319.0	6.88	6.88	1.31	1.31	0.3	0.3	5.4	0.1	16.8
59	70	3485.7	3485.7	7.0	7.0	318.7	318.7	4.74	4.74	0.51	0.51	0.4	0.4	5.0	C.C	17.1
04	68	3430.4	3430.4	3.6	3.6	318.8	318.8	2.72	2.72	0.51	0.51	0.1	0.1	4.4	C.C	17.7
09	70	3311.7	3311.7	1.3	1.3	318.5	318.5	1.44	1.44	0.32	0.32	0.1	0.1	3.8	0.0	18.2
14	68	3124.5	3124.5	0.0	0.0	308.1	308.1	1.14	1.14	0.21	0.21	0.1	0.1	3.4	0.0	18.5
19	72	2942.4	2942.4	0.3	0.3	243.6	243.6	0.90	0.90	0.19	0.19	0.0	0.0	3.1	C.C	18.7
24	59	2731.8	2731.8	1.0	1.0	215.3	215.3	0.80	0.80	0.19	0.19	0.0	0.0	2.9	0.0	18.8
29	42	2581.7	2581.7	3.4	3.4	184.7	184.7	1.08	1.08	0.19	0.19	0.0	0.0	2.9	C.C	18.9
34	13	2432.7	2432.7	1.3	1.3	165.4	169.4	1.50	1.50	0.30	0.30	0.0	0.0	2.9	0.0	18.9
39	11	2274.2	2274.2	0.0	0.0	154.0	154.0	0.90	0.90	0.20	0.20	0.0	0.0	2.9	C.C	18.9
44	11	2119.2	2119.2	0.0	0.0	145.6	145.6	0.58	0.58	0.13	0.13	0.0	0.0	2.7	0.0	18.9
49	11	1993.3	1993.3	C.C	C.C	136.9	136.9	0.44	0.44	0.12	0.12	0.C	0.C	2.6	C.C	19.0
54	12	1898.6	1898.6	C.C	0.0	125.C	125.C	0.40	0.40	0.19	0.19	0.0	0.0	2.5	C.C	19.1
59	11	1811.1	1811.1	C.C	0.0	114.3	114.3	0.40	0.40	0.08	0.08	0.C	0.C	2.5	0.0	19.1
04	10	1751.6	1751.6	C.C	0.0	103.5	103.5	0.40	0.40	0.13	0.13	0.C	0.C	2.4	C.C	19.1
08		1667.2	1667.2	0.0	0.0	102.4	102.4	0.30	0.30	0.12	0.12	0.0	0.0	2.5	0.0	19.0
AVC	722	1453.4	1453.4	16.7	16.7	113.7	113.7	3.42	3.42	1.12	1.12	0.4	0.4	4.2	2.2	17.5
TCT	3539			9.4E-02	9.4E-02	6.1E-01	6.1E-01	2.1E+02	2.1E+02	6.4E+01	6.4E+01	2.4E+01	2.4E+01	1.6E+02	8.0E+01	6.2E+02

COKE OVEN-EMISSION REPORT

TEST 22
DATE AUGUST 15, 1973
START TIME 15:37:08

OVEN 3-11
PRI TEST

END ING SEC ND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
09	18	456.4	456.4	52.0	52.0	0.0	0.0	0.05	0.05	1.73	1.73	5.1	5.1	3.6	0.0	15.0
14	30	496.4	496.4	43.0	43.0	2.7	2.7	0.10	0.10	1.89	1.89	6.5	6.5	4.1	0.0	13.0
19	11	383.4	383.4	28.8	28.8	39.9	39.9	0.04	0.04	1.74	1.74	5.7	5.7	4.6	0.0	12.1
24	3	195.8	195.8	13.4	13.4	122.2	122.2	0.00	0.00	1.27	1.27	3.8	3.8	4.7	0.0	13.4
29	1	77.9	77.9	9.9	9.9	170.1	170.1	0.00	0.00	0.82	0.82	2.3	2.3	4.1	0.0	15.5
34	2	11.1	11.1	6.4	6.4	153.8	153.8	0.00	0.00	0.55	0.55	1.6	1.6	3.7	0.0	17.1
39	3	2.0	2.0	4.3	4.3	111.7	111.7	0.00	0.00	0.42	0.42	1.2	1.2	3.2	0.0	17.9
44	4	0.0	0.0	2.2	2.2	75.1	75.1	0.00	0.00	0.32	0.32	1.0	1.0	3.0	0.0	18.4
49	3	0.0	0.0	0.0	0.0	49.3	49.3	0.00	0.00	0.27	0.27	0.7	0.7	2.8	0.0	18.6
54	3	0.0	0.0	0.0	0.0	33.9	33.9	0.00	0.00	0.19	0.19	0.5	0.5	2.7	0.0	19.1
59	2	0.0	0.0	0.0	0.0	25.8	25.8	0.00	0.00	0.13	0.13	0.2	0.2	2.7	0.0	19.3
04	2	0.0	0.0	0.0	0.0	20.1	20.1	0.00	0.00	0.10	0.10	0.2	0.2	2.5	0.0	19.6
09	3	0.0	0.0	0.0	0.0	15.1	15.1	0.00	0.00	0.10	0.10	0.1	0.1	2.6	0.0	19.7
14	6	0.0	0.0	0.0	0.0	12.0	12.0	0.04	0.04	0.08	0.08	0.1	0.1	2.5	0.0	19.8
19	38	26.8	26.8	0.0	0.0	9.7	9.7	4.46	4.46	0.59	0.59	0.3	0.3	2.6	0.0	19.5
24	43	368.0	368.0	1.8	1.8	9.5	9.5	13.36	13.36	2.89	2.89	1.0	1.0	4.1	3.9	16.8
29	40	904.1	904.1	16.0	16.0	9.8	9.8	14.00	14.00	3.76	3.76	1.5	1.5	7.0	18.4	12.1
34	32	1478.1	1478.1	31.9	31.9	16.0	16.0	14.00	14.00	3.67	3.67	1.6	1.6	9.2	24.7	9.2
39	14	1728.0	1728.0	24.6	24.6	55.5	55.5	13.48	13.48	3.38	3.38	1.2	1.2	9.5	18.8	9.7
44	11	1787.8	1787.8	11.5	11.5	95.6	95.6	10.70	10.70	2.32	2.32	0.7	0.7	8.2	8.6	12.3
49	32	1854.0	1854.0	7.4	7.4	115.5	115.5	11.30	11.30	1.91	1.91	0.7	0.7	6.5	4.0	14.1
54	34	1524.5	1924.5	7.5	7.5	106.3	106.3	13.98	13.98	2.73	2.73	0.8	0.8	5.9	9.6	13.8
59	12	1743.4	1743.4	19.4	19.4	80.7	80.7	13.24	13.24	2.99	2.99	0.9	0.9	7.0	12.5	12.4
04	10	1516.0	1516.0	18.7	18.7	60.4	60.4	9.08	9.08	2.03	2.03	0.6	0.6	7.3	5.0	13.2
09	7	1362.4	1362.4	3.0	3.0	54.9	54.9	6.30	6.30	1.30	1.30	0.5	0.5	6.2	0.3	15.1
14	7	1217.9	1217.9	3.4	3.4	57.7	57.7	4.30	4.30	0.92	0.92	0.4	0.4	4.9	0.0	16.3
19	15	1085.3	1085.3	2.1	2.1	53.5	53.5	2.50	2.50	0.56	0.56	0.4	0.4	4.1	0.0	17.3
20	3	1010.2	1010.2	2.3	2.3	49.2	49.2	1.80	1.80	0.37	0.37	0.2	0.2	3.7	0.0	17.8
AVG	175	697.3	697.3	10.4	10.4	58.9	58.9	4.93	4.93	1.42	1.42	1.4	1.4	4.8	4.0	15.6
TOT	389			5.7E-03	5.7E-03	1.7E-02	1.7E-02	3.3E+01	3.3E+01	8.4E+00	8.4E+00	6.5E+00	6.5E+00	2.1E+01	2.7E+01	5.6E+01

COKE OVEN EMISSION REPORT

TEST 23
DATE AUGUST 16, 1973
START TIME 15:15:50

OVEN 3-12
MRI TEST W12

END ING SEC ND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% C2 C
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
54	23	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.11	0.11	0.0	0.0	1.8	0.0	19.3
59	13	0.6	0.6	0.0	0.0	7.4	7.4	0.00	0.00	0.10	0.10	0.0	0.0	1.8	0.0	19.2
04	11	0.0	0.0	0.0	0.0	26.0	26.0	0.00	0.00	0.24	0.24	0.0	0.0	1.9	0.0	18.9
09	8	0.0	0.0	0.0	0.0	28.0	28.0	0.04	0.04	0.31	0.31	0.0	0.0	1.9	0.0	18.6
14	7	1.2	1.2	0.0	0.0	24.6	24.6	0.16	0.16	0.31	0.31	0.0	0.0	1.9	0.0	18.5
19	5	0.0	0.0	0.0	0.0	27.9	27.9	0.28	0.28	0.39	0.39	0.0	0.0	2.1	0.0	18.5
24	5	2.4	2.4	0.0	0.0	29.2	29.2	0.30	0.30	0.43	0.43	0.0	0.0	2.1	0.0	18.6
29	6	0.1	0.1	0.0	0.0	27.3	27.3	0.26	0.26	0.39	0.39	0.0	0.0	2.1	0.0	18.7
34	5	0.0	0.0	0.0	0.0	18.8	18.8	0.18	0.18	0.32	0.32	0.0	0.0	2.1	0.0	18.9
39	5	0.0	0.0	0.0	0.0	15.9	15.9	0.14	0.14	0.27	0.27	0.0	0.0	1.9	0.0	19.1
44	6	0.6	0.6	0.0	0.0	13.8	13.8	0.18	0.18	0.26	0.26	0.0	0.0	1.9	0.0	19.1
49	5	0.0	0.0	0.0	0.0	11.2	11.2	0.16	0.16	0.23	0.23	0.0	0.0	1.9	0.0	19.2
54	5	4.8	4.8	0.0	0.0	10.0	10.0	0.20	0.20	0.25	0.25	0.0	0.0	1.9	0.0	19.1
59	36	0.6	0.6	0.0	0.0	11.0	11.0	1.74	1.74	0.21	0.21	0.0	0.0	1.9	0.0	19.0
04	45	0.0	0.0	0.0	0.0	32.1	32.1	9.46	9.46	1.43	1.43	0.0	0.0	2.5	0.0	17.9
09	31	0.0	0.0	0.0	0.0	70.2	70.2	13.96	13.96	2.95	2.95	0.0	0.0	4.2	1.9	15.6
14	7	3.6	3.6	0.0	0.0	69.2	69.2	12.00	12.00	2.90	2.90	0.0	0.0	6.5	2.2	13.9
19	6	7.2	7.2	0.0	0.0	51.1	51.1	7.02	7.02	1.79	1.79	0.0	0.0	6.7	0.0	14.6
24	8	5.2	5.2	0.0	0.0	37.8	37.8	4.84	4.84	1.06	1.06	0.0	0.0	5.5	0.0	15.4
29	8	7.9	7.9	0.0	0.0	25.4	25.4	3.98	3.98	0.83	0.83	0.0	0.0	4.3	0.0	16.0
34	7	12.0	12.0	0.0	0.0	16.6	16.6	2.92	2.92	0.67	0.67	0.0	0.0	3.4	0.0	17.6
39	9	10.1	10.1	0.0	0.0	8.8	8.8	1.96	1.96	0.46	0.46	0.0	0.0	2.9	0.0	18.1
44	11	9.0	9.0	0.0	0.0	5.9	5.9	1.34	1.34	0.33	0.33	0.0	0.0	2.7	0.0	18.3
49	7	14.0	14.0	0.0	0.0	2.3	1.9	1.10	0.88	0.26	0.21	0.0	0.0	2.4	0.0	18.9
54	17	9.1	9.1	0.0	0.0	1.4	1.4	1.26	1.26	0.30	0.30	0.0	0.0	2.3	0.0	18.9
59	24	7.2	7.2	0.0	0.0	3.0	3.0	2.20	2.20	0.31	0.31	0.0	0.0	2.3	0.0	19.0
04	29	3.1	3.1	0.0	0.0	9.0	9.0	6.44	6.44	0.71	0.71	0.0	0.0	2.5	0.0	18.6
09	29	9.0	9.0	0.0	0.0	14.5	14.5	12.02	12.02	1.41	1.41	0.0	0.0	3.5	0.3	17.6
AVG	162	3.8	3.8	0.0	0.0	21.4	21.3	3.00	3.00	0.69	0.69	0.0	0.0	2.8	0.2	18.0
TOT	378	1.0E+00	0.0E+00	7.9E-02	7.9E-02	1.8E+01	1.8E+01	3.2E+00	3.2E+00	0.0E+00	0.0E+00	1.0E+01	7.1E-01	6.8E+01		

COKE OVEN EMISSION REPORT

TEST 24
DATE AUGUST 17, 1973
START TIME 14:15:CE

OVEN 3-3 LCW FLCW - FANS BURNED OUT
PRI TEST K4

END SEC	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
09	1	31.2	36.C	0.C	0.0	0.0	0.0	0.00	0.00	0.02	C.03	0.0	0.0	1.9	0.0	19.4
14	6	18.8	21.3	0.C	0.C	C.C	0.0	0.00	0.00	0.01	0.01	0.0	0.0	1.9	0.1	19.5
19	5	35.6	106.9	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.05	0.C	0.0	2.0	0.1	19.4
24	7	33.1	99.4	0.0	0.C	0.C	0.0	0.00	0.00	0.04	0.12	0.C	0.0	1.9	0.1	19.4
29	3	47.6	97.9	0.0	0.C	0.C	0.C	0.00	0.00	0.07	0.17	0.0	0.0	1.9	0.0	18.9
34	9	49.1	147.2	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.06	0.C	0.0	1.9	0.0	18.9
39	9	40.7	122.C	C.0	0.C	0.0	0.0	0.00	0.00	0.02	0.06	0.0	0.0	2.0	0.1	19.0
44	11	31.9	47.9	0.C	0.0	0.C	0.0	0.00	0.00	0.02	0.02	0.0	0.0	2.0	0.0	16.6
49	10	36.8	62.1	C.C	0.C	C.C	0.0	0.00	0.00	0.10	0.21	0.0	0.0	2.0	C.1	15.9
54	11	17.4	26.1	0.0	0.C	0.C	0.0	0.00	0.00	0.04	0.06	0.0	0.0	1.9	0.0	17.7
59	9	27.5	43.9	0.0	0.C	0.0	0.0	0.00	0.00	0.04	0.07	0.0	0.0	2.C	C.0	16.2
04	7	23.6	6C.1	0.0	C.C	0.0	0.0	0.C0	0.00	0.C3	0.05	0.0	0.0	1.9	0.0	18.2
09	4	20.C	16.2	0.C	0.C	0.0	0.0	0.00	0.00	0.02	0.06	0.C	0.0	1.8	0.0	19.3
14	6	30.8	78.1	0.C	C.C	C.C	0.0	0.00	0.00	0.02	0.05	0.0	0.0	2.0	0.0	19.3
19	7	33.C	99.C	0.C	0.0	0.0	0.0	0.00	0.00	0.C3	0.09	0.C	0.0	2.0	0.0	19.3
24	4	20.8	62.3	C.C	0.C	C.C	0.0	0.00	0.00	0.02	0.07	0.C	0.0	2.0	0.0	19.2
29	6	28.1	5C.2	0.C	C.C	0.0	0.0	0.00	0.00	0.03	0.05	0.0	0.0	2.0	0.0	19.2
34	9	33.6	1CC.8	0.0	0.C	0.C	0.0	0.00	0.00	0.03	C.1C	0.C	0.C	2.C	0.1	19.2
39	10	33.7	101.2	0.C	0.0	0.C	0.0	0.08	0.24	0.04	0.11	0.0	0.0	2.0	0.1	19.1
44	9	33.C	99.C	0.C	0.0	0.C	0.0	0.48	1.44	0.09	0.26	0.C	0.0	2.0	0.1	18.9
49	8	81.C	243.C	C.C	C.C	C.C	0.0	3.2C	9.60	0.61	1.82	0.0	0.0	2.1	0.1	18.2
54	10	142.3	334.3	0.0	0.0	0.0	0.0	4.06	9.93	0.90	2.18	0.1	0.2	2.6	0.1	17.3
59	12	200.0	555.3	0.C	C.C	0.C	0.1	4.68	12.93	0.92	2.52	0.4	1.0	3.1	0.1	16.3
04	8	304.6	8C3.9	0.C	0.0	0.C	0.C	6.58	18.84	1.34	3.58	0.6	1.6	3.8	0.1	15.1
09	8	424.1	761.2	0.C	0.0	1.0	2.1	6.20	11.40	1.27	2.47	1.5	2.7	5.C	0.1	14.9
14	9	558.C	1674.0	0.C	0.C	3.6	10.8	6.22	18.66	1.33	3.98	1.8	5.4	5.3	0.1	14.3
19	7	70C.2	21CC.6	0.0	0.C	0.0	0.0	6.56	20.88	1.54	4.61	1.1	3.4	5.5	0.1	13.0
24	6	833.3	2495.8	0.C	C.C	C.7	2.0	6.98	20.94	1.63	4.90	0.8	2.3	5.8	0.6	11.1
29	4	827.3	1566.8	0.C	0.0	2.3	6.4	5.14	11.58	1.21	2.81	1.3	3.2	6.0	0.1	14.3
34	6	768.1	1857.6	0.C	0.C	6.5	15.1	1.58	4.11	0.59	1.50	1.4	3.4	4.5	0.1	14.7
35	2	721.2	1081.8	0.C	C.C	11.3	16.9	0.80	1.20	0.38	0.57	0.9	1.3	4.C	0.1	11.8
AVG	89	188.5	465.2	0.0	0.0	0.6	1.4	1.78	4.76	0.41	1.09	0.3	0.8	2.8	0.1	17.3
TOT	221			0.0E+00	0.0E+00	1.1E-04	2.5E-04	4.0E+00	1.1E+01	9.2E-01	2.4E+00	6.6E-01	1.7E+00	6.0E+00	1.7E-01	3.8E+01

COKE OVEN EMISSION REPORT

TEST 25
DATE AUGUST 22, 1973
START TIME 11:14:43

OVEN 3-1 BAD FIRE ON #3
MRI TEST

END ING SEC OND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% O2
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
44	28	26.7	26.7	0.0	0.0	0.1	0.1	0.00	0.00	0.07	0.07	0.0	0.0	1.2	0.0	19.9
49	75	20.9	20.9	0.0	0.0	0.7	0.7	0.00	0.00	0.00	0.00	0.0	0.0	1.1	0.0	20.0
54	66	29.3	29.3	0.0	0.0	0.6	0.6	0.00	0.00	0.01	0.01	0.0	0.0	1.1	0.0	20.0
59	68	33.0	33.0	0.0	0.0	0.6	0.6	0.00	0.00	0.00	0.00	0.0	0.0	1.2	0.0	20.1
04	72	42.7	42.7	0.0	0.0	0.8	0.8	0.00	0.00	0.00	0.00	0.0	0.0	0.8	0.0	20.1
09	75	36.7	36.7	0.0	0.0	0.3	0.3	0.00	0.00	0.00	0.00	0.1	0.1	0.6	0.0	20.2
14	71	28.9	28.9	0.0	0.0	0.5	0.5	0.00	0.00	0.01	0.01	0.1	0.1	0.5	0.0	20.2
19	70	32.6	32.6	0.0	0.0	0.1	0.1	0.00	0.00	0.01	0.01	0.1	0.1	0.6	0.0	20.1
24	67	36.6	36.6	0.0	0.0	0.3	0.3	0.00	0.00	0.01	0.01	0.1	0.1	0.6	0.0	20.1
29	70	37.6	37.6	0.0	0.0	0.2	0.2	0.00	0.00	0.01	0.01	0.1	0.1	0.5	0.0	20.2
34	71	24.4	24.4	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.1	0.1	0.6	0.0	20.1
39	71	8.8	8.8	0.0	0.0	0.1	0.1	0.00	0.00	0.00	0.00	0.1	0.1	0.5	0.0	20.1
44	70	17.3	17.3	0.0	0.0	0.0	0.0	0.00	0.00	0.03	0.03	0.1	0.1	0.5	0.0	20.1
49	75	28.3	28.3	0.0	0.0	0.6	0.6	0.00	0.00	0.03	0.03	0.1	0.1	0.5	0.0	20.1
54	84	26.0	26.0	0.0	0.0	1.0	1.0	0.04	0.04	0.05	0.05	0.1	0.1	0.6	0.0	20.0
59	79	31.1	31.1	0.0	0.0	1.6	1.6	0.60	0.60	0.29	0.29	0.2	0.2	0.5	0.0	19.9
04	79	67.3	67.3	0.0	0.0	1.6	1.6	1.02	1.02	0.58	0.58	0.2	0.2	0.7	0.0	19.8
09	81	88.1	88.1	0.0	0.0	1.8	1.8	1.26	1.26	0.56	0.56	0.2	0.2	0.8	0.0	19.5
14	83	147.6	147.6	0.0	0.0	1.7	1.7	1.12	1.12	0.47	0.47	0.2	0.2	1.0	0.0	19.4
19	74	190.2	190.2	0.0	0.0	1.4	1.4	0.60	0.60	0.28	0.28	0.2	0.2	1.1	0.0	19.2
24	73	181.1	181.1	0.0	0.0	1.4	1.4	0.20	0.20	0.19	0.19	0.3	0.3	1.1	0.0	19.3
29	69	154.2	154.2	0.0	0.0	1.3	1.3	0.04	0.04	0.08	0.08	0.3	0.3	1.0	0.0	19.5
34	73	152.9	152.9	0.0	0.0	1.5	1.5	0.02	0.02	0.06	0.06	0.2	0.2	0.9	0.0	19.6
39	72	164.0	164.0	0.0	0.0	2.8	2.8	1.00	1.00	0.27	0.27	0.7	0.7	0.9	0.0	19.5
44	76	225.8	225.8	0.0	0.0	4.0	4.0	4.46	4.46	1.05	1.05	1.1	1.1	1.4	0.0	19.0
49	73	326.8	326.8	0.0	0.0	5.0	5.0	8.36	8.36	1.71	1.71	1.2	1.2	2.2	0.0	18.3
54	72	427.3	427.3	0.0	0.0	8.9	8.9	10.98	10.98	2.01	2.01	1.1	1.1	2.9	0.1	17.5
59	66	459.2	459.2	0.0	0.0	11.1	11.1	11.44	11.44	2.08	2.08	1.1	1.1	3.2	1.0	16.9
04	62	445.7	445.7	0.0	0.0	13.5	13.5	9.16	9.16	1.95	1.95	1.5	1.5	3.2	0.5	16.9
09	76	431.8	431.8	0.0	0.0	16.0	16.0	8.02	8.02	1.87	1.87	1.5	1.5	3.2	0.0	17.0
14	73	484.3	484.3	0.0	0.0	16.5	16.5	9.62	9.62	1.79	1.79	1.3	1.3	3.8	0.0	16.9
19	62	575.6	575.6	0.0	0.0	17.3	17.3	9.58	9.58	1.69	1.69	1.0	1.0	4.9	0.1	16.8
24	57	686.4	686.4	0.0	0.0	18.6	18.6	8.18	8.18	1.52	1.52	0.9	0.9	5.7	0.0	16.8
29	53	786.0	786.0	0.0	0.0	23.4	23.4	5.84	5.84	1.27	1.27	1.1	1.1	6.1	0.0	17.0
34	51	829.4	995.9	0.0	0.0	30.3	36.9	3.60	4.20	1.05	1.24	1.1	1.4	5.8	0.0	17.2
39	58	797.4	877.6	0.0	0.0	36.7	40.2	1.80	2.04	0.68	0.77	0.8	0.8	5.1	0.0	17.6
41	26	807.0	807.0	0.0	0.0	36.5	36.5	1.00	1.00	0.46	0.46	0.7	0.7	4.2	0.0	18.2
AVG	844	234.3	241.2	0.0	0.0	6.6	6.9	2.72	2.74	0.61	0.62	0.5	0.5	1.9	0.0	19.0
TOT	2518			0.0E+00	0.0E+00	1.5E-02	1.5E-02	6.5E+01	6.5E+01	1.5E+01	1.5E+01	1.2E+01	1.2E+01	4.4E+01	1.1E+00	4.8E+02

COKE OVEN EMISSION REPORT

TEST 26
DATE AUGUST 22, 1973
START TIME 14:05:45

OVEN 3-9
PRI TEST

ENDING SEC ND	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% O2 C
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
49	0	22.3	C.C	0.C	0.C	0.0	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.2	0.0	19.7
54	0	32.6	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.01	0.00	0.0	0.0	1.4	0.0	19.4
59	0	37.3	C.C	0.C	0.0	0.C	0.0	0.00	0.00	0.03	0.00	0.0	0.0	1.4	0.0	19.5
04	0	40.4	C.C	0.0	0.C	0.1	0.0	0.00	0.00	0.04	0.00	0.0	0.0	1.4	0.0	19.0
09	0	31.4	C.C	0.0	0.0	0.1	0.0	0.00	0.00	0.02	0.00	0.0	0.0	1.4	0.0	18.7
14	1	23.8	1.5	0.C	C.C	C.C	0.0	0.00	0.00	0.02	0.01	0.0	0.0	1.4	0.0	19.5
19	0	31.6	C.C	0.0	0.C	0.0	0.0	0.00	0.00	0.03	0.00	0.0	0.0	1.4	0.0	19.7
24	2	21.8	7.1	0.C	0.C	C.C	0.0	0.00	0.00	0.01	0.00	0.0	0.0	1.4	0.0	19.6
29	0	20.6	C.C	0.C	0.0	0.C	0.0	0.00	0.00	0.01	0.00	0.0	0.0	1.3	0.0	19.7
34	1	26.5	2.4	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.3	0.0	19.6
39	1	19.9	6.7	0.0	0.C	0.3	0.1	0.00	0.00	0.00	0.00	0.0	0.0	1.3	0.0	19.6
44	10	25.4	15.9	0.0	0.0	1.4	0.9	0.00	0.00	0.00	0.00	0.0	0.0	1.4	0.0	19.4
49	0	15.4	C.C	0.C	C.C	2.5	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.3	0.0	19.5
54	6	24.2	11.3	0.C	0.0	3.5	1.6	0.10	0.00	0.04	0.00	0.0	0.0	1.2	0.0	19.6
59	0	25.4	C.C	0.C	0.C	4.3	0.0	1.16	0.00	0.40	0.00	0.1	C.C	1.2	0.0	19.2
04	2	34.4	7.8	0.0	0.C	4.6	0.8	2.44	0.42	0.91	0.15	0.3	0.1	1.3	0.0	18.9
09	0	68.4	C.C	0.0	0.0	3.8	0.0	3.04	0.00	1.11	0.00	0.3	0.0	1.6	0.0	18.3
14	3	72.2	5.6	0.0	0.0	3.8	0.7	3.10	0.62	1.08	0.21	0.3	0.1	1.7	0.0	18.4
19	0	75.8	C.C	0.0	0.0	3.3	0.0	2.72	0.00	0.93	0.00	0.3	0.0	1.6	0.0	18.4
24	0	91.8	C.C	0.C	C.C	3.3	0.0	2.48	0.00	0.70	0.00	0.3	0.0	1.8	0.0	18.8
29	0	247.5	C.C	0.C	0.0	1.9	0.0	5.46	0.00	0.90	0.00	0.7	0.C	2.1	0.0	18.7
34	0	445.8	C.C	0.0	0.0	1.9	0.0	12.38	0.00	1.82	0.00	1.1	0.0	4.0	0.4	17.8
39	0	573.7	C.C	0.C	0.C	1.2	0.0	10.60	0.00	1.87	0.00	0.9	0.0	6.8	1.8	16.6
44	0	561.4	C.0	0.0	0.0	2.0	0.0	5.42	0.00	1.04	0.00	0.6	0.0	7.3	0.1	16.8
49	0	507.C	C.C	0.C	C.C	3.C	0.C	2.88	0.00	0.52	0.00	0.2	0.0	5.6	0.0	17.8
54	0	456.6	C.C	0.0	0.0	4.6	0.0	1.66	0.00	0.29	0.00	0.2	0.0	3.9	0.0	18.5
59	0	420.5	C.C	0.C	C.C	6.1	0.0	0.96	0.00	0.17	0.00	0.1	C.C	3.0	0.0	19.0
04	0	426.8	C.C	0.C	0.0	7.2	0.0	1.42	0.00	0.18	0.00	0.2	0.0	2.5	0.0	19.3
09	0	495.6	C.C	0.0	0.0	7.8	0.0	3.90	0.00	0.66	0.00	0.3	0.0	3.C	0.0	19.0
14	4	525.C	415.8	0.0	0.C	5.5	8.2	3.66	2.80	0.79	0.61	0.3	0.2	4.0	0.0	18.5
19	1	491.5	103.7	0.C	0.0	16.0	2.8	2.04	0.46	0.44	0.11	0.2	0.0	3.9	0.0	18.5
24	0	457.3	C.C	0.C	0.C	24.4	0.0	1.06	0.00	0.22	0.00	0.1	0.0	3.4	0.0	18.7
29	0	423.1	C.C	0.0	0.0	25.0	0.0	1.28	0.00	0.17	0.00	0.1	0.0	2.9	0.0	19.1
34	0	485.5	C.C	0.C	0.C	27.1	0.0	4.64	0.00	0.49	C.00	0.2	0.C	2.8	0.0	19.0
39	3	659.2	546.4	0.0	0.C	22.7	17.7	10.74	9.04	1.32	1.12	0.4	0.3	4.0	0.2	18.2
AVG	12	226.5	32.4	C.C	0.0	5.6	0.9	2.38	0.38	0.46	0.06	0.2	0.C	2.5	C.1	18.9
TOT	35			C.0E+00	0.CE+0C	1.8E-04	1.8E-04	6.6E-01	6.6E-01	1.2E-C1	1.2E-01	3.9E-02	3.9E-02	6.9E-01	6.2E-03	6.6E+00

COKE OVEN EMISSION REPORT

TEST 27
DATE AUGUST 23, 1973
START TIME 11:35:30

OVEN 2-23
PRE TEST

END SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% O2 DRY
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
34	14	24.2	25.2	0.0	0.0	42.3	42.3	0.00	0.00	0.04	0.04	0.0	0.0	1.5	0.0	19.4
39	14	24.2	24.2	0.0	0.0	45.1	45.1	0.00	0.00	0.03	0.03	0.0	0.0	1.7	0.0	19.7
44	14	16.5	16.5	0.0	0.0	48.8	48.8	0.00	0.00	0.04	0.04	0.0	0.0	1.5	0.0	19.8
49	14	23.8	23.8	0.0	0.0	52.1	52.1	0.00	0.00	0.02	0.02	0.0	0.0	1.7	0.0	19.8
54	15	5.5	5.5	0.0	0.0	55.5	55.5	0.00	0.00	0.01	0.01	0.0	0.0	1.7	0.0	19.8
59	15	10.3	10.3	0.0	0.0	56.3	56.3	0.00	0.00	0.01	0.01	0.0	0.0	1.5	0.0	19.7
04	15	7.1	7.1	0.0	0.0	51.7	51.7	0.00	0.00	0.01	0.01	0.0	0.0	1.4	0.0	19.6
09	15	13.5	13.5	0.0	0.0	45.6	45.6	0.00	0.00	0.00	0.00	0.0	0.0	1.4	0.0	19.3
14	15	5.7	5.7	0.0	0.0	36.4	36.4	0.00	0.00	0.00	0.00	0.0	0.0	1.2	0.0	17.7
19	15	3.2	3.2	0.0	0.0	27.6	27.6	0.00	0.00	0.00	0.00	0.0	0.0	1.2	0.0	19.3
24	16	12.6	12.6	0.0	0.0	22.6	22.6	0.00	0.00	0.00	0.00	0.0	0.0	1.1	0.0	19.3
29	16	11.4	11.4	0.0	0.0	16.7	16.7	0.00	0.00	0.02	0.02	0.0	0.0	1.5	0.0	19.5
34	15	15.2	15.2	0.0	0.0	12.1	12.1	0.00	0.00	0.05	0.05	0.0	0.0	1.1	0.0	19.5
39	15	15.3	15.3	0.0	0.0	9.6	9.6	0.00	0.00	0.08	0.08	0.0	0.0	1.2	0.0	20.0
44	15	24.2	24.2	0.0	0.0	7.7	7.7	0.00	0.00	0.07	0.07	0.0	0.0	1.2	0.0	20.1
49	15	25.3	25.3	0.0	0.0	6.0	6.0	0.00	0.00	0.05	0.05	0.0	0.0	0.8	0.0	20.2
54	14	50.6	50.6	0.0	0.0	4.4	4.4	0.00	0.00	0.07	0.07	0.0	0.0	1.6	0.0	20.1
59	15	45.3	45.3	0.0	0.0	3.5	3.5	0.00	0.00	0.08	0.08	0.0	0.0	1.5	0.0	20.1
04	15	45.6	45.6	0.0	0.0	3.2	3.2	0.00	0.00	0.08	0.08	0.0	0.0	1.6	0.0	20.1
09	14	63.3	63.3	0.0	0.0	3.6	3.6	0.00	0.00	0.07	0.07	0.0	0.0	1.7	0.0	20.0
14	15	62.1	62.1	0.0	0.0	3.5	3.5	0.00	0.00	0.07	0.07	0.0	0.0	1.3	0.0	19.9
19	15	66.6	66.6	0.0	0.0	4.3	4.3	0.00	0.00	0.06	0.06	0.0	0.0	2.1	0.0	18.3
24	16	70.2	70.2	0.0	0.0	5.3	5.3	0.00	0.00	0.06	0.06	0.0	0.0	1.5	0.0	18.5
29	16	63.2	63.2	0.0	0.0	6.8	6.8	0.00	0.00	0.08	0.08	0.0	0.0	1.4	0.0	18.8
34	15	46.5	46.5	0.0	0.0	7.5	7.5	0.00	0.00	0.11	0.11	0.0	0.0	1.4	0.0	19.4
39	14	41.3	41.3	0.0	0.0	8.3	8.3	0.00	0.00	0.11	0.11	0.0	0.0	1.8	0.0	16.9
44	15	43.3	43.3	0.0	0.0	8.6	8.6	0.00	0.00	0.12	0.12	0.0	0.0	1.8	0.0	18.8
49	15	75.4	75.4	0.0	0.0	9.8	9.8	0.00	0.00	0.13	0.13	0.0	0.0	1.8	0.0	19.2
54	15	79.2	79.2	0.0	0.0	10.5	10.5	0.02	0.02	0.12	0.12	0.0	0.0	1.8	0.0	20.0
59	15	80.2	80.2	0.0	0.0	12.3	12.3	0.08	0.08	0.11	0.11	0.0	0.0	1.6	0.0	20.1
04	16	83.1	83.1	0.0	0.0	13.7	13.7	0.10	0.10	0.12	0.12	0.0	0.0	1.6	0.0	20.1
09	16	85.8	85.8	0.0	0.0	14.8	14.8	0.10	0.10	0.12	0.12	0.0	0.0	1.6	0.0	19.9
14	16	56.5	56.5	0.0	0.0	15.9	15.9	0.16	0.16	0.12	0.12	0.0	0.0	1.4	0.0	19.4
19	17	85.3	85.3	0.0	0.0	17.8	17.8	0.18	0.18	0.16	0.16	0.0	0.0	1.5	0.0	19.0
24	18	91.5	91.5	0.0	0.0	19.9	19.9	0.20	0.20	0.16	0.16	0.0	0.0	2.6	0.0	19.1
29	17	102.4	102.4	0.0	0.0	20.7	20.7	0.20	0.20	0.15	0.15	0.0	0.0	2.2	0.0	19.5
34	18	104.4	104.4	0.0	0.0	20.7	20.7	0.20	0.20	0.14	0.14	0.0	0.0	1.8	0.0	19.5
39	17	105.7	105.7	0.0	0.0	21.2	21.2	0.20	0.20	0.13	0.13	0.0	0.0	1.5	0.0	19.3
44	16	124.7	124.7	0.0	0.0	20.5	20.5	0.14	0.14	0.12	0.12	0.0	0.0	1.3	0.0	19.1
49	16	124.7	124.7	0.0	0.0	20.1	20.1	0.10	0.10	0.11	0.11	0.0	0.0	1.4	0.0	19.1
54	16	121.4	121.4	0.0	0.0	19.5	19.5	0.08	0.08	0.09	0.09	0.0	0.0	1.9	0.0	18.8
59	16	107.2	107.2	0.0	0.0	19.8	19.8	0.00	0.00	0.04	0.04	0.0	0.0	2.4	0.0	18.6
04	14	115.6	115.6	0.0	0.0	19.8	19.8	0.04	0.04	0.07	0.07	0.0	0.0	2.6	0.0	17.6
09	14	107.7	107.7	0.0	0.0	20.2	20.2	0.04	0.04	0.05	0.05	0.0	0.0	2.2	0.0	16.6
14	17	123.3	123.3	0.0	0.0	20.3	20.3	0.10	0.10	0.04	0.04	0.0	0.0	2.1	0.0	13.6
19	14	134.0	134.0	0.0	0.0	20.0	20.0	0.10	0.10	0.04	0.04	0.0	0.0	1.4	0.0	14.6
24	12	126.5	126.5	0.0	0.0	19.0	19.0	0.00	0.00	0.03	0.03	0.0	0.0	1.5	0.0	15.2
29	14	122.1	122.1	0.0	0.0	18.6	18.6	0.30	0.30	0.03	0.03	0.0	0.0	2.6	0.0	17.7
34	17	151.4	151.4	0.0	0.0	17.3	17.3	1.44	1.44	0.21	0.21	0.0	0.0	2.1	0.0	17.5
39	19	192.0	192.0	0.0	0.0	15.3	15.3	2.78	2.78	0.35	0.35	0.0	0.0	0.5	0.0	17.5
44	16	246.2	246.2	0.0	0.0	14.0	14.0	4.58	4.58	0.71	0.71	0.0	0.0	0.5	0.0	17.0
49	15	294.4	294.4	0.0	0.0	12.8	12.8	5.76	5.76	0.99	0.99	0.0	0.0	2.0	0.0	16.1
54	17	305.0	305.0	0.0	0.0	12.0	12.0	4.84	4.84	0.87	0.87	0.0	0.0	2.6	0.0	15.7
59	19	335.2	335.2	0.0	0.0	11.9	11.9	4.22	4.22	0.70	0.70	0.0	0.0	2.3	0.0	15.6
04	19	333.4	333.4	0.0	0.0	11.0	11.0	4.06	4.06	0.62	0.62	0.0	0.0	2.2	0.0	15.7
09	19	335.8	335.8	0.0	0.0	10.7	10.7	3.70	3.70	0.55	0.55	0.0	0.0	2.2	0.0	16.6
14	17	336.5	336.5	0.0	0.0	10.3	10.3	3.08	3.08	0.49	0.49	0.0	0.0	2.5	0.0	16.7
19	16	327.4	327.4	0.0	0.0	11.0	11.0	2.00	2.00	0.21	0.21	0.0	0.0	2.7	0.0	11.9
24	17	331.7	331.7	0.0	0.0	13.5	13.5	1.18	1.18	0.18	0.18	0.0	0.0	2.8	0.0	8.6
29	17	326.8	326.8	0.0	0.0	16.3	16.3	0.76	0.76	0.08	0.08	0.0	0.0	2.3	0.0	6.3
34	18	324.4	324.4	0.0	0.0	19.3	19.3	0.70	0.70	0.08	0.08	0.0	0.0	2.0	0.0	6.9
39	19	306.3	306.3	0.0	0.0	20.6	20.6	0.56	0.56	0.06	0.06	0.0	0.0	2.0	0.0	12.5
44	19	296.4	296.4	0.0	0.0	20.1	20.1	0.40	0.40	0.02	0.02	0.0	0.0	1.4	0.0	13.5
49	19	304.4	304.4	0.0	0.0	18.9	18.9	0.38	0.38	0.01	0.01	0.0	0.0	1.2	0.0	8.4
54	19	305.3	305.3	0.0	0.0	18.5	18.5	0.34	0.34	0.01	0.01	0.0	0.0	1.7	0.0	9.1
59	15	295.5	295.5	0.0	0.0	16.3	16.3	0.30	0.30	0.00	0.00	0.0	0.0	2.6	0.0	15.1
04	19	296.4	296.4	0.0	0.0	15.4	15.4	0.26	0.26	0.02	0.02	0.0	0.0	1.7	0.0	17.9
09	20	279.3	279.3	0.0	0.0	14.3	14.3	0.12	0.12	0.01	0.01	0.0	0.0	2.0	0.0	17.5
14	20	283.1	283.1	0.0	0.0	13.0	13.0	0.10	0.10	0.01	0.01	0.0	0.0	1.4	0.0	17.8
19	18	283.1	283.1	0.0	0.0	11.5	11.5	0.04	0.04	0.00	0.00	0.0	0.0	1.2	0.0	18.2
22	11	266.0	266.0	0.0	0.0	10.3	10.3	0.03	0.03	0.00	0.00	0.0	0.0	1.0	0.0	19.2
AVG	197	134.6	135.6	0.0	0.0	16.4	16.4	0.63	0.63	0.14	0.14	0.0	0.0	1.7	0.0	17.5
TOT	1158			0.0E+00	0.0E+00	2.1E-02	2.1E-02	7.9E+00	7.9E+00	1.7E+00	1.7E+00	0.0E+00	0.0E+00	2.0E+01	0.0E+00	2.0E+02

COKE OVEN EMISSION REPORT

TEST 28
DATE AUGUST 23, 1973
START TIME 14:01:45

OVEN 3-4
PRI TEST

ENDING SEC	FIVE SECOND TOTAL VOLUME FLOW	FIVE SECOND AVERAGE														
		PPM SO2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O	% H2	% O2 D
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	MEAS	MEAS
49	5	71.4	71.4	0.0	0.0	0.1	0.1	0.00	0.00	0.01	0.01	0.1	0.1	2.8	0.0	19.4
54	4	78.4	51.5	0.0	0.0	0.4	0.2	0.00	0.00	0.00	0.00	0.1	0.1	2.0	0.0	19.6
59	0	74.4	0.0	0.0	0.0	0.1	0.0	0.00	0.00	0.00	0.00	0.1	0.0	2.2	0.0	19.6
04	1	72.1	36.5	0.0	0.0	0.2	0.1	0.00	0.00	0.01	0.01	0.1	0.0	2.3	0.0	19.5
09	5	80.2	80.2	0.0	0.0	0.2	0.2	0.00	0.00	0.00	0.00	0.1	0.1	1.8	0.0	19.6
14	4	73.2	73.2	0.0	0.0	1.3	1.3	0.00	0.00	0.02	0.02	0.1	0.1	2.5	0.0	19.5
19	4	64.8	64.8	0.0	0.0	3.4	3.4	0.00	0.00	0.01	0.01	0.1	0.1	3.1	0.0	19.4
24	4	61.1	61.1	0.0	0.0	2.1	2.1	0.00	0.00	0.00	0.00	0.1	0.1	3.1	0.0	19.4
29	3	72.6	51.0	0.0	0.0	1.6	0.8	0.00	0.00	0.00	0.00	0.1	0.1	2.7	0.0	19.5
34	6	75.8	75.8	0.0	0.0	1.1	1.1	0.00	0.00	0.00	0.00	0.1	0.1	2.3	0.0	19.5
39	6	68.3	68.3	0.0	0.0	1.9	1.9	0.00	0.00	0.00	0.00	0.1	0.1	3.5	0.0	19.3
44	6	73.7	73.7	0.0	0.0	2.1	2.1	0.00	0.00	0.01	0.01	0.1	0.1	2.8	0.0	19.4
49	10	73.6	62.8	0.0	0.0	2.4	1.8	0.00	0.00	0.00	0.00	0.1	0.1	3.0	0.0	19.4
54	8	91.1	91.1	0.0	0.0	2.7	2.7	0.12	0.12	0.08	0.08	0.2	0.2	2.3	0.0	19.5
59	6	154.3	154.3	0.0	0.0	2.3	2.3	0.66	0.66	0.47	0.47	0.2	0.2	2.6	0.0	19.5
04	10	181.4	181.4	0.0	0.0	3.2	3.2	0.90	0.90	0.76	0.76	0.3	0.3	3.2	0.0	18.9
09	8	205.4	205.4	0.0	0.0	2.6	2.6	1.30	1.30	0.80	0.80	0.4	0.4	4.5	0.0	18.6
14	7	224.9	224.9	0.0	0.0	3.1	3.1	2.94	2.94	1.36	1.36	0.6	0.6	4.3	0.0	17.7
19	30	284.4	284.4	0.0	0.0	2.5	2.5	4.68	4.68	1.97	1.97	0.8	0.8	4.2	0.0	17.7
24	8	383.5	383.5	0.0	0.0	1.3	1.3	6.66	6.66	2.66	2.66	1.0	1.0	4.4	0.0	16.7
29	5	447.7	447.7	0.0	0.0	1.0	1.0	5.94	5.94	2.72	2.72	1.0	1.0	4.8	0.0	16.7
34	12	428.3	428.3	0.0	0.0	2.4	2.4	4.38	4.38	2.07	2.07	0.7	0.7	4.8	0.0	16.7
39	8	424.6	424.6	0.0	0.0	4.4	4.4	5.80	5.80	1.76	1.76	0.7	0.7	3.9	0.0	17.3
44	6	440.4	440.4	0.0	0.0	9.5	9.5	7.68	7.68	2.14	2.14	0.8	0.8	4.1	0.0	17.3
49	7	414.5	414.5	0.0	0.0	15.8	15.8	6.52	6.52	2.00	2.00	0.8	0.8	4.7	0.0	16.7
54	7	378.0	378.0	0.0	0.0	20.8	20.8	4.28	4.28	1.39	1.39	0.6	0.6	4.2	0.0	17.2
59	7	333.0	333.0	0.0	0.0	24.9	24.9	3.04	3.04	0.92	0.92	0.4	0.4	4.0	0.0	17.8
04	6	295.8	295.8	0.0	0.0	29.7	29.7	2.38	2.38	0.63	0.63	0.3	0.3	6.3	0.0	17.8
09	5	265.1	265.1	0.0	0.0	33.9	33.9	1.86	1.86	0.49	0.49	0.3	0.3	5.7	0.0	17.9
14	6	253.6	253.6	0.0	0.0	35.8	35.8	1.38	1.38	0.35	0.35	0.2	0.2	5.3	0.0	18.0
18	5	236.3	236.3	0.0	0.0	36.8	36.8	1.17	1.17	0.28	0.28	0.2	0.2	5.6	0.0	17.9
AVG	82	205.7	200.2	0.0	0.0	7.9	7.8	2.00	2.00	0.74	0.74	0.3	0.3	3.6	0.0	18.5
TOT	210			0.0E+00	0.0E+00	1.6E-03	1.6E-03	5.5E+00	5.5E+00	2.1E+00	2.1E+00	8.9E-01	8.9E-01	8.0E+00	0.0E+00	3.8E+01

TABLE C-1

WILPUTTE VOLUME FLOW/LOCATION, NO_X

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
2	Measured corrected				BDL	BDL	BDL
5	Measured corrected		66.5×10^{-4} 66.5×10^{-4}			24.7×10^{-4} 24.7×10^{-4}	
6	Measured corrected		136×10^{-4}				63.4×10^{-4}
7	Measured corrected	133.3×10^{-4} 134.5×10^{-4}	168.5×10^{-4} 169.9×10^{-4}	170.7×10^{-4} 172.2×10^{-4}			
8	Measured corrected	200.6×10^{-4} 208.9×10^{-4}	112.2×10^{-4} 116.8×10^{-4}	122.0×10^{-4} 127.1×10^{-4}			
9	Measured corrected	$.354\times10^{-4}$ $.483\times10^{-4}$	4.72×10^{-4} 6.44×10^{-4}	2.72×10^{-4} 3.71×10^{-4}			
10	Measured corrected				68.8×10^{-4} 71.9×10^{-4}	61.6×10^{-4} 64.4×10^{-4}	82.8×10^{-4} 86.6×10^{-4}
11	Measured corrected				138.8×10^{-4} 140.2×10^{-4}	130.3×10^{-4} 131.7×10^{-4}	125.2×10^{-4} 126.6×10^{-4}
12	Measured corrected				81.5×10^{-4} 85.5×10^{-4}	44.4×10^{-4} 46.6×10^{-4}	53.9×10^{-4} 56.6×10^{-4}

TABLE C-1

(Continued)

WILPUTTE VOLUME FLOW/LOCATION, NO_X

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
13	Measured corrected		84.4×10^{-4} 90.7×10^{-4}			30.2×10^{-4} 32.5×10^{-4}	
14	Measured corrected	1.34×10^{-4} 2.29×10^{-4}			9.82×10^{-4} 16.76×10^{-4}		
22	Measured corrected		74.5×10^{-4} 74.5×10^{-4}				
23	Measured corrected		33.69×10^{-4} 33.69×10^{-4}				
26	Measured corrected		$.617 \times 10^{-4}$ $.617 \times 10^{-4}$				
28	Measured corrected		6.14×10^{-4} 6.14×10^{-4}				

TABLE C-2

AISI/EPA VOLUME FLOW/LOCATION, NO_X

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
15	Measured				1.50×10^{-4}	$.69 \times 10^{-4}$	
	corrected				1.51×10^{-4}	$.70 \times 10^{-4}$	
16	Measured				35.1×10^{-4}		40.4×10^{-4}
	corrected				35.2×10^{-4}		40.5×10^{-4}
17	Measured				30.9×10^{-4}	28.8×10^{-4}	56.1×10^{-4}
	corrected				31.3×10^{-4}	29.1×10^{-4}	56.9×10^{-4}
18	Measured				47.6×10^{-4}	6.88×10^{-4}	8.88×10^{-4}
	corrected				71.5×10^{-4}	10.3×10^{-4}	13.4×10^{-4}
19	Measured				$.23 \times 10^{-4}$	0	3.65×10^{-4}
	corrected				$.61 \times 10^{-4}$	0	9.85×10^{-4}
20	Measured				0	$.18 \times 10^{-4}$	22.99×10^{-4}
	corrected				0	$.44 \times 10^{-4}$	68.67×10^{-4}
21	Measured				0	233.9×10^{-4}	197.5×10^{-4}
	corrected				0	358.2×10^{-4}	302.5×10^{-4}
24	Measured				$.035 \times 10^{-4}$	$.003 \times 10^{-4}$	$.41 \times 10^{-4}$
	corrected				$.08 \times 10^{-4}$	$.008 \times 10^{-4}$	$.912 \times 10^{-4}$
25	Measured				18.9×10^{-4}	16.9×10^{-4}	13.3×10^{-4}
	corrected				19.1×10^{-4}	17.1×10^{-4}	13.4×10^{-4}
27	Measured					35.7×10^{-4}	
	corrected					35.7×10^{-4}	

TABLE C-3

WILPUTTE VOLUME FLOW/LOCATION, CO_2

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
2	Measured corrected				0 0	0 0	0 0
5	Measured corrected		.090 .090			.034 .034	.35 .35
6	Measured corrected			11.37			5.28
7	Measured corrected	3.53 3.61	4.46 4.56	4.52 4.62			
8	Measured corrected	4.75 4.84	2.66 2.71	2.89 2.95			
9	Measured corrected	0 0	0 0	0 0			
10	Measured corrected				.907 .907	.789 .789	1.09 1.09
11	Measured corrected				1.31 1.33	1.23 1.25	1.18 1.19
12	Measured corrected				1.06 1.11	.575 .605	.698 .735

TABLE C-3

(Continued)

WILPUTTE VOLUME FLOW/LOCATION, CO_2

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
13	Measured corrected		.113 .125			.040 .045	
14	Measured corrected	.005 .009			.037 .068		
22	Measured corrected		2.93 2.93				
23	Measured corrected		0 0				
26	Measured corrected		.013 .013				
28	Measured corrected		.35 .35				

TABLE C-4

AISI/EPA VOLUME FLOW/LOCATION, CO_2

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
15	Measured corrected				0 0	0 0	
16	Measured corrected				0 0		0 0
17	Measured corrected				.379 .387	.352 .359	.688 .703
18	Measured corrected				.623 .931	.09 .135	.116 .174
19	Measured corrected				.009 .027	0 0	.1506 .443
20	Measured corrected				0 0	.0013 .0039	.1687 .506
21	Measured corrected				0 0	1.01 1.51	.852 1.28
24	Measured corrected				.022 .055	.002 .006	.246 .619
25	Measured corrected				1.50 1.52	1.34 1.36	1.05 1.07
27	Measured corrected					0 0	

TABLE C-5

WILPUTTE VOLUME FLOW/LOCATION, NO

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
2	Measured				0	$.012 \times 10^{-4}$	$.082 \times 10^{-4}$
	Corrected				0	$.033 \times 10^{-4}$	$.22 \times 10^{-4}$
5	Measured		52.6×10^{-4}			19.6×10^{-4}	
	Corrected		52.6×10^{-4}			19.6×10^{-4}	
6	Measured			41.59×10^{-4}			19.31×10^{-4}
	Corrected						
7	Measured	53.8×10^{-4}	68.0×10^{-4}	68.9×10^{-4}			
	Corrected	55.3×10^{-4}	69.9×10^{-4}	70.8×10^{-4}			
8	Measured	399.2×10^{-4}	223.3×10^{-4}	242.9×10^{-4}			
	Corrected	409.4×10^{-4}	229.0×10^{-4}	249.0×10^{-4}			
9	Measured	$.109 \times 10^{-4}$	1.41×10^{-4}	$.811 \times 10^{-4}$			
	Corrected	$.139 \times 10^{-4}$	1.86×10^{-4}	1.07×10^{-4}			
10	Measured				BDL*	BDL*	BDL*
	Corrected				BDL*	BDL*	BDL*
11	Measured				59.6×10^{-4}	56.0×10^{-4}	53.8×10^{-4}
	Corrected				60.1×10^{-4}	56.4×10^{-4}	54.2×10^{-4}
12	Measured				27.8×10^{-4}	15.2×10^{-4}	18.4×10^{-4}
	Corrected				28.9×10^{-4}	15.7×10^{-4}	19.1×10^{-4}

* Below Detectable Limit

TABLE C-5

(Continued)

WILPUTTE VOLUME FLOW/LOCATION, NO

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
13	Measured		37.5×10^{-4}			13.4×10^{-4}	
	Corrected		39.8×10^{-4}			14.2×10^{-4}	
14	Measured	BDL*			BDL*		
	Corrected	BDL*			BDL*		
22	Measured		25.8×10^{-4}				
	Corrected		25.8×10^{-4}				
23	Measured		BDL*				
	Corrected		BDL*				
26	Measured		BDL*				
	Corrected		BDL*				
28	Measured		BDL*				
	Corrected		BDL*				

* Below Detectable Limit

TABLE C-6

AISI/EPA VOLUME FLOW/LOCATION, NO

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
15	Measured				1.28×10^{-4}	$.59 \times 10^{-4}$	
	Corrected				1.29×10^{-4}	$.59 \times 10^{-4}$	
16	Measured				2.20×10^{-4}		2.53×10^{-4}
	Corrected				2.20×10^{-4}		2.53×10^{-4}
17	Measured				2.67×10^{-4}	2.48×10^{-4}	4.85×10^{-4}
	Corrected				2.76×10^{-4}	2.56×10^{-4}	5.01×10^{-4}
18	Measured				$.357 \times 10^{-4}$	$.052 \times 10^{-4}$	$.067 \times 10^{-4}$
	corrected				$.537 \times 10^{-4}$	$.077 \times 10^{-4}$	$.100 \times 10^{-4}$
19	Measured				$.113 \times 10^{-4}$	0	1.82×10^{-4}
	corrected				$.330 \times 10^{-4}$	0	5.47×10^{-4}
20	Measured				0	$.001 \times 10^{-4}$	$.077 \times 10^{-4}$
	corrected				0	$.002 \times 10^{-4}$	$.232 \times 10^{-4}$
21	Measured				0	38.7×10^{-4}	32.7×10^{-4}
	corrected				0	58.1×10^{-4}	49.1×10^{-4}
24	Measured				BDL*	BDL*	BDL*
	corrected				BDL*	BDL*	BDL*
25	Measured				BDL*	BDL*	BDL*
	corrected				BDL*	BDL*	BDL*
27	Measured					BDL	
	corrected					BDL	

*Below Detectable Limit

TABLE C-7

WILPUTTE VOLUME FLOW/LOCATION, CO

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
2	Measured				0	.0243	.1606
	corrected				0	.0568	.3743
5	Measured		2.2650			.8428	
	corrected		2.2656			.8430	
6	Measured			.0323			.0150
	corrected			.0323			.0150
7	Measured	1.9531	2.4682	2.5007			
	corrected	1.9705	2.4901	2.5230			
8	Measured	4.2815	2.3951	2.6049			
	corrected	4.4136	2.4690	2.6853			
9	Measured	.0093	.1244	.0717			
	corrected	.0125	.1676	.0966			
10	Measured				1.1072	.9634	1.3326
	corrected				1.1399	.9918	1.3719
11	Measured				1.3194	1.2391	1.1900
	corrected				1.3322	1.2512	1.2016
12	Measured				1.0331	.5625	.6833
	corrected				1.0797	.5878	.7141

TABLE C-7

(Continued)

WILPUTTE VOLUME FLOW/LOCATION CO

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
13	Measured corrected		.8942 .9868			.3201 .3533	
14	Measured corrected	.0145 .0234			.1063 .1717		
22	Measured corrected		3.7983 3.7983				
23	Measured corrected		1.3788 1.3788				
26	Measured Corrected		.0427 .0427				
28	Measured Corrected		.8235 .8235				

TABLE C-8

AISI/EPA, VOLUME FLOW/LOCATION, CO

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
15	Measured Corrected				.295 .296	.135 .136	
16	Measured Corrected				.628 .629		.722 .723
17	Measured Corrected				.790 .805	.735 .748	1.434 1.461
18	Measured Corrected				.551 .834	.080 .121	.103 .156
19	Measured Corrected				.023 .068	0 0	.377 1.090
20	Measured Corrected				0 0	.001 .002	.101 .303
21	Measured Corrected				3.677 3.667	2.714 2.714	2.364 2.364
24	Measured Corrected				.030 .078	.003 .008	.339 .886
25	Measured Corrected				1.894 1.911	1.697 1.713	1.328 1.340
27	Measured Corrected					.284 .284	

TABLE C-9

WILPUTTE VOLUME FLOW/LOCATION, THC

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
2	Measured corrected					.054	.356
5	Measured corrected		0			0	
6	Measured corrected			2.223			1.036
7	Measured corrected	2.96 2.96	3.74 3.74	3.79 3.79			
11	Measured corrected				2.39 2.43	2.25 2.28	2.15 2.19
12	Measured corrected				1.54 1.63	.84 .89	1.02 1.08
13	Measured corrected		5.08 5.52			1.82 1.97	
14	Measured corrected	.001 .003			.009 .010		
22	Measured corrected		1.49 1.49				
23	Measured corrected		7.7 7.7				
26	Measured corrected		.23 .23				
28	Measured corrected		2.1 2.1				

TABLE C-10

AISI/EPA -VOLUME FLOW/LOCATION THC

SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
15	Measured corrected				.223 .223	.107 .107	
16	Measured corrected				.93 .93		1.07 1.07
17	Measured corrected				2.68 2.73	2.50 2.54	4.85 4.95
18	Measured corrected				.180 .278	.026 .04	.034 .052
19	Measured corrected				.06 .19	0 0	1.04 3.09
20	Measured corrected				0 0	.001 .004	.149 .466
21	Measured corrected				0 0	8.56 12.90	7.14 10.75
24	Measured corrected				.13 .34	.01 .03	1.46 3.93
25	Measured corrected				8.37 8.42	7.50 7.55	5.85 5.91
27	Measured corrected					1.3 1.3	

Particulate Mass Loading Computer Program

The purpose of this computer program is to compute an isokinetic mass from the measured anisokinetic mass, the volume flow, the sampling velocity and various other measured and computed quantities. The computation is made over all specified time points of a test and for each duct through which the particulates flow. The basic equations are given below:

$$EM_{ik} = \frac{A_k}{a} M_{ik} \sum_{\ell=1}^{m} Q_{ik\ell} \overline{\%W\ell} \qquad \text{(C-3)}$$

i = test index
k = duct index
ℓ = particle size range index
m = number of particle sizes ranges

EM_{ik} = isokinetic mass (mg.)
M_{ik} = anisokinetic mass (mg.)
A_k = duct area (ft^2)
$\overline{Q_{ik\ell}}$ = average anisokinetic correction factor
$\overline{\%W\ell}$ = average isokinetic weight % (a fraction)

$$\overline{Q}_{ik\ell} = \sum_{t=1}^{T_i} Q_{ik}^{(t)} / T_i \qquad \text{(C-4)}$$

$$Q_{ik\ell}^{(t)} \begin{cases} = 0 \;\; ; \;\; F_{ik}(t) = 0 \;\; \text{and} \;\; Y_1 < Y_{limit} \\ = 1 \;\; ; \;\; F_{ik}(t) = 0 \;\; \text{and} \;\; Y_1 \geq Y_{limit} \\ = \left(\left[1 - d_{ik\ell}^{(t)}\right] V_{ik} A_k / Fik^{(t)} + \alpha_{ik\ell}^{(t)} \right)^{-1} ; \\ \qquad F_{ik}(t) > 0 \end{cases}$$

$$\alpha_{ik\ell}(t) = \frac{1 - e^{\left[-4.5/\lambda_{ik\ell}(t)\right]}}{4.5} \left(\lambda_{ik\ell}(t)\right) \qquad \text{(C-5)}$$

$$\lambda_{ik\ell}(t) = (.508)\ F_{ik}(t)\ \gamma_{\ell}\ (t)/A_{ik}g \qquad \text{(C-6)}$$

T_i = time period for test
t = time variable
$Q_{ik\ell}(t)$ = anisokinetic correction factor
$F_{ik}(t)$ = volume flow (ft^3/min.)
V_{ik} = samplings velocity (ft./min.)
$\alpha_{ik\ell}(t)$ = inertial parameter
$\gamma\ell$ = free fill particle velocity (ft./min.)
g = 980 cm/sec^2
γ_{limit} = free fall velocity control factor for $F_{ik}(t) = 0$

When applying this correction procedure, the sampling system should never sample when the stack flow equals zero. The correction procedures under these conditions ($F_{ik}(t) = 0$) are inadequate. The system should be controlled to shut down when zero flow is sensed. However, since no such control was in operation during these tests, a control factor γ_{limit} is used in the program such that if Flow is zero, the correction factor, Q, is zero for all free fall velocities less than γ_{limit} and one for free fall velocities larger than γ_{limit}. The limit free fall velocity was set between the free fall velocity of the ambient air particle size (less than 10) and the free fall velocity of "large particles."

$$\overline{\%W\ell} = \sum_{i=1}^{n} \%W_{i\ell}/n \qquad \text{(C-7)}$$

$$\%W_{i\ell} \begin{cases} = 0\ ;\ \overline{Q}_{j\ell} = 0 & \text{(C-8)} \\ = \dfrac{\%W'_{j\ell} Q_{j\ell}}{\sum_{j} \%W'_{j\ell} Q_{j\ell}}\ ;\ Q_{j\ell} > 0 & \text{(C-9)} \end{cases}$$

n = number of tests
j = an ik pair (there is one j for each test chosen such that for the particular ik pair, a value of $W'_{j\ell}$ has been given)
$W_{j\ell}$ = isokinetic weight % (a fraction)
$W'_{j\ell}$ = weight percent produced by combining optical and Anderson data

The program is controlled entirely by the card and tape inputs whose formats are presented in Tables C-11 through C-18. The main controls are the selection of tests which is governed by the presence of non-blank test numbers on the test duct card (Table C-12) and the test duration selection which is indicated on the test time definition card (Table C-13).

The program reads its card input from DONAME-SYSIN and its tape input from DDNAME = INPUT. The data cards are ordered as indicated by Tables C-11 - C-17. The program prints the following outputs:

$\underbrace{i, k,}_{\text{for all i, k}}$ EM_{ik}, $\left.\begin{array}{l}\overline{Q}\ (i, k, \ell) \\ \%\ W_{i\ell} \\ \%\ \overline{W_\ell}\end{array}\right\}$ for ℓ = 1 to M

Table C-12, the test duct card, contains a list of test numbers and the corresponding duct numbers as they are ordered on the input tape. However, if the test number is blank, the entire test data on the input tape is omitted from the computations. The test time definition card (Table C-13) contains the beginning and ending times for each selected test. The list is terminated by a test number of 99.

The tape in Table C-14 contains data from coke oven gas measurements as processed by other computer programs. The primary functions of these programs were: (1) correction of instrument error, (2) time shifting to account for transmission lags, (3) reformatting for more efficient processing, and (4) calculation of gas data.

TABLE C-11

MISCELLANEOUS CONSTANTS CARD

Columns	Contents
1 - 2	n (number of tests on the tape including those to be skipped)
3 - 4	number of ducts per test
5 - 6	m
7 - 15	a
16 - 25	γ_{limit}

TABLE C-12

TEST DUCT CARD

(up to 3 cards)

Columns	Contents	
1 - 2	i	
3 - 4	k_1	duct numbers for test i
5 - 6	k_2	
7 - 8	k_3	
9 - 16	i, k_1, k_2, k_3,	as above
17 - 24	↓	
25 - 32		
33 - 40	↓	
41 - 48		
49 - 56	↓	
57 - 64		
65 - 72	↓	
73 - 80	↓	

TABLE C-13

TEST TIME DEFINITION CARD

(up to 6 cards)

Columns	Contents
1 - 2	i (i=99 for terminination)
3 - 4	Beginning hour
5 - 6	Beginning minute
7 - 8	Beginning second
9 - 10	Ending hour
11 - 12	Ending minute
13 - 14	Ending second
15 - 28	Test time definition as above
29 - 42	Test time definition as above
43 - 56	Test time definition as above
57 - 70	Test time definition as above
71 - 80	Unused

TABLE C-14

DUCT AREA CARD

(up to 3 cards)

Columns	Contents
1 - 2	k
3 - 10	A_k
11 - 20	k, A_k as above
21 - 30	
31 - 40	
41 - 50	
51 - 60	cannot be used on the third card
61 - 70	
71 - 80	

TABLE C-15

FREE FALL VELOCITY CARD

(up to 2 cards)

Columns	Contents	
1 - 10	γ_1	
11 - 20	γ_2	
21 - 30	γ_3	
31 - 40	γ_4	
41 - 50	γ_5	
51 - 60	γ_6	
61 - 70	γ_7	
71 - 80	γ_8	cannot be used on the last card

TABLE C-16

ANISOKINETIC WEIGHT PERCENT CARD

(Up To 90 Cards)

Columns	Contents
1-2	i (99=termination)
3-4	k
5	unused
6-10	W'_{ik1}
11-15	W'_{ik2}
16-20	W'_{ik3}
21-25	W'_{ik4}
26-30	W'_{ik5}
31-35	W'_{ik6}
36-40	W'_{ik7}
41-45	W'_{ik8}
46-50	W'_{ik9}
51-55	W'_{ik10}
56-60	W'_{ik11}
61-65	W'_{ik12}
66-70	W'_{ik13}
71-75	W'_{ik14}
76-80	W'_{ik15}

TABLE C-17

SAMPLE VELOCITY WEIGHT CARD

(up to 23 cards)

Columns	Contents	
1 - 2	i (99 = termination)	
3 - 4	k	
5 - 10	V_{ik}	
11 - 20	M_{ik}	
21 - 40	i, k, V_{ik}, M_{ik} as above	
41 - 60	i, k, V_{ik}, M_{ik} as above	cannot be used on 23rd card
61 - 80	i, k, V_{ik}, M_{ik} as above	

TABLE C-18

INPUT TAPE
FORMAT

Character Positions	Contents
1 - 3	Julian Day ("KEY" indicates that the record is a test separator)
4 - 5	Hour
6 - 7	Minute
9	Quarter Minute
10 - 249	Data field for second 1 (See Table CXXI)
250 - 489	Data field for second 2
490 - 729	Data field for second 3
↓	↓
↓	↓
↓	↓
3367 - 3608	Data field for second 15

Table C-19 presents the data field format for the particulate program listing. Following Table C-19 is a computer listing of the particulate correction program described above. Table C-20 gives the correction factors which were calculated by the equation:

$$Q_{ik} = \sum_{e} Q_{ik\ell} \cdot \%W_{\ell} \qquad \text{(C-10)}$$

using the data from the computer printout. A sample of the printout is shown in Table C-21. The calculated isokinetic mass values and size distribution data is listed in the body of this document.

TABLE C-19

DATA FIELD FORMAT

Relative Character Position	Contents
1 - 116	Unused
117 - 120	Fi_1
121 - 124	Unused
125 - 128	Fi_2
129 - 132	Unused
133 - 136	Fi_3
137 - 240	Unused

```
//    EXEC PL1LFCLG                                                    00000020
//PL1L.SYSIN DD *                                                      00000030
 MASS: PROCEDURE OPTIONS(MAIN) ;                                      00000040
 /*                                                                   00000050
      COKE OVEN DATA REDUCTION                                        00000060
         PARTICULATE MASS LOADING                                     00000070
 */                                                                   00000080
      DCL 1 INREC UNALIGNED BASED(P)    ,                            00000090
            2 JD      CHAR(3)           ,                            00000100
            2 HR      CHAR(2)           ,                            00000110
            2 MIN     CHAR(2)           ,                            00000120
            2 QUART   CHAR(1)           ,                            00000130
            2 SECREC(15)                ,                            00000140
              3 DUM1  CHAR(116)         ,                            00000150
              3 FLOW(14)                ,                            00000160
                4 AF    FLOAT DEC(6)    ,                            00000170
                4 SF    FLOAT DEC(6)    ,                            00000180
              3 SEC   CHAR(2)           ,                            00000190
              3 DUM2  CHAR(10)          ;                            00000200
      DCL (NTEST,NDUCT,NRANGE) FIXED BIN(31) ;                        00000210
      DCL LITTLE_A FLOAT DEC(6) ;                                     00000220
      DCL 1 DATA(90)                    ,                             00000230
            2 TEST    CHAR(2)           ,                           00000240
            2 DUCT    CHAR(2)           ,                           00000250
            2 EM      FLOAT DEC(6)      ,                           00000260
            2 V       FLOAT DEC(6)      ,                           00000270
            2 M       FLOAT DEC(6)      ,                           00000280
            2 WP(15)  FLOAT DEC(6)      ,                           00000290
            2 W(15)   FLOAT DEC(6)      ,                           00000300
            2 Q(15)   FLOAT DEC(6)      ;                           00000310
      DCL NDATA FIXED BIN(31)           ;                           00000320
      DCL  W_AVG(15)FLOAT DEC(6)  ;                                 00000330
      DCL  FPV(15) FLOAT DEC(6)   ;                                 00000340
      DCL FPV_LIMIT FLOAT DEC(6) ;
      DCL  A(20)   FLOAT DEC(6)   ;                                 00000350
      DCL 1 INDEX(30)                   ,                           00000360
            2 TEST    CHAR(2)           ,                           00000370
            2 DUCT(3) CHAR(2)           ,                           00000380
            2 BGN                       ,                           00000390
              3 HR    CHAR(2)           ,                           00000400
              3 MIN   CHAR(2)           ,                           00000410
              3 SEC   CHAR(2)           ,                           00000420
            2 END                       ,                           00000430
              3 HR    CHAR(2)           ,                           00000440
              3 MIN   CHAR(2)           ,                           00000450
              3 SEC   CHAR(2)           ;                           00000460
      DCL (ITIME,IDUCT  )  FIXED BIN(31) ;                          00000470
      DCL (I,J,K,L,IT,IP)  FIXED BIN(31) ;                          00000480
      DCL DCT FIXED BIN(31)             ;                           00000490
      DCL (D,T) CHAR(2) ;               ;                           00000500
      DCL 1 TIME(5)                     ,                           00000510
            2 TEST CHAR(2)              ,                           00000520
            2 BGN ,3 (HR,MIN,SEC) CHAR(2) ,                         00000530
            2 END ,3 (HR,MIN,SEC) CHAR(2) ;                         00000540
      DCL (TIME_LIMIT,II,III,MM(15)     ) FIXED BIN(31) ;           00000550
      DCL DUMVM CHAR(16)    ;                                       00000560
      DCL DUMWP CHAR(75) ;                                          00000570
      DCL DUMTM CHAR(10) ;                                          00000580
      DCL LAMBDA FLOAT DEC(6) ;                                     00000590
```

```
     DCL SUM FLOAT DEC(13)   ;                                          00000600
/*                                                                      00000610
     INITIALIZE                                                         00000620
*/                                                                      00000630
     EM(*),V(*),M(*) = 0.0E+0 ;                                         00000640
     WP(*,*) = -1.0 ;                                                   00000650
     Q(*,*),W(*,*) = 0.0E+0 ;                                           00000660
     W_AVG(*),FFV(*) = 0.0E+0 ;                                         00000670
     A(*) = 0.0E+0;                                                     00000680
     INDEX.BGN.HR(*),INDEX.BGN.MIN(*),INDEX.BGN.SEC(*),                 00000690
     INDEX.END.HR(*),INDEX.END.MIN(*),INDEX.END.SEC(*) = ' ' ;          00000700
     MM(*) = 0 ;                                                        00000710
/*                                                                      00000720
     READ AND PRINT INPUT CARDS                                         00000730
*/                                                                      00000740
     GET EDIT(NTEST,NDUCT,NRANGE,LITTLE_A,FFV_LIMIT,                    00000750
             ( INDEX.TEST(J) , INDEX.DUCT(J,1) ,INDEX.DUCT(J,2),        00000760
               INDEX.DUCT(J,3) DO J = 1 TO NTEST ) )                    00000770
             (COL(1),3 F(2), F(9),F(10),                                00000780
              3 ( COL(1) ,40 A(2) ) ) ;                                 00000790
     PUT PAGE EDIT(NTEST,NDUCT,NRANGE,LITTLE_A,FFV_LIMIT,               00000800
           ( INDEX.TEST(J) , INDEX.DUCT(J,1) ,INDEX.DUCT(J,2) ,         00000810
             INDEX.DUCT(J,3) DO J = 1 TO NTEST) )                       00000820
           (COL(1),3 F(2) ,F(10,7) , F(11,3) ,                          00000830
            3 (COL(1), 40 A(2))  ) ;                                    00000840
/**/                                                                    00000850
A1:                                                                     00000860
     GET EDIT( (TIME.TEST(I),TIME.BGN.HR(I),TIME.BGN.MIN(I),            00000870
               TIME.BGN.SEC(I) ,TIME.END.HR(I),TIME.END.MIN(I),         00000880
               TIME.END.SEC(I) DO I = 1 TO 5 ) )                        00000890
           (COL(1), 35 A(2))  ;                                         00000900
     PUT EDIT( (TIME.TEST(I),TIME.BGN.HR(I),TIME.BGN.MIN(I),            00000910
               TIME.BGN.SEC(I),TIME.END.HR(I),TIME.END.MIN(I),          00000920
               TIME.END.SEC(I) DO I = 1 TO 5) )                         00000930
           (COL(1),35 A(2) ) ;                                          00000940
     DO I = 1 TO 5 ;                                                    00000950
     IF TIME.TEST(I) = '99' THEN GO TO A3 ;                             00000960
     DO J = 1 TO NTEST ;                                                00000970
     IF TIME.TEST(I) = INDEX.TEST(J) THEN DO ;                          00000980
        INDEX.BGN(J) = TIME.BGN(I) ;                                    00000990
        INDEX.END(J) = TIME.END(I) ;                                    00001000
        GO TO A2 ;                                                      00001010
        END ;                                                           00001020
     END ;                                                              00001030
A2:                                                                     00001040
     END ;                                                              00001050
     GO TO A1 ;                                                         00001060
A3:                                                                     00001070
     GET EDIT(DUMTM) (A(10)) ;                                          00001080
/**/                                                                    00001090
     J = 9999 ;                                                         00001100
     DO K = 1 TO NDUCT ;                                                00001110
     J = J + 1 ;                                                        00001120
     GET EDIT(DCT,A(DCT)) (F(2),F(8)) ;                                 00001130
     IF J > 8  THEN DO ;                                                00001140
        J = 1 ;                                                         00001150
        PUT EDIT(DCT,A(DCT)) (COL(1),F(2),F(8,2)) ;                     00001160
        END ;                                                           00001170
        ELSE PUT EDIT(DCT,A(DCT)) (F(2),F(8,2)) ;
```

```
     END ;                                                              00001180
/**/                                                                    00001190
     GET EDIT ((FFV(L) DO L=1 TO NRANGE)) (COL(1),8 F(10)) ;            00001200
     PUT EDIT ((FFV(L) DO L=1 TO NRANGE)) (COL(1),8 F(10,3)) ;          00001210
/**/                                                                    00001220
     I = 0 ;                                                            00001230
     DO J = 1 TO NTEST ;                                                00001240
     IF INDEX.TEST(J) = '  ' THEN GO TO A4 ;                           00001250
     DO K = 1 TO 3 ;                                                    00001260
     IF INDEX.DUCT(J,K) = '  ' THEN GO TO A4 ;                         00001270
     I = I + 1 ;                                                        00001280
     DATA.TEST(I) = INDEX.TEST(J) ;                                     00001290
     DATA.DUCT(I) = INDEX.DUCT(J,K) ;                                   00001300
     END;                                                               00001310
A4:                                                                     00001320
     END;                                                               00001330
     NDATA = I ;                                                        00001340
/**/                                                                    00001350
A5:  GET EDIT(T,D) (COL(1),2 A(2)) ;                                    00001360
     PUT EDIT(T,D) (COL(1),2 A(2)) ;                                    00001370
     IF T = '99' THEN GO TO A6 ;                                        00001380
     DO I = 1 TO NDATA ;                                                00001390
     IF T = DATA.TEST(I) THEN IF D = DATA.DUCT(I) THEN DO ;             00001400
        GET EDIT(   (WP(I,L) DO L = 1 TO NRANGE))                       00001410
                ( COL(6), 15 F(5) ) ;                                   00001420
        PUT EDIT(   (WP(I,L) DO L = 1 TO NRANGE))                       00001430
                (COL(6) , 15 F(5,3)) ;                                  00001440
        GO TO A5 ;                                                      00001450
        END ;                                                           00001460
     END ;                                                              00001470
     GO TO A5 ;                                                         00001480
A6:                                                                     00001490
     GET EDIT(DUMWP) (COL(6),A(75)) ;                                   00001500
/**/                                                                    00001510
     J = 9999 ;                                                         00001520
A7:  J = J+1 ;                                                          00001530
     GET EDIT(T,D) (2 A(2)) ;                                           00001540
     IF J > 4 THEN DO ;                                                 00001550
        J = 1 ;                                                         00001560
        PUT EDIT (T,D) (COL(1),2 A(2)) ;                                00001570
        END ;                                                           00001580
        ELSE PUT EDIT(T,D) (2 A(2)) ;                                   00001590
     IF T = '99' THEN GO TO A8 ;                                        00001600
     DO I = 1 TO NDATA ;                                                00001610
     IF T = DATA.TEST(I) THEN IF D = DATA.DUCT(I) THEN DO ;             00001620
         GET EDIT( V(I),W(I)) ( F(6),F(10)) ;                           00001630
         PUT EDIT( V(I),W(I)) ( F(6,1),F(10,2)) ;                       00001640
         GO TO A7 ;                                                     00001650
         END;                                                           00001660
     END ;                                                              00001670
     GET EDIT ( DUMVW) (A(16)) ;                                        00001680
     GO TO A7 ;                                                         00001690
/*                                                                      00001700
     READ TAPE AND COMPUTE Q AND W                                      00001710
*/                                                                      00001720
A8:                                                                     00001730
     READ FILE(INPUT) SET(P) ;                                          00001740
     ON ENDFILE(INPUT) GO TO DONE ;                                     00001750
/* */
```

```
A9:  DO J = 1 TO NTEST ;                                                00001770
/*                                                                      00001800
     LOCATE TEST                                                        00001810
*/                                                                      00001820
RD1:                                                                    00001830
     IF JD = 'KEY' THEN GO TO RD1A ;                                    00001840
     READ FILE(INPUT) SET(P) ;                                          00001850
     GO TO RD1 ;                                                        00001860
RD1A:                                                                   00001870
     READ FILE(INPUT) SET(P) ;                                          00001880
     IF INDEX.TEST(J) = '   ' THEN GO TO NEXT_TEST ;                   00001890
     ITIME = 1 ;                                                        00001900
     GO TO RD2A ;                                                       00001910
/*                                                                      00001920
     LOCATE HOUR AND MINUTE                                             00001930
*/                                                                      00001940
RD2: READ FILE(INPUT) SET(P) ;                                          00001950
RD2A:                                                                   00001960
     IF INREC.JD = 'KEY' THEN GO TO NEXT_TEST ;                         00001970
     IF INREC.HR < INDEX.BGN.HR(J) THEN GO TO RD2 ;                     00001980
     IF INREC.HR > INDEX.BGN.HR(J) THEN GO TO FND ;                     00001990
     IF INREC.MIN < INDEX.BGN.MIN(J) THEN GO TO RD2 ;                   00002000
     IF INREC.MIN > INDEX.BGN.MIN(J) THEN GO TO FND ;                   00002010
/*                                                                      00002020
     LOCATE SEC                                                         00002030
*/                                                                      00002040
     DO ITIME= 1 TO 15 ;                                                00002050
     IF INREC.SEC(ITIME) >= INDEX.BGN.SEC(J) THEN GO TO FND   ;         00002060
     END;                                                               00002070
     GO TO RD2 ;                                                        00002080
/*                                                                      00002090
     LOCATE  TEST-DUCT AND NO. DUCTS FOR THIS TEST                      00002100
*/                                                                      00002110
FND: DO I = 1 TO NDATA ;                                                00002120
     IF INDEX.TEST(J) = DATA.TEST(I) THEN GO TO FND1 ;                  00002130
     END;                                                               00002140
     GO TO NEXT_TEST  ;                                                 00002150
FND1:                                                                   00002160
     DO IDUCT = 1 TO 3 ;                                                00002170
     IF INDEX.DUCT(J,IDUCT) = '   ' THEN GO TO FND2 ;                   00002180
     END;                                                               00002190
     IDUCT = 4 ;                                                        00002200
FND2:IDUCT = IDUCT-1 ;                                                  00002210
     IF IDUCT <= 0 THEN GO TO NEXT_TEST ;                               00002220
     IP = 0 ;                                                           00002230
     TIME_LIMIT = 15 ;                                                  00002240
     PUT EDIT('PROCESSING FOR TEST ',INDEX.TEST(J),'  (',IDUCT,         00002250
          ' DUCTS )' ) (COL(1),3 A,F(2),A) ;                            00002260
/*                                                                      00002270
     PROCESS FLOW DATA FROM TAPE TO COMPUTE Q AND W                     00002280
*/                                                                      00002290
MORE:IF INREC.JD = 'KEY' THEN GO TO COMPUTE ;                           00002300
/*                                                                      00002310
     LOCATE END HR AND MIN                                              00002320
*/                                                                      00002330
     IF INREC.HR > INDEX.END.HR(J) THEN GO TO COMPUTE ;                 00002340
     IF INREC.HR < INDEX.END.HR(J) THEN GO TO DOIT ;                    00002350
     IF INREC.MIN > INDEX.END.MIN(J) THEN GO TO COMPUTE ;               00002360
     IF INREC.MIN < INDEX.END.MIN(J) THEN GO TO DOIT ;                  00002370
```

```
/*                                                                      00002380
     LOCATE END SEC                                                     00002390
*/                                                                      00002400
          DO TIME_LIMIT = 1 TO 15 ;                                     00002410
          IF INREC.SEC(TIME_LIMIT)  = INDEX.END.SEC(J) THEN GO TO DOIT ;00002420
          IF INREC.SEC(TIME_LIMIT) >  INDEX.END.SEC(J) THEN             00002430
               GO TO COMPLTE ;                                          00002440
          END ;                                                         00002450
          TIME_LIMIT = 15 ;                                             00002460
/**/                                                                    00002470
DOIT:IP = IP + TIME_LIMIT - ITIME + 1 ;                                 00002480
/**/
     DO L = 1 TO NRANGE ;                                               00002490
     III = 0 ;                                                          00002500
     DO II = I TO I+IDUCT-1 ;                                           00002510
     III = III + 1 ; K = DATA.DUCT(II) ;                                00002520
     SUM = 0.0E+0 ;                                                     00002530
     DO IT = ITIME TO TIME_LIMIT ;                                      00002540
/**/
     IF INREC.SECREC(IT).FLOW(III).AF <= 0.E+0 THEN DO ;
        IF FFV(L) < FFV_LIMIT THEN GO TO SKP ;
        SUM = SUM + 1.E+0 ;
        GO TO SKP ;
        END ;
     LAMBDA = 0.508E+0 * INREC.SECREC(IT).FLOW(III).AF                  00002580
            * FFV(L) / (980.E+0 * A(K) ) ;                              00002590
     LAMBDA =   4.5E+0 / LAMBDA ;                                       00002600
     LAMBDA = (1.E+0 - EXP(-LAMBDA) ) / LAMBDA ;                        00002610
     SUM = SUM + 1.E+0 /( (1.E+0 - LAMBDA) * V(II) * A(K)               00002620
                        / INREC.SECREC(IT).FLOW(III).AF                 00002630
                        + LAMBDA ) ;                                    00002640
/**/
SKP: END;                                                               00002650
     DATA.Q(II,L) = DATA.Q(II,L) + SUM ;                                00002660
     END;                                                               00002670
     END;                                                               00002680
/**/                                                                    00002690
     ITIME = 1;                                                         00002700
     READ FILE(INPUT) SET(P) ;                                          00002710
     GO TO MORE ;                                                       00002720
/**/                                                                    00002730
COMPUTE:                                                                00002740
     PUT EDIT('  (',IP,' FLOW POINTS )' ) (A,F(4),A) ;                  00002750
     IF IP <= 0 THEN GO TO NEXT_TEST ;
     DO II = I TO I+IDUCT-1 ;
     SUM = 0.0E+0 ;
     DO L = 1 TO NRANGE ;                                               00002980
     DATA.Q(II,L) = DATA.Q(II,L) / IP ;                                 00002990
     SUM = SUM + DATA.WP(II,L) * DATA.Q(II,L) ;                         00003000
     END;                                                               00003010
     DO L = 1 TO NRANGE ;                                               00003020
     IF DATA.WP(II,L) > 0.E+0 THEN IF DATA.Q(II,L) > 0.E+0 THEN DO;     00003030
         NN(L) = NN(L) + 1 ;                                            00003040
         DATA.W(II,L) =  DATA.WP(II,L) * DATA.Q(II,L) / SUM ;           00003050
         W_AVG(L) = W_AVG(L) + DATA.W(II,L) ;                           00003060
         END;                                                           00003070
     END ;                                                              00003080
     END ;                                                              00003090
/**/                                                                    00003100
```

```
NEXT_TEST:                                                              00002960
     END A9 ;
/*                                                                      00002980
     COMPUTE MASS LOADING                                               00002990
*/                                                                      00003000
DONE:
     DO L = 1 TO NRANGE ;
     IF MM(L) > 0 THEN W_AVG(L) = W_AVG(L) / MM(L) ;
     END ;
     DO I = 1 TO NDATA ;                                                00003010
     SUM = 0.0E+0 ; K = DATA.DUCT(I) ;                                  00003020
     DO L = 1 TO NRANGE;                                                00003030
     SUM = SUM + Q(I,L)* W_AVG(L) ;                                     00003040
     END;                                                               00003050
     DATA.EM(I) =  A(K) * DATA.M(I) *SUM /LITTLE_A ;                    00003060
     END;                                                               00003070
/*                                                                      00003080
     PRINT RESULTS                                                      00003090
*/                                                                      00003100
     PUT PAGE EDIT('MASS LOADING COMPUTATIONS','TEST DUCT  ISOKINETIC',00003110
                   'NO.  NO.    WEIGHT','L =',(L DO L =1 TO NRANGE) ,  00003120
                   ' ' )                                                00003130
                  (COL(20),A,SKIP(3),COL(1),A,COL(1),A,COL(28),A,       00003140
                 COL(31), (NRANGE) F(6),SKIP,COL(100),A ) ;             00003150
     DO I = 1 TO NDATA ;                                                00003160
     DO L = 1 TO NRANGE ; IF DATA.W(I,L) < 0 THEN DATA.W(I,L) = 0;END;  00003170
     PUT EDIT(DATA.TEST(I),DATA.DUCT(I),DATA.EM(I),'Q(I,L) ',           00003180
              (DATA.Q(I,L) DO L = 1 TO NRANGE)   ,    '%W(I,L)',        00003190
              (DATA.W(I,L) DO L = 1 TO NRANGE)  ) (SKIP(2) ,            00003200
              COL(2),A(2), COL(7),A(2) ,COL(10),E(12,5), COL(24),A ,    00003210
              COL(31),(NRANGE) F(6,2) ,                 COL(24),A ,     00003220
              COL(31),(NRANGE) F(6,1,2) ) ;                             00003230
     IF I = 1 THEN PUT EDIT('%W(L)  ',(W_AVG(L) DO L = 1 TO NRANGE) )   00003240
                           (COL(24),A,COL(31),(NRANGE) F(6,1,2) ) ;     00003250
     END ;                                                              00003260
 END MASS;                                                              00003270
//GO.INPUT DD DSN=ANDYDATA,UNIT=2400,DISP=(OLD,KEEP),LABEL=(1,SL),      00003
//            DCB=(RECFM=FB,LRECL=3608,BLKSIZE=3608),                   00003620
//            VOL=SER=00C190
//GO.SYSIN DD *                                                         00003280
270613.00085720 1                                                                (END PROGRAM)
02040506030502  040401  050502  060603  07010203080102030901020310040506110405061901020320010203210203 (DATA INPUT CARDS) (CARD SET 1)
      2302    24010203                                                           (CARD SET 2)
021637001638590311484511501104101815102010051608111610580611074811090907152254152443081134251136270911435111462210152609152825111511904152105121402121407501309115109165814151630151923151243171246281611040311074217111255111508181521311524001911110411151520110806111045211058151103082215370815392023151550151809241419081421359 (CARD SET 3)
01     .8502      .8503      .8504      .6905      .6906      .69          (CARD SET 4)
     .001       .001       .002       .006       .025       .07        .15        .29   (CARD SET 5)
     .73       6.60      40.9      246.5     1597.4
0701 .1276.0626.1228.1628.0646.0198.0167.0387.1031.0236.0790.1139.0760      (CARD SET 6)
0802 .1525.0467.1057.2598.1374.0077.0153.0095.0357.0193.0646.0931.0621
1006 .2037.0350.0240.0270.0360.0250.0120.0130.0359.0490.1638.2360.1574
1105 .1845.0491.0217.0829.0136.0086.0073.0154.0240.0498.1666.2401.1601
2302 .0644.0350.0820.1780.0850.0440.0130.0180.0578.0346.1158.1669.1113
99
0204  60.0        1.00205 170.4       45.80206 194.0       47.60302 159.0       30.3   (CARD SET 7)
```

```
0305 159.6      52.10401 172.2      18.80404 175.8      21.40502 185.4      252.6
0505 181.0      35.70603 226.4     135.60606 227.4      32.50701 470.6      203.1
0702 608.3    -183.50703 716.6     135.60801 738.5     145.90802 422.2      124.6
0803 577.8     271.50901 380.2      42.30902 425.3     296.60903 326.3      358.2
1004 193.4      51.81005 184.1      84.41006 350.1      62.81104 196.6       46.7
1105 202.2      42.21106 343.8      60.51901 517.3      31.11902 565.1      109.0
1903  60.0       1.02001  60.0     60.02002 533.4      50.12003 532.9      139.9
2101 527.5      9.62102 535.4      63.12103 881.3     2675.2302 593.4      259.4
2401 477.1      3.32402 599.3      12.32403 680.4      208.799
```

(END INPUT DATA CARDS)

TABLE C-20

PARTICULATE CORRECTION FACTORS, Q

TEST NO.	STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3	LARRY CAR
2					.519	.783	WILPUTTE
5	1.637				.987		WILPUTTE
6			1.648			1.117	WILPUTTE
7	.587	.691	1.01				WILPUTTE
8	.905	.627	.657				WILPUTTE
9	.484	.789	.591				WILPUTTE
10				1.021	1.042	1.115	WILPUTTE
11				1.280	1.233	1.180	WILPUTTE
19				.462	.471	.463	AISI/ EPA

TABLE C-20

(Continued)

PARTICULATE CORRECTION FACTORS, Q

TEST NO.	STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3	LARRY CAR
20					.463	.525	AISI/ EPA
21				.865	.716	.649	AISI/ EPA
23		.542					WILPUTTE
24				.399	.463	.416	AISI/ EPA
8A	.552	.663	1.048				WILPUTTE

TABLE C-21

(SAMPLE)

MASS LOADING COMPUTATIONS

TEST NO.	DUCT NO.	ISOKINETIC WEIGHT	L=	1	2	3	4	5	6	7	8	9	10	11	12	13
8A	01	3.58976E+04	Q(I, L)	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.17	0.93	0.96	0.99	1.00
			%W(I,L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
			%W(L)	14.7	4.3	6.2	12.4	5.9	1.9	1.2	1.7	4.5	3.3	11.0	18.7	14.1
8A	02	5.25198E+04	Q (I, L)	.39	.39	.39	.39	.39	.39	.39	.39	.39	.73	.83	.95	.99
			%W(L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8A	03	1.02817E+06	Q (I, L)	1.11	1.11	1.11	1.11	1.11	1.10	1.09	1.07	1.01	1.11	1.00	0.99	1.00
			%W(L)	14.7	4.3	6.2	12.4	5.9	1.4	1.2	1.7	4.5	3.3	11.0	18.7	14.1

Optical Data Reduction Program

The data processing program used to reduce the raw optical system data received from the microdensitometer facility were developed and run by MITRE on an IBM 370-145 machine using a conversational monitor capability to initiate and control the program during excitation. The program was written in PL-1 to facilitate manipulation of the data sets. The program is divided into four basic steps for the processing of a data frame. The first step takes as input the raw data tape created by the data logger of the microdensitometer and labels each record with appropriate identifying headers and processing keys. The basic data record consists of 539 character records. Each character (byte in IBM notation) represents a positive binary value from 0 to 255. The data record structure containing header information and keys consists of a 15 byte record key followed by the 539 byte input record. The record keys were transcribed from written documentation of the data tapes onto cards and matched sequentially with the input records. The key contents of each record are described in Table C-22.

The record type identifiers are "B" if the record represents a base value, or "D" if they represent a data value. The record scan identifier is either a "1", "2", or "3", representing the light bar scan, the dark strip scan, and a color bar scan, respectively. The second program step checks data elements in binary form against rules established to detect faulty or poor data. The results of these checks control the balance of the program process by allowing normal processing to continue or inhibiting further calculations and entering a zero value or a maximum mass value for the element under test depending upon the results of the tests. A summary of the results of these tests for each element is provided in the form of "flags" below each element column and a summary of all flags for a complete frame is provided at the end of the frame report. The checks performed on data are controlled by variables which are eigher selected at the beginning of each run or set to default values if no new value is specified. The variable "DELTA" is the required binary difference between a known light area and an area to be

TABLE C-22

DATA RECORD STRUCTURE

FIELD DESCRIPTION	FIELD TYPE	LENGHT IN BYTES
Sequence Number	Binary	2
Test Identifier	Character	2
Hour	"	2
Minute	"	2
Second	"	2
Film Roll Identifier	"	2
Record Type	"	1
Record Scan	"	1
Sequence	"	1

declared as a light bar gap. The variable "ENOISE" is the binary value by which a data light element is allowed to exceed the corresponding base light value without being detected as bad data. This difference can be accounted for in instrument measurement errors. The variable "DNOISE" is the binary value by which the dark readings may exceed corresponding data light readings before the data is disallowed as bad data. This condition occurs in heavy emissions and can be accounted for by instrument inaccuracies. The "RCUT" value is selected as the lowest 1/T value which will be calculated by the program. This selection determines the value of the variable "MAXMASS" which is the mass value set for an element if the selected 1/T value is exceeded.

A sub-function of this portion of the program also involves the identification of gaps between light bar segments and the determination of needed adjustment of data frames to properly coincide with these gaps. A summary of the necessary adjustment is contained at the end of each frame report. The third program step converts the binary densitometry data to relative light intensity values. This conversion is accomplished using input data in the form of a look-up table in which the subscript of an element corresponds to the raw binary densitometry data and the contents of that table element is a corresponding relative light intensity value. This intensity value is used in the final calculation of emission light transmission. The table is input via a card deck supplied by the facility doing densitometry and film calibration. The card format is eight fields, each containing a floating point light intensity number corresponsing to the 256 possible density values. The last step in the program uses the light intensity values to calculate a transmission value corrected for plume air light. The program determines the natural log of the reciprocal of this value and multiplies it by a series of system constants to arrive at a mass emission rate per vertical unit of plume height for each element. The results of these calculations are printed for each element and a total of these results is presented at the end of a complete scan (539 elements).

The constants used in this calculation are input through the terminal for each run or are allowed to be set by default values. The constant names are as follows:

MASD The assigned density (G/cm^3) of the particles.

KOOP The constant which associates particle light obscuration with particle volume per unit cross-sectional area of plume (cm^3/m^2).

DLEG The length of one scan segment of the light source (m).

Two data files containing the keyed data records have been provided to EPA. Details of these tapes appear in Figure 86. The card input decks of the conversion tables used have also been supplied for the appropriate data.

The following section contains a complete listing of the program used to reduce the optical monitoring system data.

TAPE CHARACTERISTICS:

Tape Number	ϕϕ6768
Density	16ϕϕ BPI
Type	9-Track
Label	No Label

DATA SET #3:

Source:	Film Analysis #1 (MITRE TAPE 190)

DATA SET #4:

Source:	Film Analysis #2 (MITRE TAPE PR4)

Record Format:	Fixed Blocked
Logical Record Length	554
Block Size	5540

FIGURE C-11

DATA TRANSFER DETAIL

SOURCE LISTING

```
STMT LEV NT

   1       0   LIGHT: PROCEDURE OPTIONS(MAIN) ;                                                    BEE00010
   2    1  0   DCL TOTAS FIXED BIN (31) INIT (0) ;                                                BEE00020
   3    1  0      DCL (COC,DID,LOC,WID) (0:4) FIXED BIN (31,6) INIT ((5) 0) ;                     BEE00030
   4    1  0      DCL (ABIN,BHTOL) FIXED BINARY (31) INIT (4) ;                                   BEE00040
   5    1  0       DCL (HIT,SKIPBEE,TA,CORR) FIXED BIN (15) INIT (0) ;                            BEE00050
   6    1  0     DCL (PHAS,WIDTH,INDEX) FIXED BIN (31,6) INIT (0) ;                               BEE00060
   7    1  0       DCL FLAS (539) CHAR (1) INIT ((539) (' ')) ;                                   BEE00070
   8    1  0        DCL THCHAR CHAR (1) DEFINED TH POSITION (2) ;                                 BEE00080
   9    1  0        DCL A2CHAR CHAR (1) DEFINED ABIN POSITION (4) ;                               BEE00090
  10    1  0     DCL ENOISE FIXED BIN (15) INIT (6) ; /* FL > BL BIN NOISE TOL    */             BEE00100
  11    1  0     DCL ONOISE FIXED BIN (15) INIT (7) ; /* DL > DD BIN NOISE TOL    */             BEE00110
  12    1  0    DCL (MAXMASS              ) DECIMAL FLOAT (6) INIT (0) ;                          BEE00120
  13    1  0     DCL F1 (15) CHAR (1) BASED (Q1) ;                                               BEE00130
  14    1  0     DCL (IUP,EPS,TOPIN,IDO,SCAN) FIXED BIN (15) INIT (0) ;                          BEE00140
  15    1  0     DCL (CF1,CF2,CF3,CF4,CF5,CF6) FIXED BIN (15) INIT (0) ;                         BEE00150
  16    1  0    DCL (ONSOURCE,ONCHAR,ONLOC,ONCODE) BUILTIN ;                                     BEE00160
  17    1  0     DCL BASS (539)  FIXED BIN (15) INIT ((539) 0) ;                                 BEE00170
  18    1  0     DCL S2ZZ FIXED BIN (31) INIT (1) ; DCL IND FIXED BIN (15) ;                     BEE00180
  20    1  0       DCL (BUG,BUGGY) FIXED BIN (15) INIT (0) ;                                     BEE00190
  21    1  0      DCL RCUT DECIMAL FLOAT (6) INIT (10) ;                                         BEE00200
  22    1  0      DCL DELTA DECIMAL FLOAT (6) INIT (14.5) ;                                      BEE00210
  23    1  0     DCL MASD DECIMAL FLOAT (6) INIT (1.2);                                          BEE00220
  24    1  0     DCL KCCP DECIMAL FLOAT (6) INIT (1.33) ;                                        BEE00230
  25    1  0     DCL DLEG DECIMAL FLOAT (6) INIT (0.02714) ;                                     BEE00240
  26    1  0      DCL    (BD,FL,FD,FC,R,RIN,ME) (015) FLOAT DECIMAL (6) ;                       BEE00250
  27    1  0      DCL BL (015) DECIMAL FLOAT (6) BASED (S) ;                                     BEE00260
  28    1  0     DCL BI (15) FIXED BIN (15) BASED (SS) ;                                         BEE00270
  29    1  0      DCL INREC CHAR (0600) VAR ;                  /* LARGER ?  */                  BEE00280
  30    1  0      DCL (AVG2,THRESH,TEMP,CON,MASS          ) DECIMAL FLOAT (6) INIT(0);           BEE00290
  31    1  0      DCL (I,J,LEN,INT,TH,NRD,NRI,STOP,CNT,REP) FIXED BIN (15) INIT (0) ;            BEE00300
  32    1  0     DCL A2 FIXED BIN (31) INIT (0) ;                                                BEE00310
  33    1  0      DCL INBIT (-1:539) BIT (8) BASED (Q) ;   /* REF P94 TWO BYTE CON */            BEE00320
  34    1  0      DCL 1 CARD BASED (T) ,                                                         BEE00330
                      5 SN CHAR (5) ,                                                          BEE00340
                      5 B1 CHAR (1) ,                                                          BEE00350
                      5 TEST CHAR (2) ,                                                        BEE00360
                      5 B2 CHAR (7) ,                                                          BEE00370
                      5 HR CHAR (2) ,                                                          BEE00380
                      5 MIN CHAR (2) ,                                                         BEE00390
                      5 SEC CHAR (2) ,                                                         BEE00400
                      5 B3 CHAR (4) ,                                                          BEE00410
                      5 ROLL CHAR (2) ,                                                        BEE00420
                      5 B5 CHAR (12) ,                                                         BEE00430
                      5 REC_TYPE CHAR (1) ,                                                    BEE00440
                      5 REC_SCAN CHAR (1) ,                                                    BEE00450
                      5 B6 CHAR (4) ,                                                          BEE00460
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STMT LEV NT

                        5 SEQ CHAR (1) ,                                                    BEE00470
                        5 B7 CHAR (14) ,                                                    BEE00480
                        5 BEES FLOAT DECIMAL (6) ,                                          BEE00490
                        5 B7A CHAR (8) ,                                                    BEE00500
                        5 TAPE CHAR (3) ,                                                   BEE00510
                        5 B8 CHAR (5) ;                                                     BEE00520
  35   1  0       DCL TABLE (0:299) DECIMAL FLOAT (6) ;                                    BEE00530
  36   1  0       DCL 1 NUREC ,                                                            BEE00540
                        5 SN FIXED BIN (15) ,                                             BEE00550
                        5 TEST CHAR (2) ,                                                 BEE00560
                        5 HR   CHAR (2) ,                                                 BEE00570
                        5 MIN  CHAR (2) ,                                                 BEE00580
                        5 SEC  CHAR (2) ,                                                 BEE00590
                        5 ROLL CHAR (2) ,                                                 BEE00600
                        5 REC_TYPE CHAR (1) ,                                             BEE00610
                        5 REC_SCAN CHAR (1) ,                                             BEE00620
                        5 SEQ CHAR (1) ,                                                  BEE00630
                        5 VAL (539) CHAR (1)       ;                                      BEE00640
  37   1  0     DCL 1 RECREC BASED (Q) ,                                                  BEE00650
                      5 LONG FIXED BIN (15) ,                                             BEE00660
                      5 VAL (539) CHAR (1) ;                                              BEE00670
  38   1  0     DCL ONEBIT (15) BIT  (8) BASED (Y) ,                                      BEE00680
                   TWOBIT (15) BIT  (8) BASED (Z) ;                                       BEE00690
  39   1  0       DCL BASE (539) FLOAT DECIMAL (6) ;                                      BEE00700
  40   1  0       DCL (F5,F0) (15) CHAR (2) INIT ((15)(2) ' ') ;                          BEE00710
  41   1  0       DCL (F2,F3,F4)    (15) CHAR (1) INIT ((15)(1) ' ') ;                    BEE00720
  42   1  0       DCL AVG_ELEM (539) FLOAT DECIMAL (6) INIT ((539) 0) ;                   BEE00730
  43   1  0       DCL INPUT FILE INPUT RECORD SEQUENTIAL BUFFERED ;                       BEE00740
  44   1  0      DCL TELE FILE OUTPUT STREAM PRINT ;                                      BEE00750
  45   1  0       DCL PARMS FILE INPUT STREAM ;                                           BEE00760
  46   1  0       DCL TABVAL FILE INPUT RECORD SEQUENTIAL ;                               BEE00770
  47   1  0       DCL CART CHAR (80) BASED (T) ;                                          BEE00780
  48   1  0       DCL RECKEY FILE INPUT SEQUENTIAL BUFFERED ;                             BEE00790
  49   1  0       OPEN FILE (REPO) OUTPUT STREAM PRINT PAGESIZE (64) LINESIZE (132) ,     BEE00800
                        FILE (TELE) OUTPUT STREAM PRINT LINESIZE (80) PAGESIZE (200) ,    BEE00810
                        FILE (SYSPRINT) OUTPUT STREAM PRINT LINESIZE (132) ,              BEE00820
                        FILE (PARMS) INPUT STREAM ,                                       BEE00830
                     FILE (TELE) ,                                                        BEE00840
                        FILE (TABVAL) ;                                                   BEE00850
  50   1  0       ON ENDPAGE (REPO) BEGIN ; REP = 0 ; CNT = CNT + 1 ;                     BEE00860
  53   2  0         PUT FILE (REPO) EDIT ('LET THERE BE LIGHT AND DARK','PAGE',CNT,       BEE00870
                    'TEST',NUREC.TEST,'ZERO PAL =',AVG2,'HR:MIN:SEC',NUREC.HR,':',       BEE00880
                  NUREC.MIN,':',NUREC.SEC,' ','BASE',SKIPBEE,'SCAN',SCAN)                 BEE00890
                 (PAGE,COL(60),A,COL(120),A,F(6),COL(10),A,F(4),COL(20),A,F(15,3),        BEE00900
                COL(64),A,X(2),3(P'99',A),COL(105),A,F(6),COL(120),A,F(6)) ;              BEE00910
  54   2  0       PUT FILE (REPO) EDIT                                                    BEE00920
                  ('* LIGHT BAR GAP','+ PAL > BL','$ DL > BL','# DL < DD (NOISE)',        BEE00930
                  '? DL < DD (INVALID)','% 1/T > RCUT','@ BL < AVG BD (INVALID)')(SKIP,BEE00940
  55   2  0       10 (A,X(4))) ;  END ;                                                   BEE00950
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STMT LEV NT

  56   1  0     ON ENDFILE (INPUT) BEGIN ; GO TO FINI ; END ;                                  BEE00960
  59   1  0     ON ENDFILE (RECKEY) BEGIN ; GO TO FINI ; END ;                                 BEE00970
  62   1  0     ON CONVERSION BEGIN ; PUT FILE (SYSPRINT) EDIT ('CONVERSION ERROR',            BEE00980
                  'ERROR CODE =',ONCODE,ONSOURCE,ONCHAR,ONLOC) (SKIP(3),A,A,F(6),            BEE00990
  64   2  0       3(SKIP,A)) ; GO TO GOOF ; END ;                                            BEE01000
  66   1  0   INIT:                                                                          BEE01010
                  Q = ADDR (INREC) ;                                                         BEE01020
  67   1  0    PUT FILE (TELE)EDIT ('ENTER MASD,KOOP,DLEG,RCUT,SZZZ,DELTA,ENOISE,            BEE01030
                 DNOISE,BHTOL,SKIPBEE')          (SKIP,A) ;                                  BEE01040
  68   1  0     GET FILE (PARMS) DATA (MASD,KOOP,DLEG,   /* DATA LIST OPTIONAL */            BEE01050
  69   1  0   SZZZ,DELTA,RCUT,ENOISE,DNOISE,BHTOL,SKIPBEE);CON=MASD * KOOP * DLEG;          BEE01060
  70   1  0           MAXMASS = CON * LOG (RCUT) ;                                         BEE01070
  71   1  0     PUT FILE (SYSPRINT) DATA (MASD,KOOP,DLEG,RCUT,CON,BHTOL,                   BEE01080
                SZZZ,DELTA,ENOISE,DNOISE,MAXMASS,BHTOL,SKIPBEE) PAGE ;                       BEE01090
  72   1  0     PUT FILE (TELE) DATA (MASD,KOOP,DLEG,RCUT,CON,                             BEE01100
                SZZZ,DELTA,ENOISE,DNOISE,MAXMASS,SKIPBEE) ;                                BEE01110
  73   1  0     DO I = 0 TO 49 ;                                                           BEE01120
  74   1  1       READ FILE (TABVAL) SET (T) ;                                             BEE01130
  75   1  1       GET STRING (CART) EDIT ((TABLE  (J) DO J = I * 6 TO I * 6 + 5))          BEE01140
                 (6(P'9V.999999E-99')) ;                                                   BEE01150
  76   1  1       END ;                                                                    BEE01160
  77   1  0     PUT FILE (SYSPRINT) EDIT ('FUNCTIONAL VALUES',(TABLE  (J) DO J =           BEE01170
                   0 TO  299)) (SKIP (3),COL(60),A,SKIP,50(SKIP,10(F(13,6)))) ;            BEE01180
  78   1  0     CLOSE FILE (PARMS) , FILE (TABVAL) ;                                       BEE01190
  79   1  0    OPEN FILE (INPUT) RECORD INPUT SEQUENTIAL BUFFERED ,                        BEE01200
                     FILE (RECKEY) RECORD INPUT SEQUENTIAL BUFFERED ;                      BEE01210
  80   1  0   MO: READ FILE (RECKEY) SET (T) ;                                            BEE01220
  81   1  0    IF CARD.REC_TYPE ¬= 'B' | CARD.REC_SCAN ¬= '1' THEN DO ;                    BEE01230
  82   1  1    READ FILE (INPUT) INTO (INREC) ; GO TO MO ; END ;                          BEE01240
  85   1  0   DO WHILE (SKIPBEE > IUP); READ FILE (INPUT) INTO (INREC) ;                  BEE01250
  87   1  1   NRI = NRI + 1 ; IF CARD.REC_TYPE ¬= '*' THEN DO ;                           BEE01260
  89   1  2   LEN = LENGTH (INREC) ;                                                      BEE01270
  90   1  2   NUREC = CARD, BY NAME ;NUREC = RECREC, BY NAME;                            BEE01280
  92   1  2   END; READ FILE (RECKEY) SET (T);                                           BEE01290
  94   1  1    IF CARD.REC_TYPE = 'B' & CARD.REC_SCAN = '1' THEN IUP = IUP + 1;          BEE01300
  95   1  1    PUT FILE (TELE) DATA (CART,NRI,NRO) SKIP ; END;                           BEE01310
  97   1  0   BASES:                                                                     BEE01320
  98   1  0     READ FILE (INPUT) INTO (INREC) ; NRI = NRI + 1 ;                         BEE01330
  99   1  0     LEN = LENGTH (INREC) ;                                                   BEE01340
 100   1  0   IF CARD.REC_SCAN = '3' | CARD.REC_TYPE = '*' THEN LEN = 999 ;            BEE01350
 101   1  0     IF LEN = 539 | LEN = 540 THEN DO ;     /* GOOD BASE RECORD */           BEE01360
 102   1  1       NUREC = CARD, BY NAME ;                                                BEE01370
 103   1  1       NUREC = RECREC, BY NAME ;                                              BEE01380
 104   1  1       IF NUREC.REC_SCAN = '1' THEN DO ; TH = 0 ;                             BEE01390
 106   1  2         DO I = 1 TO 539 ;                                                    BEE01400
 107   1  3           INT = INBIT (I) ; BASS (I) = INT ;                                 BEE01410
 109   1  3           BASE (I) = TABLE (INT) ;                                           BEE01420
 110   1  3   IF (I > 20 & I < 51) | (I > 489 & I < 520) THEN DO ;                       BEE01430
              /* DETERMINE THRESHOLD VALUES */                                          BEE01440
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STMT LEV NT

111   1  4                TH = TH + INT ; END ;                                          BEE01450
113   1  3             END ;                                                             BEE01460
114   1  2     PUT FILE (SYSPRINT) DATA  (BASE,BASS) PAGE ;                              BEE01470
115   1  2             IF NRI ¬= NUREC.SN THEN GO TO GOOF ;                              BEE01480
116   1  2             READ FILE (RECKEY) SET (T) ;                                      BEE01490
117   1  2             THRESH = TH ;                                                     BEE01500
118   1  2             TH      =(THRESH / 60) - DELTA ;                                  BEE01510
119   1  2             THRESH = TABLE (TH) ;                                             BEE01520
120   1  2     PUT FILE (SYSPRINT) DATA (THRESH,TH) ;                                    BEE01530
121   1  2     PUT FILE (TELE)     DATA (THRESH,TH) ;                                    BEE01540
122   1  2        IF CARD.REC_TYPE ¬= '8' | CARD.REC_SCAN ¬= '2' THEN GO TO GOOF ;       BEE01550
123   1  2             ELSE GO TO BASES ; END ;                                          BEE01560
125   1  1          ELSE  DO ; SKIPBEE = SKIPBEE + 1;SCAN,TA = 0;                        BEE01570
128   1  2             SB: BHAS,CF1,A2 = 0;       /* BASE 2 SUM OF INT VALUES */     BEE01580
129   1  2             DO I = 1 TO 539 ;                                                 BEE01590
130   1  3             INT = INBIT (I) ;                                                 BEE01600
131   1  3           IF BASE (I) < THRESH THEN DO ;FLAS (I) = '*' ;                      BEE01610
133   1  4             CF1 = CF1 + 1 ; IF I > 39 & I < 500 THEN BHAS = BHAS              BEE01620
135   1  4                 + 1 ; END ; ELSE FLAS (I) = ' ' ;                             BEE01630
137   1  3             A2 = A2 + INT ; END ;                                             BEE01640
139   1  2             AVG2 = A2 ;                                                       BEE01650
140   1  2             A2 = (AVG2  / 539.0) + 0.5 ;                                      BEE01660
141   1  2             AVG2 = TABLE (A2) ; ABIN = A2 + BHTOL ;                           BEE01670
143   1  2     TOTAS = 0 ;INDEX = 40 ; TOPIN = 120 ;                                     BEE01680
146   1  2      DO I = 0 TO 4 ; WID(I),LOC(I),WIDTH = 0 ;                                BEE01690
148   1  3        DO J  = INDEX TO TOPIN;                                               BEE01700
149   1  4          IF FLAS (J) = '*' THEN DO ; LOC (I) = J ;                           BEE01710
151   1  5           WIDTH = 1 ;TOPIN = J + 15 ; GO TO WHOLCHK ; END ;                  BEE01720
155   1  4         END;                                                                BEE01730
156   1  3         PUT FILE (TELE) EDIT ('NO BASE B.H. ERROR ***') (SKIP,A) ;          BEE01740
157   1  3     GO TO SHIFTER ;                                                         BEE01750
158   1  3     WHOLCHK:                                                                BEE01760
                  DO J = J + 1 TO TOPIN ;                                             BEE01770
159   1  4     IF FLAS (J) = '*' THEN WIDTH = WIDTH + 1 ; ELSE GO TO ENDHOLE; END;     BEE01780
162   1  3     ENDHOLE: DO J = J + 1 TO TOPIN ;                                        BEE01790
163   1  4      IF FLAS (J) = '*' THEN GO TO SHIFTER ; END ;                           BEE01800
165   1  3      IF WIDTH > 9 | WIDTH < 4 THEN GO TO SHIFTER ; ELSE GO TO BHOLE;       BEE01810
167   1  3     SHIFTER: PUT FILE (TELE) EDIT ('BASE THRESHOLD ADJUSTMENT ***')         BEE01820
168   1  3     (SKIP,A) ; PUT FILE (TELE) DATA (I,J,WIDTH,TA,TH,THRESH,LOC,WID,A2,     BEE01830
              AVG2) SKIP ;                                                            BEE01840
169   1  3     GET FILE (PARMS) DATA (TH); THRESH = TABLE (TH) ;TA = TA + 1;           BEE01850
172   1  3    PUT FILE (TELE) DATA (TH,THRESH,TA); GO TO SB;                           BEE01860
174   1  3     BHOLE: INDEX = LOC (I) + 80 ;TOPIN = INDEX + 15 ;WID (I) = WIDTH ;      BEE01870
177   1  3       TOTAS = TOTAS + WIDTH ; END;                                          BEE01880
179   1  2     IF TOTAS ¬= BHAS THEN DO ; PUT FILE (TELE) EDIT ('EXTRA * PROBLEM')     BEE01890
181   1  3      (SKIP,A) ; PUT FILE (TELE) DATA (TOTAS,BHAS) SKIP ; END ;              BEE01900
183   1  2      PUT FILE (TELE) DATA (LOC,WID) SKIP ; TEMP = TABLE (ABIN) ;            BEE01910
185   1  2        PUT FILE (SYSPRINT) DATA (A2,AVG2,FLAS) SKIP ;                       BEE01920
186   1  2        PUT FILE (TELE) DATA (A2,ABIN,CF1,BHAS,AVG2,TEMP)  SKIP ;            BEE01930
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STMT LEV NT

  187   1  2           READ FILE (RECKEY) SET (T) ;                                    BEE01940
  188   1  2    IF CARD.REC_TYPE = '8' THEN GO TO BASES;                               BEE01950
  189   1  2             END ; END ;                                                   BEE01960
  191   1  0         ELSE  DO ;                                                        BEE01970
  192   1  1             IF CARD.REC_TYPE = '*' THEN DO ;                              BEE01980
  193   1  2               READ FILE (RECKEY) SET (T) ;                                BEE01990
  194   1  2                                        GO TO BASES ; END ;                BEE02000
  196   1  1              ELSE IF CARD.REC_SCAN = '3' & LENGTH (INREC) = 539           BEE02010
                    THEN DO ;                                                         BEE02020
  197   1  2     NUREC = CARD, BY NAME; NUREC = RECREC, BY NAME; READ FILE (RECKEY)   BEE02030
                   SET (T) ;                                                          BEE02040
  200   1  2      END; ELSE GO TO GOOF; END;                                          BEE02050
  203   1  0     DATA:   /* DATA REC #1 */                                           BEE02060
  204   1  0        READ FILE (INPUT) INTO (INREC) ; NRI = NRI + 1 ;                 BEE02070
  205   1  0        LEN = LENGTH (INREC) ; IF CARD.REC_TYPE = '*' | CARD.REC_SCAN    BEE02080
  206   1  0     = '3' THEN DO ; LEN = 999 ; END;                                    BEE02090
  209   1  0        IF LEN = 539 THEN DO ;  /* GOOD DATA RECORD # 1 */                BEE02100
  210   1  1          IF CARD.REC_TYPE ¬= 'D' | CARD.REC_SCAN ¬= '1' THEN GO TO GOOF ;BEE02110
  211   1  1            NUREC = CARD, BY NAME ;                                       BEE02120
  212   1  1            NUREC = RECREC, BY NAME ;                                     BEE02130
  213   1  1           END ; ELSE IF CARD.REC_TYPE = '*' THEN DO ;                    BEE02140
  215   1  1             READ FILE (RECKEY) SET (T) ;                                BEE02150
  216   1  1                                          GO TO DATA ; END ;               BEE02160
  218   1  0                    ELSE GO TO GOOF ;                                     BEE02170
  219   1  0     READ FILE (RECKEY) SET (T) ;                                        BEE02180
  220   1  0     DATMC:                                                              BEE02190
  221   1  0        READ FILE (INPUT) INTO (INREC) ; NRI = NRI + 1 ;                 BEE02200
  222   1  0        LEN = LENGTH (INREC) ;                                           BEE02210
  223   1  0        IF LEN = 539 THEN DO ; /*GOOD DATA RECORD # 2 */                 BEE02220
  224   1  1      IF (CARD.REC_TYPE ¬= 'D' | CARD.REC_SCAN ¬= '2') THEN GO TO GOOF ; BEE02230
                   /* DATA FRAME SHIFT */                                           BEE02240
  225   1  1       EPS = 20 ; SCAN = SCAN + 1 ;                                     BEE02250
  227   1  1      SHIFT: HIT = 0 ;                                                  BEE02260
  228   1  1        DO I = 0 TO 4 ; DOC (I) = 0 ; DID (I) = 0 ;WIDTH = 0 ;          BEE02270
  232   1  2        INDEX = LOC (I) - EPS; IF INDEX < 20 THEN INDEX = 20 ;          BEE02280
  234   1  2        TOPIN = INDEX + 2 * EPS ; IF TOPIN > 520 THEN TOPIN = 520 ;     BEE02290
  236   1  2          DO J = INDEX TO TOPIN;                                        BEE02300
  237   1  3             IF NUREC.VAL (J) < THCHAR & RECREC.VAL (J) < A2CHAR THEN   BEE02310
  238   1  4               DO ; DOC (I) = J ; WIDTH = 1 ;                          BEE02320
  240   1  4                    TOPIN = J + EPS ; GO TO HOLECHK ; END ; END;       BEE02330
  244   1  2        HOLECHK: DO J = J + 1 TO TOPIN ;                              BEE02340
  245   1  3                   IF NUREC.VAL (J) < THCHAR & RECREC.VAL (J) < A2CHAR BEE02350
  246   1  3                     THEN WIDTH = WIDTH + 1 ; ELSE GO TO ENDHOLD ;     BEE02360
  247   1  3         END HOLECHK ;                                                 BEE02370
  248   1  2      ENDHOLD:                                                         BEE02380
  249   1  3       IF WIDTH > 3 & WIDTH < 9 THEN DO ; DID (I) = WIDTH ;            BEE02390
  250   1  3             HIT = HIT + 1 ; END ;                                     BEE02400
  252   1  2        END ;                                                          BEE02410
  253   1  1      IF HIT < 2 THEN GO TO NOSHIFT ;                                  BEE02420
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STMT LEV NT

                                                                                                                    BEE02430
 254   1  1      BHAS,INDEX = 0 ;                                                                                   BEE02440
 255   1  1  PUT FILE (TELE) DATA (HIT,EPS,DOC,DID) ;                                                             BEE02450
 256   1  1       DO I = 0 TO 4 ; IF DID (I) > 0 THEN DO ;                                                         BEE02460
 258   1  3      WIDTH = DOC (I) + (DID (I) / 2) - (LOC (I) + (WID (I) /2));                                       BEE02470
 259   1  3      IF INDEX = 0 THEN DO; BHAS,INDEX = WIDTH ;                                                        BEE02480
                /* SET SHIFT BASED ON FIRST BH  *****    */                                                       BEE02490
 261   1  4            END ; ELSE DO ;                                                                           BEE02500
 263   1  4              IF ABS (INDEX - WIDTH) < 5 THEN BHAS = BHAS +WIDTH ;                                    BEE02510
 264   1  4                 ELSE DO ;                                                                            BEE02520
                 /* SHIFT SHOULD NOT DIFFER BY MORE THAN 5 CHAR */                                              BEE02530
 265   1  5                    PUT FILE (TELE) EDIT                                                             BEE02540
               ('VARIABLE SHIFT ERROR **** PROCESSING CONTINUES') (SKIP(3),A) ;                                  BEE02550
 266   1  5      PUT FILE (TELE) DATA (I,INDEX,WIDTH,DOC,DID,LOC,WID,BHAS) ;                                       BEE02560
 267   1  5      GO TO NOSHIFT ; END;                                                                            BEE02570
 269   1  4      END; END; END;                                                                                  BEE02580
 272   1  1    INDEX = DIVIDE (BHAS,HIT,31,5) ; INDEX = ROUND (INDEX,1) ;                                        BEE02590
 274   1  1    WIDTH = INDEX / 15 ; WIDTH = ROUND (WIDTH,1) ;                                                    BEE02600
 276   1  1    IF INDEX = 0 THEN GO TO NOSHIFT;                                                                  BEE02610
 277   1  1      IF INDEX > 0 THEN DO ; IUP = 35 - WIDTH ; IDO = 0 ;                                             BEE02620
 280   1  2       STOP = 539 - IUP * 15 ; END ; ELSE DO ; IUP = 35 ;STOP = 14 ;                                  BEE02630
 285   1  2        IDO = 0 - WIDTH ; END ;                                                                       BEE02640
 287   1  1    PUT FILE (TELE) DATA (INDEX,WIDTH,IUP,IDO,STOP,BHAS,HIT ) SKIP;                                   BEE02650
 288   1  1    GO TO LOOP ;                                                                                      BEE02660
 289   1  1         NOSHIFT: STOP = 14 ; IUP = 35 ; INDEX,WIDTH,IDO = 0 ;                                        BEE02670
 292   1  1          LOOP: REP = 20 ; MASS = 0 ;                                                                 BEE02680
 294   1  1         DO I = IUP TO IDO BY -1 ;                                                                    BEE02690
 295   1  2           DO J = 1 TO 15 ; F2(J),F3(J),F4(J),F5(J),F0(J) = ' ' ; END ;                               BEE02700
 298   1  2      IF I = IDO THEN DO ;IF  INDEX < 0 THEN DO ; STOP = 15 + INDEX                                   BEE02710
 301   1  4    + WIDTH * 15 ; IND = (I* 15) + 16 - STOP ;                                                        BEE02720
 302   1  4    PUT FILE (TELE) DATA (I,IDO,STOP,IND) ;                                                           BEE02730
 303   1  4    END; END; ELSE INC = (I * 15) + 1 ;                                                               BEE02740
 306   1  2           S = ADDR (BASE (IND)) ;  /* ONEBIT - FRAME LIGHT */                                       BEE02750
 307   1  2          SS = ADDR (BASS (IND)) ;  /* TWOBIT - FRAME DARK */                                        BEE02760
 308   1  2          C1 = ADDR (FLAS (IND)) ;                                                                   BEE02770
 309   1  2            IND = IND + INDEX ; IF IND < 1 THEN DO ; IND = 1 ;                                       BEE02780
 312   1  3     PUT FILE (TELE) EDIT ('IND < 1 **** ERROR') (SKIP,A) ;                                          BEE02790
 313   1  3      PUT FILE (TELE) DATA (I,IDO,INDEX,STOP,WIDTH) ; END;                                           BEE02800
 315   1  2     ELSE IF IND + STOP > 540 THEN DO ; IND = 540 - STOP ;                                           BEE02810
 317   1  3     PUT FILE (TELE) EDIT ('IND > 540 **** ERROR') (SKIP,A) ;                                        BEE02820
 318   1  3     PUT FILE (TELE) DATA (I,IUP,INDEX,STOP,WIDTH) ; END;                                            BEE02830
 320   1  2     Y = ADDR (NUREC.VAL (IND)) ; Z = ADDR (RECREC.VAL (IND)) ;                                      BEE02840
 322   1  2      DO J =  1 TO STOP ;                                                                            BEE02850
 323   1  3      IF F1 (J) ¬= '*' THEN DO ;                                                                     BEE02860
 324   1  4             FL(J)= TABLE (ONEBIT (J)) ; F0(J) = TABLE (TWOBIT (J)) ;                                BEE02870
 326   1  4             IF F0(J) > BL(J) THEN DO ; F2(J) = '+' ; CF2 = CF2 + 1; END;                            BEE02880
                       /*  BEE'S LAW                          */                                              BEE02890
 330   1  4             IF FL(J) > BL(J) THEN DO ; INT = ONEBIT (J) ;                                          BEE02900
 332   1  5                INT = INT - BI (J) ;       IF INT > ENOISE THEN DO ;                                BEE02910
 334   1  6                          BUGGY = BUGGY + 1 ;
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STMT LEV NT

                                        "F3 (J) = '$' ; IF INT < 100 THEN PUT        BEE02920
 335   1  6                                                                          BEE02930
 337   1  6       STRING (FO (J)) EDIT (INT) (P'Z9') ; ELSE FO (J) = '(' ;          BEE02940
 338   1  6                              END ; ELSE DO ;BUG = BUG + 1 ;F3(J) = '¬' ;  BEE02950
 342   1  6      END ; END ;                                                        BEE02960
 344   1  4            TEMP = FL(J) - FD(J) ;                                      BEE02970
 345   1  4            IF TEMP <= 0 THEN DO ;                                      BEE02980
                     /* BEE'S SECOND LAW */                                        BEE02990
 346   1  5         INT = ONEBIT (J) ; INT = TWOBIT (J) - INT ;                    BEE03000
 348   1  5         IF INT < DNOISE THEN DO ;                                      BEE03010
 349   1  6          F4 (J) = '#' ; CF5 = CF5 + 1 ; MASS = MASS + MAXMASS ;        BEE03020
 352   1  6         ME(J) = MAXMASS ; R(J) = 1.0 ; RIN (J) = 0 ; END ;             BEE03030
 356   1  5            ELSE DO ;                                                   BEE03040
 357   1  6                 F4(J) = '?' ;                                          BEE03050
 358   1  6       IF INT < 100 THEN                                                BEE03060
                     PUT STRING (F5 (J)) EDIT (INT) (P'Z9') ;                     BEE03070
 359   1  6      ELSE F5 (J) = '(' ;                                               BEE03080
 360   1  6           R(J),RIN(J),ME(J) = 0 ; CF3 = CF3 + 1 ;                      BEE03090
 362   1  6         END ;   END ;                                                  BEE03100
 364   1  4           ELSE DO ;                                                    BEE03110
 365   1  5             R(J) =(BL(J) - AVG2) / TEMP ;                              BEE03120
 366   1  5             IF R(J) >  RCUT THEN DO ; F3(J) = '%' ;CF4 = CF4 + 1 ;     BEE03130
 369   1  6           MASS = MASS + MAXMASS ;                                      BEE03140
 370   1  6         ME (J) = MAXMASS ; RIN (J) = LOG (R (J)) ; END ; ELSE DO ;     BEE03150
 374   1  6             IF R(J) >= 1 THEN DO ;                                     BEE03160
 375   1  7               RIN (J) = LOG (R(J)) ; ME(J) = CON * RIN(J) ;            BEE03170
 377   1  7               MASS = MASS + ME (J) ;                                   BEE03180
 378   1  7                                 END ; ELSE DO ; RIN (J) = 0 ;          BEE03190
 381   1  7  F4 (J) = '@' ;    ME(J) = 0 ; CF6 = CF6 + 1 ;                        BEE03200
 384   1  7          END ;  END ; END ; END ; ELSE RIN(J),ME(J),R(J) = 0; END;     BEE03210
 390   1  2         IF REP > 6 THEN SIGNAL ENDPAGE (REPO) ;                        BEE03220
 391   1  2         PUT FILE (REPO) EDIT ('DATA D',(FD(J) DO J = STOP TO 1 BY -1),BEE03230
                                         'BASE L',(BL(J) DO J = STOP TO 1 BY -1),BEE03240
                                         'DATA L',(FL(J) DO J = STOP TO 1 BY -1),BEE03250
                                         '1/T',(R(J)     DO J = STOP TO 1 BY -1),BEE03260
                                        'LN(1/T)',(RIN(J)DO J = STOP TO 1 BY -1),BEE03270
                                        'EL MASS',(ME(J) DO J = STOP TO 1 BY -1),BEE03280
                                  'FLAGS',IND,(F1(J),F2(J),F3(J),FO(J),F4(J),F5(J) DO BEE03290
                                       J = STOP TO 1 BY -1)) (SKIP,4(SKIP,A,COL(11),BEE03300
                        (STOP) (F(8,3))),SKIP,A,COL(11),(STOP) (F(8,5)),SKIP,A,COL(11), BEE03310
                     (STOP) (F(8,3)),SKIP,A,F(4),COL(11),(STOP) (6 (A))) ;          BEE03320
 392   1  2         REP = REP + 1 ;                                                BEE03330
 393   1  2         IF STOP < 15 THEN STOP = 15 ;                                  BEE03340
 394   1  2       END ; END;                                                       BEE03350
 396   1  0        ELSE IF CARD.REC_TYPE = '*' THEN DO ;                          BEE03360
 397   1  1           READ FILE (RECKEY) SET (T) ;                                BEE03370
 398   1  1                                       GO TO DATMO ; END ;              BEE03380
 400   1  0       ELSE GO TO GOOF ;                                              BEE03390
 401   1  0           PUT FILE (REPO) EDIT ('ZERO PAL =',AVG2,'TOTAL FRAME MASS RATEBEE03400
               ',MASS) (SKIP(3),COL(11),A,F(12,3),COL(61),A,F(12,3)) ;
```

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STMT LEV NT

 402   1  0    PUT FILE (REPO) EDIT ('FLAG SUMMARIES','*',CF1,'+',CF2,'¬',BUG,      BEE03410
                '$',BUGGY,'#',CF5,'?',CF3,'%',CF4,'@',CF6) (SKIP(2),COL(50),A,      BEE03420
               SKIP(2),10 (COL(50),A,F(6))) ;                                       BEE03430
 403   1  0         BEES = MASS ;                                                   BEE03440
 404   1  0    PUT FILE (REPO) EDIT ('ALIGNMENT SHIFT =',INDEX,                     BEE03450
               'NUMBER OF HOLES MATCHED',HIT) (SKIP (3),2 (COL(40),A,COL(65),       BEE03460
               F(5))) ;                                                             BEE03470
 405   1  0              BUG,BUGGY = 0 ;                                           BEE03480
 406   1  0        CF2,CF3,CF4,CF5,CF6 = 0 ;                                       BEE03490
 407   1  0       NUREC = CARD, BY NAME ;                                          BEE03500
 408   1  0       NUREC = RECREC, BY NAME ;                                        BEE03510
 409   1  0       CHECK:                                                           BEE03520
                  IF SZZZ < SCAN THEN GO TO FINI ;                                 BEE03530
 410   1  0      READ FILE (RECKEY) SET (T) ;                                      BEE03540
 411   1  0     IF CARD.REC_SCAN = '3' THEN DO ; READ FILE (INPUT) INTO (INREC) ;  BEE03550
 413   1  1     NRI = NRI + 1 ;                                                   BEE03560
 414   1  1      GO TO CHECK ; END;                                               BEE03570
 416   1  0        IF CARD.REC_TYPE = 'D' THEN GO TO DATA;                        BEE03580
 417   1  0       ELSE IF CARD.REC_TYPE = '*' THEN DO ;                           BEE03590
 418   1  1             READ FILE (INPUT) INTO (INREC) ; NRI = NRI + 1 ;          BEE03600
 420   1  1               GO TO CHECK ; END ;                                     BEE03610
 422   1  0       ELSE IF CARD.REC_TYPE = 'B' & CARD.REC_SCAN = '1' THEN GO TO BASES;BEE03620
 423   1  0         ELSE GO TO FINI ;                                             BEE03630
 424   1  0       GOOF:   /* SYN PROBLEMS */                                      BEE03640
                    PUT FILE (TELE) EDIT ('ERROR *** OUT OF SYNCHRONIZATION')    BEE03650
                      (PAGE,A) ;                                                 BEE03660
 425   1  0         PUT FILE (TELE) DATA (NRI,LEN,CARD.SN,CARD.TEST,CARD.HR,     BEE03670
                   CARD.MIN,CARD.SEC,CARD.ROLL,CARD.REC_TYPE,CARD.REC_SCAN,CARD.TAPE,BEE03680
                  I,J,STOP) ;                                                    BEE03690
 426   1  0    FINI:                                                            BEE03700
                  PUT FILE (TELE) EDIT ('FINI ******************','REC IN',NRI,BEE03710
                 'REC OUT',NRO) (SKIP,A,SKIP,2(A,F(6),X(2))) ;                   BEE03720
 427   1  0     PUT FILE (SYSPRINT) EDIT ('REC IN',NRI,'REC OUT',NRO) (SKIP(2),  BEE03730
 428   1  0          2(A,F(6),SKIP)) ; RETURN ;                                  BEE03740
 429   1  0      FLERR: PUT FILE (TELE) EDIT                                     BEE03750
                  ('BASE LIGHT * FLAG ERROR ***') (SKIP(2),A) ;                   BEE03760
 430   1  0     PUT FILE (SYSPRINT) DATA (FLAS,I,J,INDEX,WIDTH,WID,LOC,TOTAS,BHAS);BEE03770
 431   1  0      GO TO FINI ;                                                    BEE03780
 432   1  0      END LIGHT ;                                                     BEE03790
```

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
4	ABIN	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,0) 1,142,184,186
********	ABS	BUILTIN 263
********	ADDR	BUILTIN 66,306,307,308,320,321
42	AVG_ELEM	(539) AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1
30	AVG2	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,139,140,141,168,185,186,365,401 53
32	A2	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,0) 1,128,137,137,139,140,141,142,168,185,186
9	A2CHAR	DEFINED POSITION (4) UNALIGNED CHARACTER (1) 237,245
39	BASE	(539) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 109,114,131,306
97	BASES	/* STATEMENT LABEL CONSTANT */ 123,188,194,422
17	BASS	(539) AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,108,114,307
26	BD	(15) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6)
34	BEES	/* IN CARD */ BASED ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 403
6	BHAS	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,6) 1,128,134,134,179,181,186,254,260,263,263,266,272,287,430
174	BHOLE	/* STATEMENT LABEL CONSTANT */ 166
4	BHTOL	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		1,68,71,71,142
28	BI	(15) BASED (SS) ALIGNED BINARY FIXED (15,0) 332
27	BL	(15) BASED (S) ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 326,330,365,391
20	BUG	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,340,340,402,405
20	BUGGY	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,334,334,402,405
34	B1	/* IN CARD */ BASED UNALIGNED CHARACTER (1)
34	B2	/* IN CARD */ BASED UNALIGNED CHARACTER (7)
34	B3	/* IN CARD */ BASED UNALIGNED CHARACTER (4)
34	B5	/* IN CARD */ BASED UNALIGNED CHARACTER (12)
34	B6	/* IN CARD */ BASED UNALIGNED CHARACTER (4)
34	B7	/* IN CARD */ BASED UNALIGNED CHARACTER (14)
34	B7A	/* IN CARD */ BASED UNALIGNED CHARACTER (8)
34	B8	/* IN CARD */ BASED UNALIGNED CHARACTER (5)
34	CARD	BASED (T) /* STRUCTURE */
47	CART	BASED (T) UNALIGNED CHARACTER (80) 75,95
15	CF1	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,128,133,133,186,402
15	CF2	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,328,328,402,406
15	CF3	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,361,361,402,406
15	CF4	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,368,368,402,406
15	CF5	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,350,350,402,406

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
15	CF6	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,383,383,402,406
409	CHECK	/* STATEMENT LABEL CONSTANT */ 414,420
31	CNT	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,52,52,53
30	CON	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,69,70,71,72,376
5	CORR	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1
203	DATA	/* STATEMENT LABEL CONSTANT */ 216,416
220	DATMO	/* STATEMENT LABEL CONSTANT */ 398
22	DELTA	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,68,71,72,118
3	DID	(0:4) AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,6) 1,230,249,255,257,258,266
********	DIVIDE	BUILTIN 272
25	DLEG	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,68,69,71,72
11	DNOISE	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,68,71,72,348
3	DOC	(0:4) AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,6) 1,229,238,255,258,266
248	ENDHOLD	/* STATEMENT LABEL CONSTANT */ 246
162	ENDHOLE	/* STATEMENT LABEL CONSTANT */ 160
10	ENOISE	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,68,71,72,333
14	EPS	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		1,225,232,234,240,255
26	FC	(15) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6)
26	FD	(15) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 325,326,344,391
426	FINI	/* STATEMENT LABEL CONSTANT */ 409,423,431 57,60
26	FL	(15) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 324,330,344,391
7	FLAS	(539) AUTOMATIC UNALIGNED INITIAL CHARACTER (1) 1,132,136,149,159,163,185,308,430
429	FLERR	/* STATEMENT LABEL CONSTANT */
40	FO	(15) AUTOMATIC UNALIGNED INITIAL CHARACTER (2) 1,296,336,337,391
13	F1	(15) BASED (Q1) UNALIGNED CHARACTER (1) 323,391
41	F2	(15) AUTOMATIC UNALIGNED INITIAL CHARACTER (1) 1,296,327,391
41	F3	(15) AUTOMATIC UNALIGNED INITIAL CHARACTER (1) 1,296,335,341,367,391
41	F4	(15) AUTOMATIC UNALIGNED INITIAL CHARACTER (1) 1,296,349,357,381,391
40	F5	(15) AUTOMATIC UNALIGNED INITIAL CHARACTER (2) 1,296,358,359,391
424	GOOF	/* STATEMENT LABEL CONSTANT */ 115,122,201,210,218,224,400 64
5	HIT	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,227,250,250,253,255,272,287,404
244	HOLECHK	/* STATEMENT LABEL CONSTANT */ 241
34	HR	/* IN CARD */ BASED UNALIGNED CHARACTER (2) 90,102,197,211,407,425

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
36	HR	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (2) 90,102,197,211,407 53
31	I	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,73,73,75,75,106,106,107,108,109,110,110,110,110,129,129,130,131,132,134, 134,136,146,146,147,147,150,168,174,176,228,228,229,230,232,238,249,256,256, 257,258,258,258,258,266,294,294,298,301,302,305,313,318,425,430
14	IDO	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,279,285,287,291,294,298,302,313
33	INBIT	(-1:539) BASED (Q) UNALIGNED BIT (8) 107,130
19	IND	AUTOMATIC ALIGNED BINARY FIXED (15,0) 301,302,305,306,307,308,309,309,310,311,315,316,320,321,391
6	INDEX	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,6) 1,144,148,174,175,232,233,233,234,236,254,259,260,263,266,272,273,273,274, 276,277,287,291,299,300,309,313,318,404,430
66	INIT	/* STATEMENT LABEL CONSTANT */
43	INPUT	EXTERNAL FILE BUFFERED RECORD SEQUENTIAL INPUT 56,79,82,86,97,203,220,412,418
29	INREC	AUTOMATIC UNALIGNED CHARACTER (600) VARYING 66,82,86,89,97,99,196,203,205,220,222,412,418
31	INT	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,107,108,109,111,130,137,331,332,332,333,336,336,346,347,347,348,358,358
14	IUP	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,85,94,94,278,280,283,287,290,294,318
31	J	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,75,75,75,77,77,77,148,148,149,150,152,158,158,158,159,162,162,162,163,168, 236,236,237,237,238,240,244,244,244,245,245,295,295,296,296,296,296,296,322, 322,323,324,324,325,325,326,326,327,330,330,331,332,335,336,337,341,344,344, 346,347,349,352,353,354,357,358,359,360,360,360,365,365,366,367,370,371,371, 374,375,375,376,376,377,380,381,382,388,388,388,391,391,391,391,391,391,391, 391,391,391,391,391,391,391,391,391,391,391,391,391,391,391,391,391,391,391, 425,430
24	KOOP	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,68,69,71,72
31	LEN	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		1,89,99,100,101,101,205,207,209,222,223,425
********	LENGTH	BUILTIN 89,99,196,205,222
1	LIGHT	EXTERNAL ENTRY RETURNS(BINARY FIXED (15,0))
3	LOC	(0:4) AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,6) 1,147,150,168,174,183,232,258,266,430
********	LOG	BUILTIN 70,371,375
37	LONG	/* IN RECREC */ BASED ALIGNED BINARY FIXED (15,0)
292	LOOP	/* STATEMENT LABEL CONSTANT */ 288
23	MASD	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,68,69,71,72
30	MASS	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,293,351,351,369,369,377,377,401,403
12	MAXMASS	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,70,71,72,351,352,369,370
26	ME	(15) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 352,360,370,376,377,382,388,391
36	MIN	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (2) 90,102,197,211,407 53
34	MIN	/* IN CARD */ BASED UNALIGNED CHARACTER (2) 90,102,197,211,407,425
80	MO	/* STATEMENT LABEL CONSTANT */ 83
289	NOSHIFT	/* STATEMENT LABEL CONSTANT */ 253,267,276
31	NRI	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,87,87,95,98,98,115,204,204,221,221,413,413,419,419,425,426,427
31	NRO	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,95,426,427

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
36	NUREC	AUTOMATIC /* STRUCTURE */
16	ONCHAR	BUILTIN 63
16	ONCODE	BUILTIN 63
38	ONEBIT	(15) BASED (Y) UNALIGNED BIT (8) 324,331,346
16	ONLOC	BUILTIN 63
16	ONSOURCE	BUILTIN 63
45	PARMS	EXTERNAL FILE STREAM INPUT 49,68,78,169
********	Q	AUTOMATIC ALIGNED POINTER 66,91,103,107,130,198,212,237,245,321,408
********	Q1	AUTOMATIC ALIGNED POINTER 308,323,391
26	R	(15) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 353,360,365,366,371,374,375,388,391
21	RCUT	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,68,70,71,72,366
34	REC_SCAN	/* IN CARD */ BASED UNALIGNED CHARACTER (1) 81,90,94,100,102,122,196,197,206,210,211,224,407,411,422,425
36	REC_SCAN	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (1) 90,102,104,197,211,407
36	REC_TYPE	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (1) 90,102,197,211,407
34	REC_TYPE	/* IN CARD */ BASED UNALIGNED CHARACTER (1) 81,88,90,94,100,102,122,188,192,197,206,210,211,214,224,396,407,416,417,422, 425
48	RECKEY	EXTERNAL FILE BUFFERED RECORD SEQUENTIAL INPUT 59,79,80,93,116,187,193,199,215,219,397,410
37	RECREC	BASED (Q) /* STRUCTURE */

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
31	REP	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,292,390,392,392 51
********	REPO	EXTERNAL FILE 49,50,390,391,401,402,404 53,54
26	RIN	(15) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 354,360,371,375,376,380,388,391
36	ROLL	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (2) 90,102,197,211,407
34	ROLL	/* IN CARD */ BASED UNALIGNED CHARACTER (2) 90,102,197,211,407,425
********	ROUND	BUILTIN 273,275
********	S	AUTOMATIC ALIGNED POINTER 306,326,330,365,391
128	SB	/* STATEMENT LABEL CONSTANT */ 173
14	SCAN	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,127,226,226,409 53
34	SEC	/* IN CARD */ BASED UNALIGNED CHARACTER (2) 90,102,197,211,407,425
36	SEC	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (2) 90,102,197,211,407 53
34	SEQ	/* IN CARD */ BASED UNALIGNED CHARACTER (1) 90,102,197,211,407
36	SEQ	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (1) 90,102,197,211,407
227	SHIFT	/* STATEMENT LABEL CONSTANT */
167	SHIFTER	/* STATEMENT LABEL CONSTANT */ 157,163,165
5	SKIPBEE	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
		1,68,71,72,85,126,126 53
36	SN	/* IN NUREC */ AUTOMATIC ALIGNED BINARY FIXED (15,0) 90,102,115,197,211,407
34	SN	/* IN CARD */ BASED UNALIGNED CHARACTER (5) 90,102,197,211,407,425
********	SS	AUTOMATIC ALIGNED POINTER 307,332
31	STOP	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,280,284,287,289,300,301,302,313,315,316,318,322,391,391,391,391,391,391, 391,391,391,391,391,393,393,425
********	SYSPRINT	EXTERNAL FILE PRINT 49,71,77,114,120,185,427,430 63
18	SZZZ	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,0) 1,68,71,72,409
********	T	AUTOMATIC ALIGNED POINTER 74,75,80,81,81,88,90,90,90,90,90,90,90,90,93,94,94,100,100,102,102,102, 102,102,102,102,102,102,116,122,122,187,188,192,193,196,197,197,197,197,197, 197,197,197,197,199,206,206,210,210,211,211,211,211,211,211,211,211,214, 215,219,224,224,396,397,403,407,407,407,407,407,407,407,407,407,410,411,416, 417,422,422
5	TA	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,127,168,171,171,172
35	TABLE	(0:299) AUTOMATIC ALIGNED DECIMAL /* SINGLE */ FLOAT (6) 75,77,109,119,141,170,184,324,325
46	TABVAL	EXTERNAL FILE RECORD SEQUENTIAL INPUT 49,74,78
34	TAPE	/* IN CARD */ BASED UNALIGNED CHARACTER (3) 425
44	TELE	EXTERNAL FILE STREAM PRINT OUTPUT 49,49,67,72,95,121,156,167,168,172,180,181,183,186,255,265,266,287,302,312, 313,317,318,424,425,426,429
30	TEMP	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,184,186,344,345,365

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
36	TEST	/* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (2) 90,102,197,211,407 53
34	TEST	/* IN CARD */ BASED UNALIGNED CHARACTER (2) 90,102,197,211,407,425
31	TH	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,105,111,111,117,118,119,120,121,168,169,170,172
8	THCHAR	DEFINED POSITION (2) UNALIGNED CHARACTER (1) 237,245
30	THRESH	AUTOMATIC ALIGNED INITIAL DECIMAL /* SINGLE */ FLOAT (6) 1,117,118,119,120,121,131,168,170,172
14	TOPIN	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,145,148,152,158,162,175,234,235,235,236,240,244
2	TOTAS	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,0) 1,143,177,177,179,181,430
38	TWOBIT	(15) BASED (Z) UNALIGNED BIT (8) 325,347
36	VAL	(539) /* IN NUREC */ AUTOMATIC UNALIGNED CHARACTER (1) 91,103,198,212,237,245,320,408
37	VAL	(539) /* IN RECREC */ BASED UNALIGNED CHARACTER (1) 91,103,198,212,237,245,321,408
158	WHOLCHK	/* STATEMENT LABEL CONSTANT */ 153
3	WID	(0:4) AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,6) 1,147,168,176,183,258,266,430
6	WIDTH	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,6) 1,147,151,159,159,165,165,168,176,177,231,239,245,245,248,248,249,258,260, 260,263,263,266,274,275,275,278,285,287,291,300,313,318,430
********	Y	AUTOMATIC ALIGNED POINTER 320,324,331,346
********	Z	AUTOMATIC ALIGNED POINTER 321,325,347

APPENDIX D

LEAKING COKE OVEN DOORS

MEASUREMENT APPROACH

The problem of monitoring the emissions from leaking doors, as shown in Figure D-1, consists of collecting the emissions and them analyzing them in any appropriate way. A collecting hood was designed and fabricated to bolt to the oven above the leaking door. The hood exhausted up and over the edge of the oven floor into a specially fabricated measurement duct. A temperature sensor and gas probe in the duct connected via the previously installed cable and overhead boom to the instrumentation van located on the ground. Instrumentation in the van analyzed the gaseous content of the emissions and recorded this and the temperature data for future analysis. A sketch of the installation on the coke oven battery is shown in Figure D-2.

Collecting Hood

In order to trap and duct the leaking door emissions, a hood was designed that could be bolted to the bucking stays (vertical "I" beams between the ovens) above the top of the door. The hood was constructed of 20 gauge galvanized sheet and attached onto a pre-constructed 14" x 4" galvanized "boot" with a six inch stove pipe fitting on the other end. The bottom dimension of the hood fits inside the 36 inch space between the stays with the outside of the hood extending out over the door edge. To avoid loss of smoke and emissions due to horizontal wind gusts, a 36 inch asbestos "skirt" was attached to the bottom edge of the hood and hung down well below the top of the door. A six inch stove pipe elbow extended out the top of the hood, and the horizontal part of the elbow would line up with the measurement duct that would lay flush on the top of the oven. A schematic sketch of the hood in place and connected to the measurement duct is shown in Figure D-3, and a photo of the hood is shown in Figure D-4, and the hood being installed in Figure D-5.

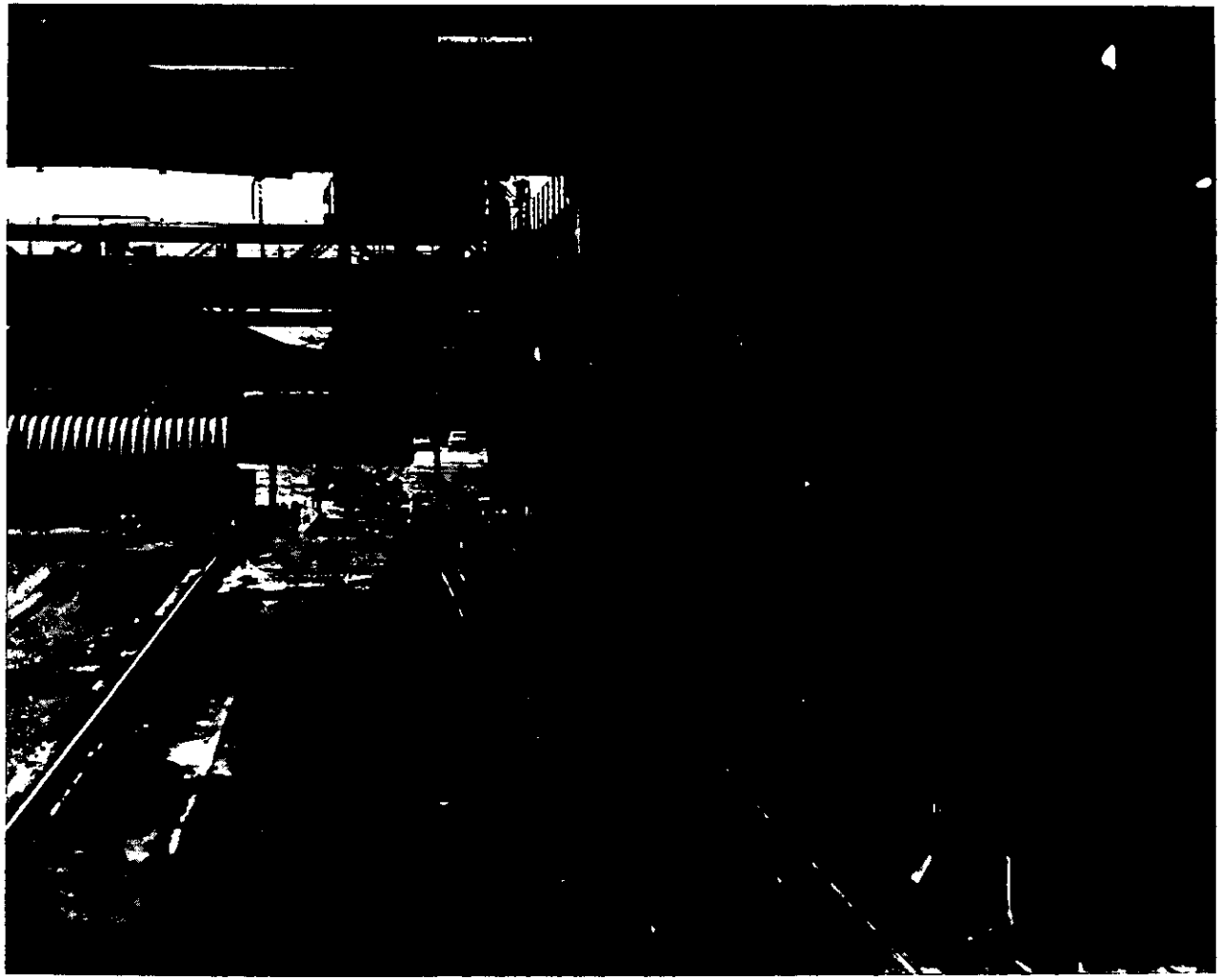


FIGURE D-1
LEAKING COKE OVEN DOORS

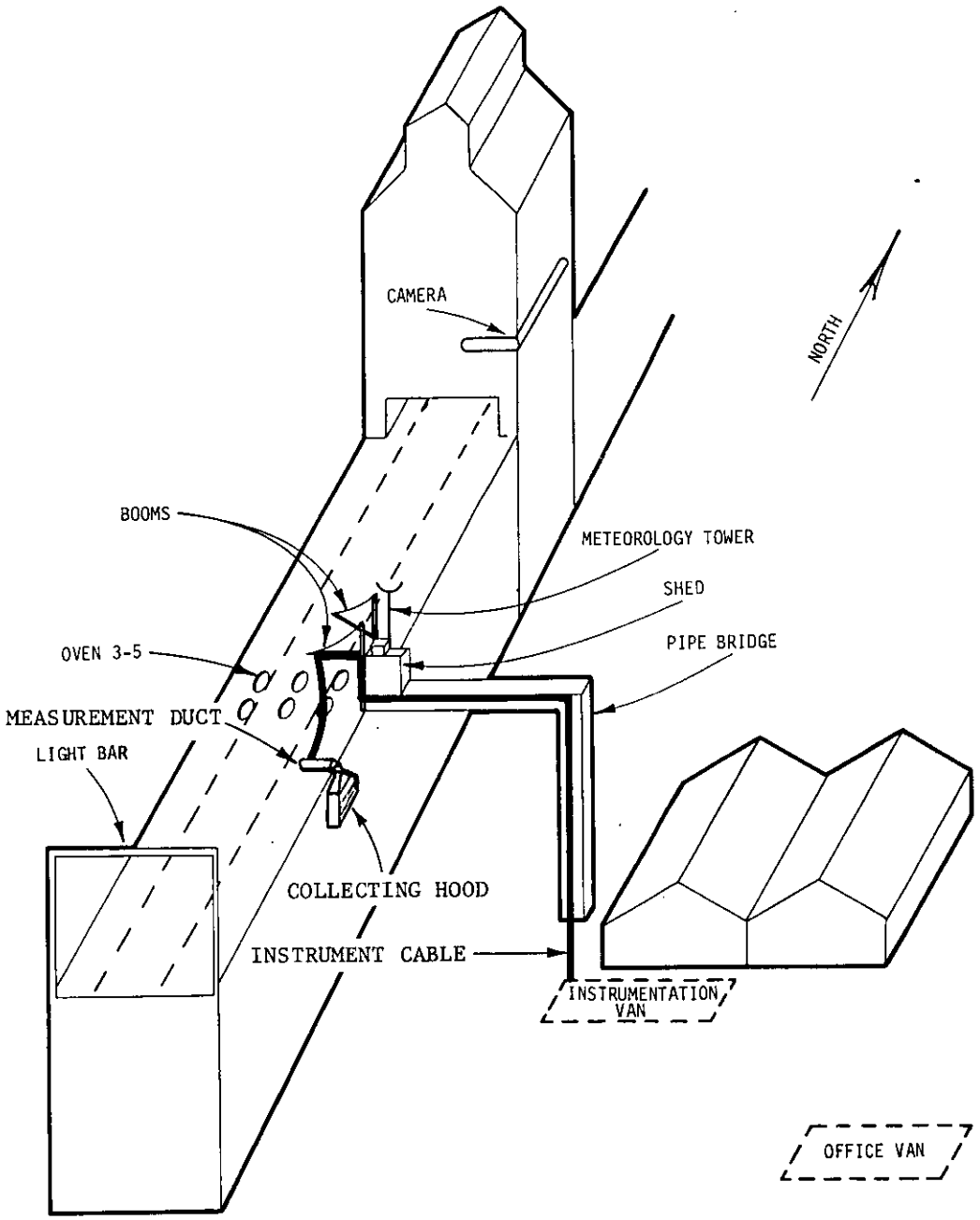


FIGURE D-2
INSTRUMENT LAYOUT J & LP-4 BATTERY–PITTSBURGH WORKS 1973

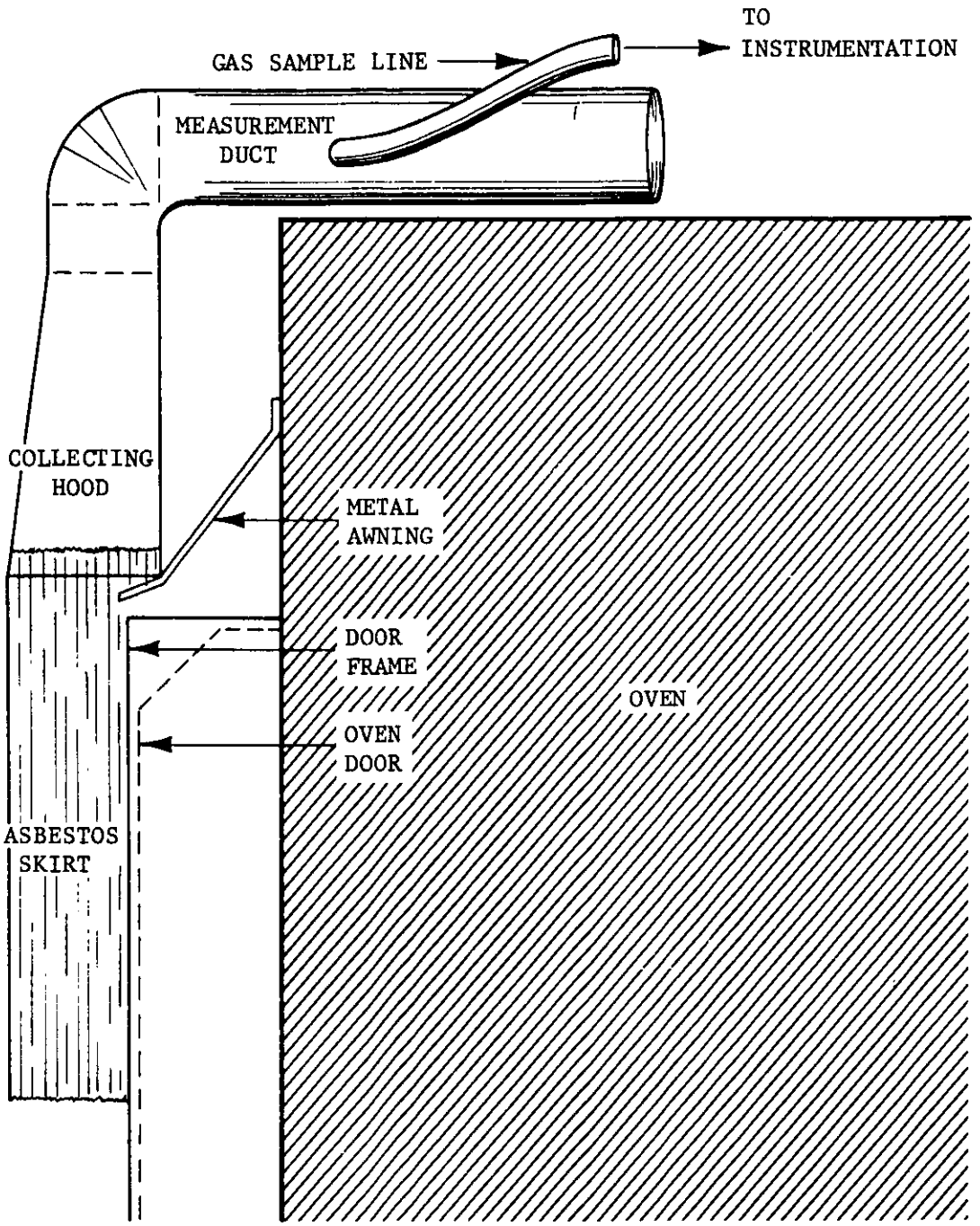


FIGURE D-3
CROSS-SECTIONAL VIEW OF LEAKING COKE OVEN DOOR
COLLECTING & MEASUREMENT EQUIPMENT

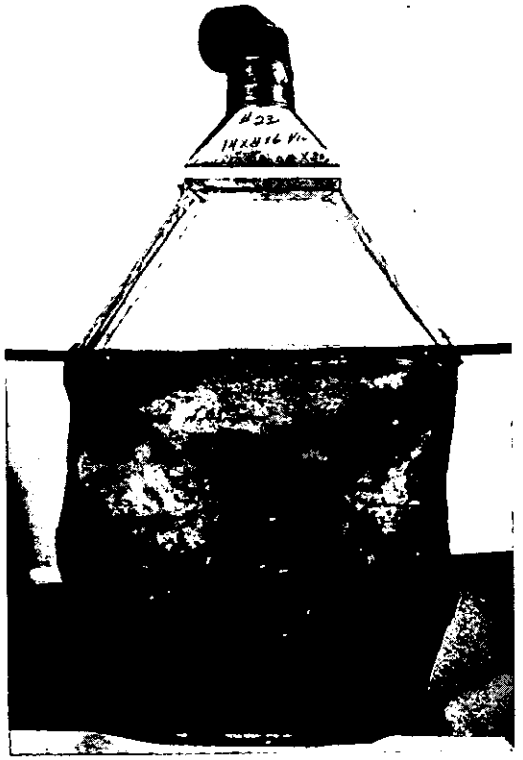


FIGURE D-4
COLLECTING HOOD



FIGURE D-5
INSTALLING COLLECTING HOOD

Measurement Duct

Gases that were collected by the hood passed into a duct where the required measuring and sampling took place. This duct was fabricated from a two foot section of six inch galvanized stove pipe. The exhaust end of the duct was fitted with a 150 cubic foot per minute squirrel cage blower, driven by a 1/70 HP electric motor. This aspirating fan assured a continuous flow through the hood into the measurement duct. A thermocouple was mounted midway along the duct, and a gas probe and flame arrestor were installed in the duct as shown in Figure D-6. The thermocouple lead wires, the heated tubing from the gas probe/flame arrestor, and the power line for the fan motor was bundled together into a cable and attached to an overhead boom and extended via the boom and a cross-over pipe bridge to an instrumentation van on the ground. (See Figure D-7.)

Particulate Measurement System

Particulates in the emissions flow were collected for analysis. This was accomplished by placing a Brinks impactor in the exhaust stream of the measurement duct and attaching an aspirating pump to the filter in the usual fashion. The equipment as installed on the coke oven is shown in Figure D-8.

The Brinks impactor is a five stage stainless steel device, one and one half inches in diameter and 15-1/2 inches long that separates the particulate matter in the gas stream into five fractions ranging in size from 0.3 to 3.0 microns. This device is usually operated with a cyclone separator upstream from the impactor, to remove particulates greater than 3 microns in size. For this experiment, the cyclone was not used. A more complete description of this impactor can be found in "Industrial and Engineering Chemistry," Volume 50, No. 4, April 1958, pp 645-648.

Operational Technique

Ovens that could be monitored were those within range of the overhead cable booms and those that were obviously leaking. The tests were conducted during a period of the day when no charging tests were scheduled so that personnel and equipment were available. Since maximum door leaks

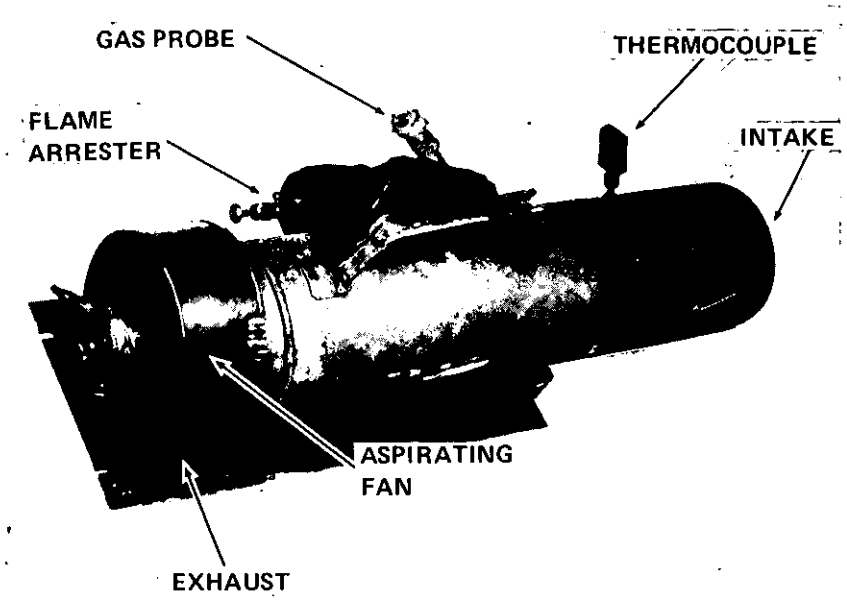


FIGURE D-6
MEASUREMENT DUCT

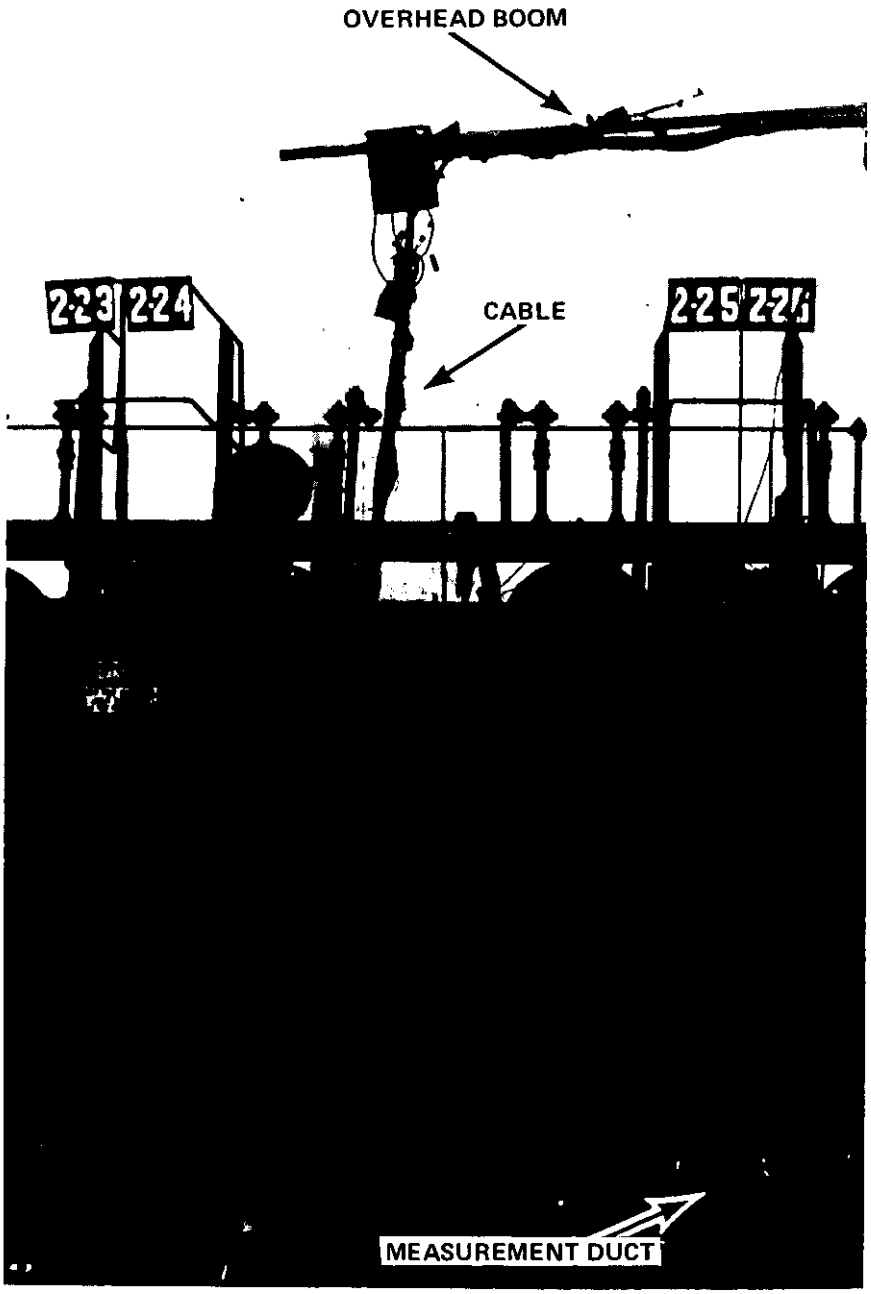


FIGURE D-7
MEASUREMENT DUCT IN PLACE ON OVEN

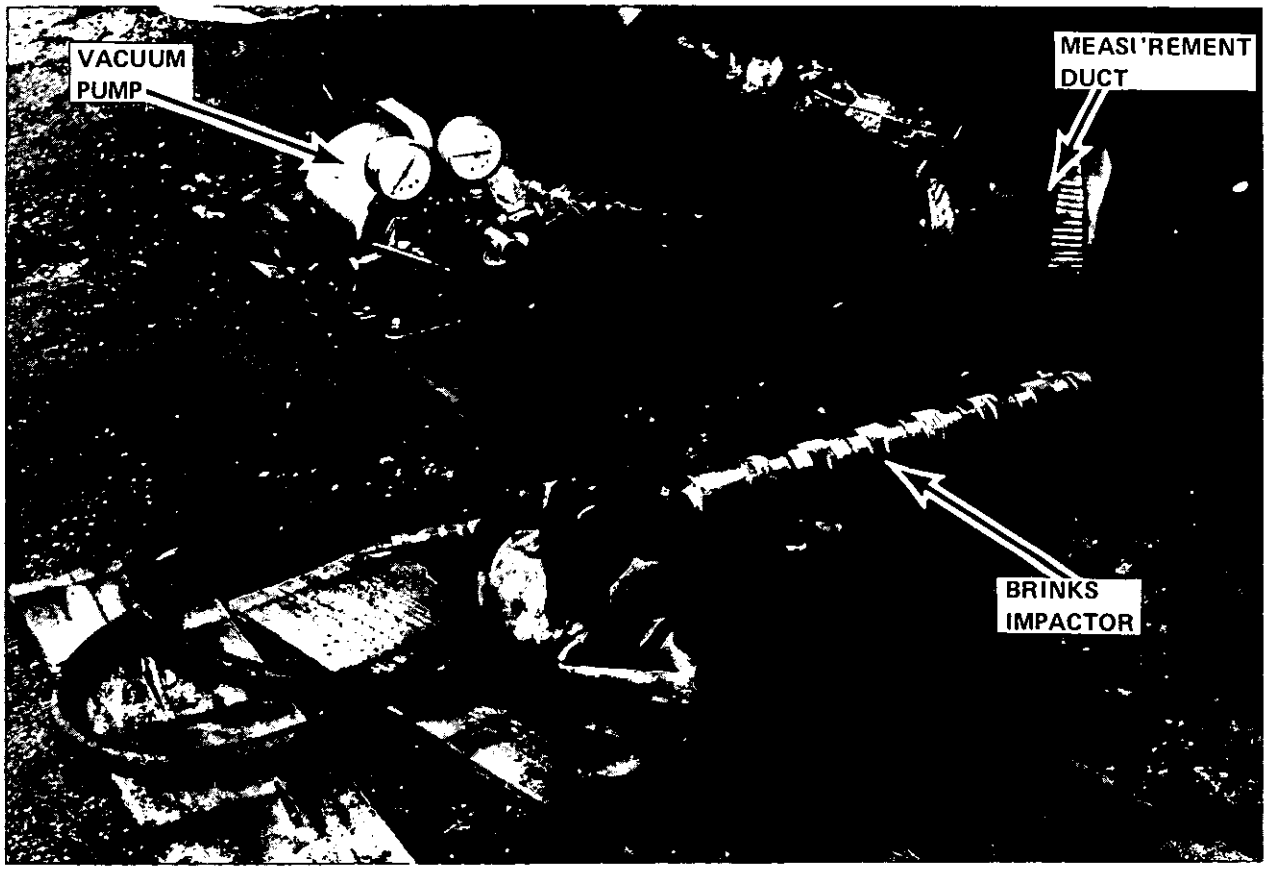


FIGURE D-8
PARTICULATE SAMPLING OF LEAKING DOOR MEASUREMENT DUCT

can be expected immediately after charging, coordination with the J&L Oven Foreman was required to select an oven that would satisfy the above requirements. It was then necessary to have the pusher car move under the designated oven while the collecting hood was bolted in place. The measurement duct could then be attached to the exhaust pipe of the hood while standing on the top of the oven and the cable attached to the overhead boom.

The conditions on the oven were unfavorable for equipment and personnel. The top surface temperature on the oven is approximately 200°F - hot enough to burn wire insulation and rubber tubing and hot enough to either trip the thermal relay in electric motors, or to burn the wires and field winding of the motor. As a result, wooden boards were placed under all equipment to insulate it from the heat - as can be seen in illustrations of the equipment in use.

After the equipment on the oven was connected, the monitoring equipment in the instrument van could be operated in a continuous or incremental mode. Due to the high tar content of the emissions, it was found that tubes, filters, etc. became heavily contaminated with tar when the system was operated continuously. As a result, the aspirating fan in the measurement duct ran continuously while the monitoring system in the van would only periodically draw gas and perform analysis.

RESULTS

Data obtained during the tests were recorded on strip charts and on magnetic tape for the first test only. Tabulations of the data (expressed in terms of concentration) are presented in Tables D-1 through D-4 The natural next step was to quantify these data and to see if they are in agreement with the results of other investigators. This was done by using the manufacturer's rating for volume flow of the aspirating fan and converting the gases to standard conditions of 29.92 inches of mercury and 70°F. This conversion was derived from the relationship:

$$\frac{PF}{T} = \frac{P'F'}{T'} \qquad \text{(D-1)}$$

TABLE D-1
COKE OVEN TEST PROGRAM—DOOR LEAK EXPERIMENT

TEST # 1 DATE 8/8/73 OVEN 2-27 TEMP 101°F

OVEN CHARGED AT 0630 BAROMETRIC PRESSURE 29.42

	NO	NO_x	THC	CO	CO_2	H_2	O_2	Temp.
TIME (EDST)	ppm / cfm	ppm / cfm	ppm / cfm	% / cfm	% / cfm	% / cfm	% / cfm	°F
1320	<.5 / -	65 / .007	6100 / .69	540 / .06	<.1 / -	<1 / -	20 / 22.7	230
1327	<.5 / -	72 / .008	6000 / .68	360 / .04	<.1 / -	<1 / -	20 / 22.7	230
1337	<.5 / -	127 / .014	5100 / .54	480 / .05	<.1 / -	<1 / -	20 / 21.3	274
1344	<.5 / -	72 / .008	7000 / .79	480 / .05	<.1 / -	<1 / -	20 / 22.7	230
1351	<.5 / -	75 / .009	6300 / .71	450 / .05	<.1 / -	<1 / -	20 / 22.7	230
1402	<.5 / -	70 / .008	5500 / .59	450 / .05	<.1 / -	<1 / -	21 / 21.5	270
1414	<.5 / -	80 / .009	6500 / .73	450 / .05	<.1 / -	<1 / -	20 / 22.5	234
1432	<.5 / -	82 / .009	6100 / .69	600 / .07	<.1 / -	<1 / -	20 / 22.7	230
1450	<.5 / -	105 / .012	6500 / .73	600 / .07	<.1 / -	<1 / -	20 / 22.5	236
1459	<.5 / -	85 / .009	7700 / .86	600 / .07	<.1 / -	<1 / -	20 / 22.3	240

TABLE D-2
COKE OVEN TEST PROGRAM–DOOR LEAK EXPERIMENT

TEST # 2 DATE 8/9/73 OVEN 2-27 TEMP 109°F

OVEN CHARGED AT 0330 BAROMETRIC PRESSURE 29.31

	NO	NO_x	THC	CO	CO_2	H_2	O_2	Temp.
TIME (EDST)	ppm / cfm	ppm / cfm	ppm / cfm	% / cfm	% / cfm	% / cfm	% / cfm	°F
1055	<.5 / –	10 / .001	4500 / .54	<.1 / –	<.1 / –	< 1 / –		190
1115	<.5 / –	50 / .006	4500 / .54	<.1 / –	<.1 / –	< 1 / –		190
1130	<.5 / –	40 / .005	3500 / .42	<.1 / –	<.1 / –	< 1 / –		190
1150	<.5 / –	60 / .007	4000 / .48	<.1 / –	<.1 / –	< 1 / –		190
1215	<.5 / –	65 / .008	4300 / .51	<.1 / –	<.1 / –	< 1 / –		190
1216	<.5 / –	35 / .004	2500 / .30	<.1 / –	<.1 / –	< 1 / –		190
1240	<.5 / –	50 / .006	4000 / .48	<.1 / –	<.1 / –	< 1 / –		190
1255	<.5 / –	50 / .006	4000 / .48	<.1 / –	<.1 / –	< 1 / –		190
1315	<.5 / –	30 / .004	2800 / .33	<.1 / –	<.1 / –	< 1 / –		160

TABLE D-3
COKE OVEN TEST PROGRAM–DOOR LEAK EXPERIMENT

TEST # 3 DATE 8/13/73 OVEN 2-26 TEMP 116°F

OVEN CHARGED AT 0840 BAROMETRIC PRESSURE 29.58

	NO	NO_x	THC	CO	CO_2	H_2	O_2	Temp.
TIME (EDST)	ppm / cfm	ppm / cfm	ppm / cfm	% / cfm	% / cfm	% / cfm	% / cfm	°F
1415	<.5 / –	15 / .002	1600 / .190	<.1 / –	<.1 / –	<1 / –		200*
1445	<.5 / –	20 / .002	2000 / .238	<.1 / –	<.1 / –	<1 / –		200
1500	<.5 / –	20 / .002	2100 / .250	<.1 / –	<.1 / –	<1 / –		200
1515	<.5 / –	20 / .002	1800 / .214	<.1 / –	<.1 / –	<1 / –		200
1535	<.5 / –	20 / .002	2200 / .261	<.1 / –	<.1 / –	<1 / –		200
1545	<.5 / –	15 / .002	1100 / .131	<.1 / –	<.1 / –	<1 / –		200
								*All Temp. Assumed

TABLE D-4
COKE OVEN TEST PROGRAM–DOOR LEAK EXPERIMENT

TEST # 4 DATE 8/16/73 OVEN 3-23 TEMP _____

OVEN CHARGED AT 1130 BAROMETRIC PRESSURE 29.58

	NO	NO_x	THC	CO	CO_2	H_2	O_2	Temp.
TIME (EDST)	ppm / cfm	ppm / cfm	ppm / cfm	% / cfm	% / cfm	% / cfm	% / cfm	°F
1335	<.5 / –	9 / .001	1000 / .126	<.1 / –	<.1 / –	<1 / –		
1345	0.8 / –	17 / .002	1000 / .121	<.1 / –	<.1 / –	<1 / –		
1350	0.8 / –	15 / .002	700 / .088	<.1 / –	<.1 / –	<1 / –		
1400*			1800 / .234	.03 / –	.1 / –	.05 / –	15.5 / 19.3	
1405	<.5 / –	15 / .002	1000 / .125	<.1 / –	<.1 / –	<1 / –		
1415	<.5 / –		1000 / .126	<.1 / –	<.1 / –	<1 / –		
1425	<.5 / –	18 / .002	1000 / .119	<.1 / –	<.1 / –	<1 / –		
1530*			1300 / .157	.02 / –	.1 / –	.05 / –	16.6 / 19.3	
1530	<.5 / –	20 / .002	1000 / .121	<.1 / –	<.1 / –	<1 / –		

*Manual Sampling Results

Where

P = pressure at standard conditions

P' = pressure at measured conditions

F = flow at standard conditions

F' = flow at measured conditions

T = temperature at standard conditions

T' = temperature at measured conditions

This relationship translates to the equation:

$$F = \frac{F'P'T}{PT'} \qquad \text{(D-2)}$$

$$F = \frac{150 \text{ CFM X } P' \text{ in. Hg x } (460° + 70°F)\ °R}{29.92 \text{ in. Hg x } (460 + T°F)\ °R} \qquad \text{(D-3)}$$

Adjusting the 150 CFM flow of the fan to standard conditions from those given each time a reading was taken resulted in new flow values. The concentrations in ppm were converted to percent, and these percentages for each gas were multiplied by the adjusted volume flow to produce the CFM figures given in Tables D-1 through D-4.

Although these flow values appear reasonable, a check was made to see if they agree with previously published data. This was done for the case of Total Hydrocarbons (THC) where an average value of 0.35 CFM for all four tests was used. The density of methane (0.0448 lb/cu ft)* was used to determine mass loading, although a slightly heavier gas might be better, due to the tar content of the emissions. During the 19 hour coking cycle,** in which 15 tons of coal are coked, the weight of total hydrocarbon discharged into the atmosphere is as follows:

$$\frac{.0448 \text{ lb}}{\text{cu ft}} \times \frac{.35 \text{ cu ft}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} \times 19 \text{ hr} = \frac{17.9 \text{ lb}}{15 \text{ ton charge}} \qquad \text{(D-4)}$$

$$= 1.2 \text{ lb/ton}$$

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*Eshbach's Handbook of Engineering Fundamentals, 1969, p 1-140.

**It was observed that the doors normally did not leak for the full 19 hour coking cycle, however to compare this with other data, this full coking cycle is used in the calculation.

This figure of 1.2 lb THC/ton of coal coked is, obviously, for an oven with leaking doors. Reexamination of Figure D-1 reveals that the majority of the doors do not leak and therefore this figure should be applied only to those ovens that exhibit considerable leakage. This 1.2 lb/ton figure is not to be construed as a normal level of emissions from all oven doors. The U. S. Environmental Protection Agency has published* a figure of 1.5 lb/ton. Considering the variation in flow recorded (0.09 - 0.86 CFM) these two values certainly compare favorable enough to verify the feasibility of the leaking door monitoring system.

Particulate data obtained during one test (DL-4) is presented below. This data point is not to be considered representative of the entire oven, but is included only to show the results of this one test.

Weight Grams	Stage Size (μ)	Weight %
0.03302	3.18	21.67
0.02869	1.87	18.83
0.02894	1.27	18.99
0.03351	0.65	21.99
0.02810	0.32	18.44

These figures represent a mass loading of 897 mg/m^3

*Compilation of Air Pollutant Emission Factors, Second Edition, AP-42 April 1973, p 7.2-2.

APPENDIX E

PARTICULATE SIZE DISTRIBUTION

Three methods used in determining particulate size distribution will be discussed in this Appendix. They are as follows: The MITRE Direct Impaction Particulate Collecting Carrousel, Preliminary Particulate Size Distribution From the Brinks Sampler, and Coulter Counter Distribution. As explained in the main body of this report, the primary size distribution was determined from a combination of the Andersen and Carrousel distributions. The Andersen and Optical Analyses of Cyclone and Andersen samples are listed in Appendix B and are not discussed here.

MITRE CARROUSEL

In the course of monitoring the gaseous and particulate emissions produced while charging the P4 Coke Oven Battery of the J & L Pittsburgh Works, MITRE noted certain deficiencies in the standard sampling techniques.

In general, particles above 20μ in diameter are collected as cyclone "catches" and on "knock out" plates of the Andersen and Brinks impactors rather than on sizing stages which can provide discrete size range information. The material collected at these points (which accounted for a substantial percentage of the total sample) was to be processed after extraction by a solvent rise and redispersion for optical analysis. This procedure could substantially alter physical characteristics of the particles such as shape and agglomeration. Such alteration would prevent performing dependable optical analyses which would provide information on large particles as they exist in the emission plume. Both size and shape information on these larger particles is a necessary input to the optical monitoring program as well as to the basic particulate measurement effort.

To make an independent investigation of the particulates in terms of size, shape and number, MITRE designed, fabricated and operated a new hardware item on the coke oven and the samples obtained were analyzed. This section describes the equipment and the results of the analysis.

APPROACH

To collect particulate samples that were not distorted by motion through a cyclone, distorted by overloading the sample collecting area, or subjected to solution in a solvent prior to analysis, the concept of briefly passing a collector through the emissions plume was applied. The points of measurement were the stack of a Wilputte Larry Car and the AISI/EPA Emission Guide, where very heavy and hot (300°F) gases and particulate would be vented to the atmosphere during a portion of the charging cycle as shown in Figure E-1. A stack adaptor, 12 inches in diameter, had been added to the larry car and a 12 inch section of stove pipe served as a platform for sensors and was placed in the adapter during measurement tests. The new collector was designed and built to fit onto this stove pipe on the stack.

Collector Design

If particulate samples are to be analyzed for size, shape and count, they should be collected in or on, a container that lends itself to some direct method of observation. Due to the small size of the particles, a microscope is required for the analysis, and a glass microscope slide then becomes a natural choice for use in collecting the samples. A question arose as to whether the impacted particles would adhere to and remain on the slides. As a result, the slides were coated with a thin layer of silicon grease assuring minimal loss of sample. One test was conducted with half the slides ungreased to determine if the grease had any adverse effects on particle number, size or shape.

During periods of heavy particulate flow, a microscope slide in the stream would become heavily coated after a very few seconds, resulting in a bulky deposit in which individual particles could not be analyzed. Therefore, the microscope slide could remain in the particulate streams only for a period of time of approximately one second. Since the stack sampling point is 15-20 feet above the oven floor, the collector had to operate unattended during charging, and a mechanical method had to be selected to move the slide in and out of the particulate flow. Endless



FIGURE E-1
LARRY CAR CHARGING COKE OVEN

belts were considered, but finally a wheel was selected to offer the best solution to the problem. A 12" diameter 16mm movie film reel was used for fabricating a rotating frame for eleven glass slides, which were attached to the frame with metal paper clamps (see Figure E-2). This frame could be mounted on the stack sampling duct so that only part extended over the duct in the particulate stream. The film storage can was used as an outer protective housing for the rotating slide frame, and matching holes in the top and bottom allowed the particulates to flow by, around and over the slides, yet controlled the time that the slide was exposed to the particulate stream (Figure E-3). The rotating wheel was driven by a slow speed electric motor (6 second revolution) and was controlled such that the wheel could make one revolution only and then the rotating action would stop.

Summarizing the most important design features that were incorporated into the fabrication and operation of the hardware:

- Particulate samples were collected by direct impaction on the microscope slides
- Slide exposure time was controlled to prevent overloading
- Slides were greased to minimize the chance that particles impacting on the slide may be reentrained later
- Eleven samples were taken over a six second period
- Sampling occurred when emission levels were judged to be at peak condition.

Operational Procedure

The first step in preparing for a test was to prepare the glass microscope slides. New slides were coated with a thin layer of silicone grease and placed (greased side down) on the rotating wheel by the metal clips located around the outer perimeter. The top protective housing was then placed over the wheel with the exposure opening lined up with bottom housing. The crack around the perimeter where the two halves of the housing join was secured with duct tape to hold them together and to force gases and particulate to enter only at the exposure opening.

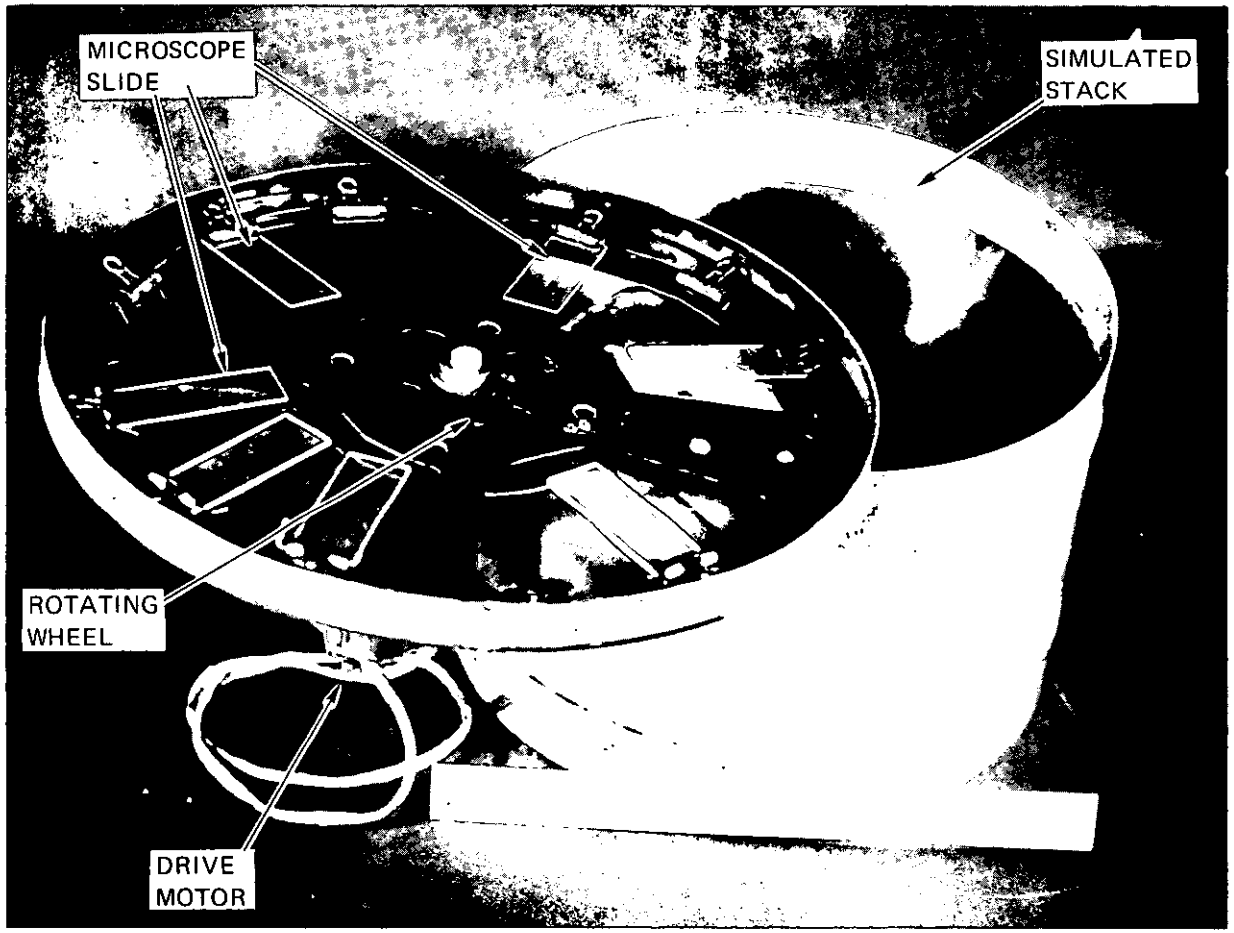


FIGURE E-2
CARROUSEL INTERIOR EXPOSED

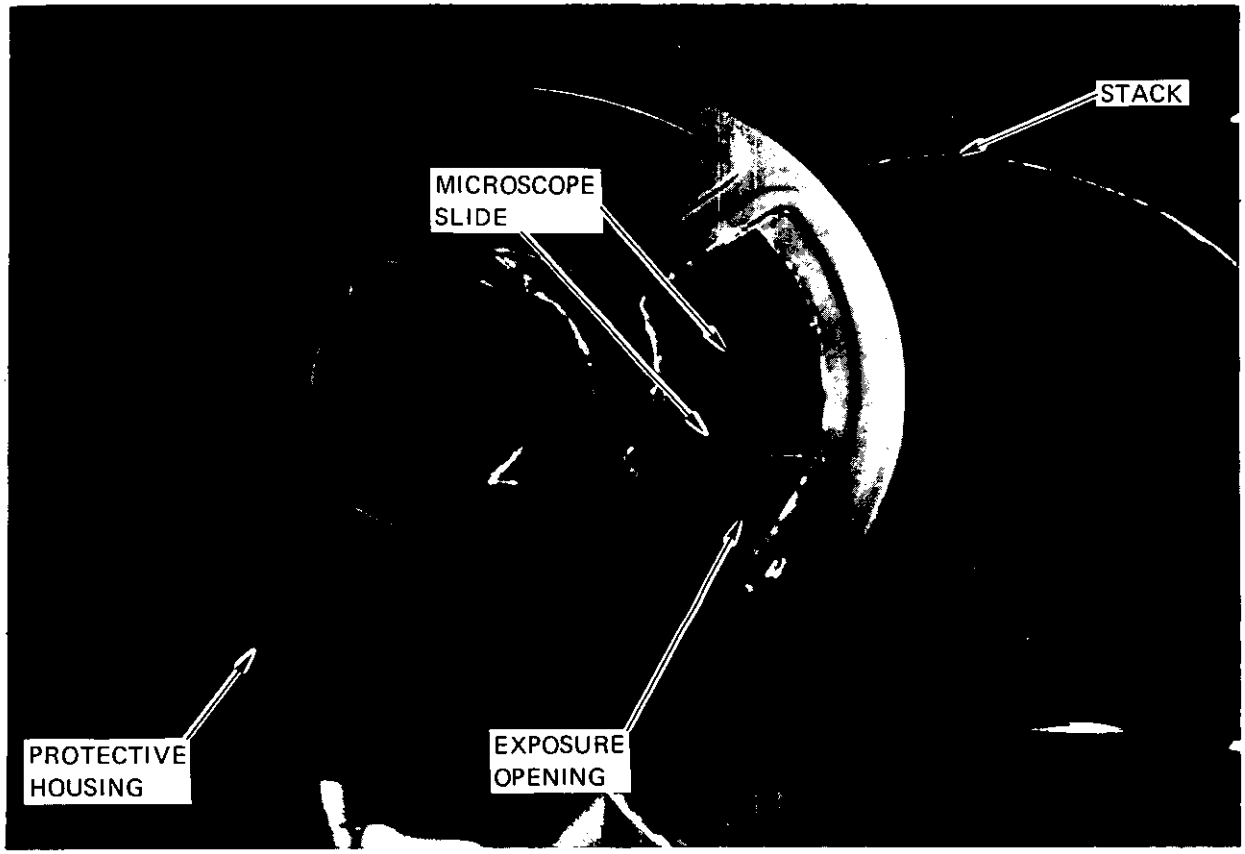


FIGURE E-3
CARROUSEL IN OPERATIONAL CONFIGURATION

The drive motor of the carrousel was then connected to 110 volt power, but with the activating switch in the "off" position. After the larry car was positioned over the oven to be charged, the carrousel unit was then ready to be carried up to the stack. Access to the stack was obtained by means of an aluminum ladder placed against the larry hopper. One man would carry the carrousel up the ladder and clamp it onto the top of the stack adaptor in such a position that the exposure opening was over the stack and the drive motor on the outside of the stack. The rotating wheel was then manually turned all the way counterclockwise, to the "start" of the normal rotation, so that a full rotation would result when power was applied. The operator then descended from the larry car to the oven floor and the larry car could begin to charge in the usual fashion. During this time, the carrousel operator would observe the emissions plume coming out of the larry car stack, and when a heavy plume was present he would activate the drive motor. This would cause the rotating wheel to make one complete clockwise revolution and stop -- exposing each of the microscope slides to the emissions plume for approximately one second. The carrousel would remain on top of the larry car stack until the charge was completed, at which time the carrousel operator would remove it from the stack and release the larry car.

The slides were removed from the rotating wheel and stored in a commercial slide holder. They were placed in the holder grease (and particulate) side up, and the samples carefully handled and transported by auto to the home office for later analysis.

Some tests were conducted while other pollution measurements were being taken, and in these cases the carrousel was operated simultaneously with the other equipment, and appeared as shown in Figure E-4.

OPTICAL SIZING

Once at MITRE, the particulate samples were labeled and representative slides were selected from each test and analyzed for particle size distribution and number density. Particles were grouped in one of seven

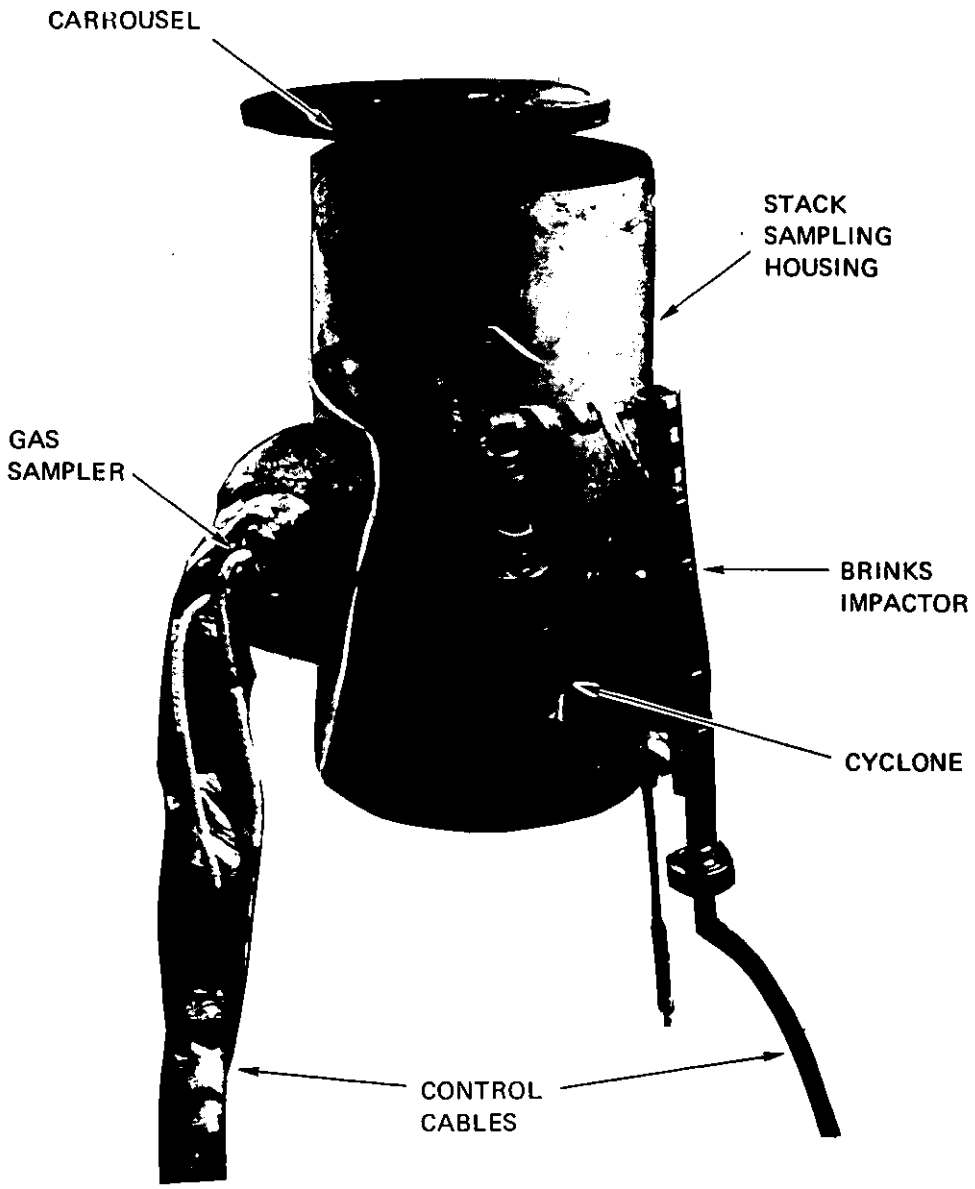


FIGURE E-4
HOUSING WITH TWO PARTICULATE SAMPLERS

size ranges using a calibrated reticle* with the "Ferets diameter" method. The ranges are:

1 - 4.6 to 9.2 μm	5 - 73.6 to 147.2 μm
2 - 9.2 to 18.4 μm	6 - 147.2 to 230 μm
3 - 18.4 to 36.8 μm	7 - >230 μm.
4 - 36.8 to 73.6 μm	

The particles were sized optically with a B & L microscope at 300, and 150 powers. The magnified samples were displayed and counted on a closed circuit television system coupled optically to the microscope. Through the use of a Polaroid camera attachment, pictures were periodically taken.

A particle count of about 500 (termed a "batch")** was required at each of the powers. Areas scanned (fields-of-view) were selected at random to produce a representative sample, until the batch was complete. Each slide to be analyzed was chosen such that a field-of-view had less than 200 particles*** in the countable ranges for any given power. The areas of field-of-view at 150 power and 300 power are 965 μm^2 and 241 μm^2 respectively.

A batch counted in the 300 range includes particles between 4.6 μm and 147.2 μm (excluding ranges 6 and 7). The 150 power batches include particles greater than 9.2 μm (excludes range 1). To combine the results for 300 x and 150 x batches sized for the same test, the number of particles in the omitted ranges were calculated from the ratios of the other batches. For example, the number of particles in range 1 of batch 2 would be calculated as the ratio:

$$N_{12} = N_{11} \cdot \frac{\sum_{i=2}^{5} N_{i2}}{\sum_{i=2}^{5} N_{i1}} \qquad \text{(E-1)}$$

*The reticle was calibrated with 39 μm and as μm pollen.

**Lodge, J. P., Production of Controlled Test Atmospheres In: Air Production, Volume II, Stern, A. C. (ed.) New York and London, Academic Press, 1968. p. 465 - 481.

***Silverman, L., Billings, C. E., First, M. W. Particle Size Analysis in Industrial Hygiene. New York and Longon, Academic Press, 1971. p. 106 - 107.

where, for a given sample (slide),

N_{12} ≡ the number of particles in (unmeasured) range 1 of batch 2

N_{11} ≡ the number of particles in range 1 of batch 1

N_{i2} ≡ the number of particles in range i of batch 2

N_{i1} ≡ the number of particles in range i of batch 1.

The data from optical measurements are shown on Tables E-2 to E-6 in this report.

The number of fields-of-view completing a batch were counted and recorded and the area calculated. The density of the slide was then calculated as a ratio between the number of particles counted to area scanned. The location of each field-of-view was recorded to the nearest tenth of a mm using the movable stage position scale. All slides were labelled and stored for later access.

The theoretical collection efficiency of the microscope slides was investigated to determine system biases relative to particle size and emission velocity (this is discussed later). The collection efficiency was used to produce correction factors to be applied to the measured results.

Each slide was also analyzed for particles larger than 1000μ with a ten power magnifier. The number of particles larger than 1000μ was counted on each slide and the density for particles > 1000μ was calculated and recorded. Other data obtained from optical sizing and presented later include:

- Particulate counts for each test
- Particle density for each slide for particles larger than 18μ
- Particle density of particles larger than 1000μ
- Calculated percentage of particles vs size range
- Cumulative number and weight percents vs size range.

DATA REDUCTION

The collection efficiency corrections calculated in this Appendix were applied to the respective size ranges described in the following section. Though the optical sizing of the coke oven particles included ranges from 4.6μm and larger, the data analyzed will include only the size ranges where the particles were larger than 18.4μm. Ranges 1 and 2 were excluded from final computations here because:

a) it was found that the collection efficiency of this device drops off rapidly below 20μm under the stated operating conditions
b) the Andersen sampler adequately sized particles up to 20μm
c) it was difficult to confidently identify the smaller particles due to foreign materials and grease anomalies on the slides.

Figure E-5 is a cumulative curve of particle number percent vs particle diameter of the average values from Tables E-1 and E-2. The graph indicates that for the particles greater than 18μm (corrected for collection efficiency) the mean number diameter is 35μm. The uncorrected values are also graphed along with the corrected values.

Figure E-6 is a graph of weight percent vs particle diameter. It is derived from Figure E-5 assuming spherical particles and a density of 1.2 gm/cm^3 by using the formula:

$$Wt\%_j = \frac{\#\%_j \cdot \rho \frac{4\pi R^3_j}{3}}{\sum_i^F \#\%_i \cdot \rho \frac{4\pi}{3} R_i^3} = \frac{\#\%_j \cdot \rho R_j^3}{\sum_{i=1}^F \#\%_i \rho R_i^3} \qquad (E\text{-}2)$$

where,

ρ = particle density

R_j = Radius of particle of jth range

$\#\%_j$ = The number percent of particles in the jth range.

TABLE E-1

DEPOSITION EFFICIENCY FOR SAMPLER AT COKE OVEN

Particle Diameter = 2a	$K = 48 \times 10^4 a^2$	EM Deposition Efficiency	Correction Factor
10μ	.12	0	———
20μ	.48	.35	2.86
30μ	1.08	.62	1.61
40μ	1.92	.72	1.39
50μ	4.32	.84	1.19
80μ	7.68	.9	1.11
100μ	12.00	.93	1.08
120μ	17.28	.95	1.05
160μ	30.72	.97	1.03
200μ	48.00	.99	1.01
300μ	108.00	.995	1
400μ	192.00	1	1

TABLE E-2

TEST 22

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER: 300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	TOTAL PARTICLES
4.6 to 9.2	245	1 - 2	610		855
9.2 to 18.4	99	2 - 4	260	1 - 2	359
18.4 to 36.8	41	4 - 8	110	2 - 4	151
36.8 to 73.6	34	8 - 16	62	4 - 8	96
73.6 to 147.2	13	16 - 32	38	8 - 16	51
147.2 to 230	7		17	16 - 25	24
>230	3		8	>25	11
TOTAL	442-		1,105		1,547
# of Scans	103	Area/Scan 241 μ^2	59	Area/Scan 965 μ^2	
Area Scanned	24,846 μ^2		56,935 μ^2		Particles >18 μ Per/Area 4100/mm^2
	TOTAL AREA SCANNED		87,781 μ^2		Particles >1000 μ Per/Area .014 mm^2

* 1 Division on Microscope Reticle equals 4.6 microns

** 1 Division on Microscope Reticle equals 9.2 microns

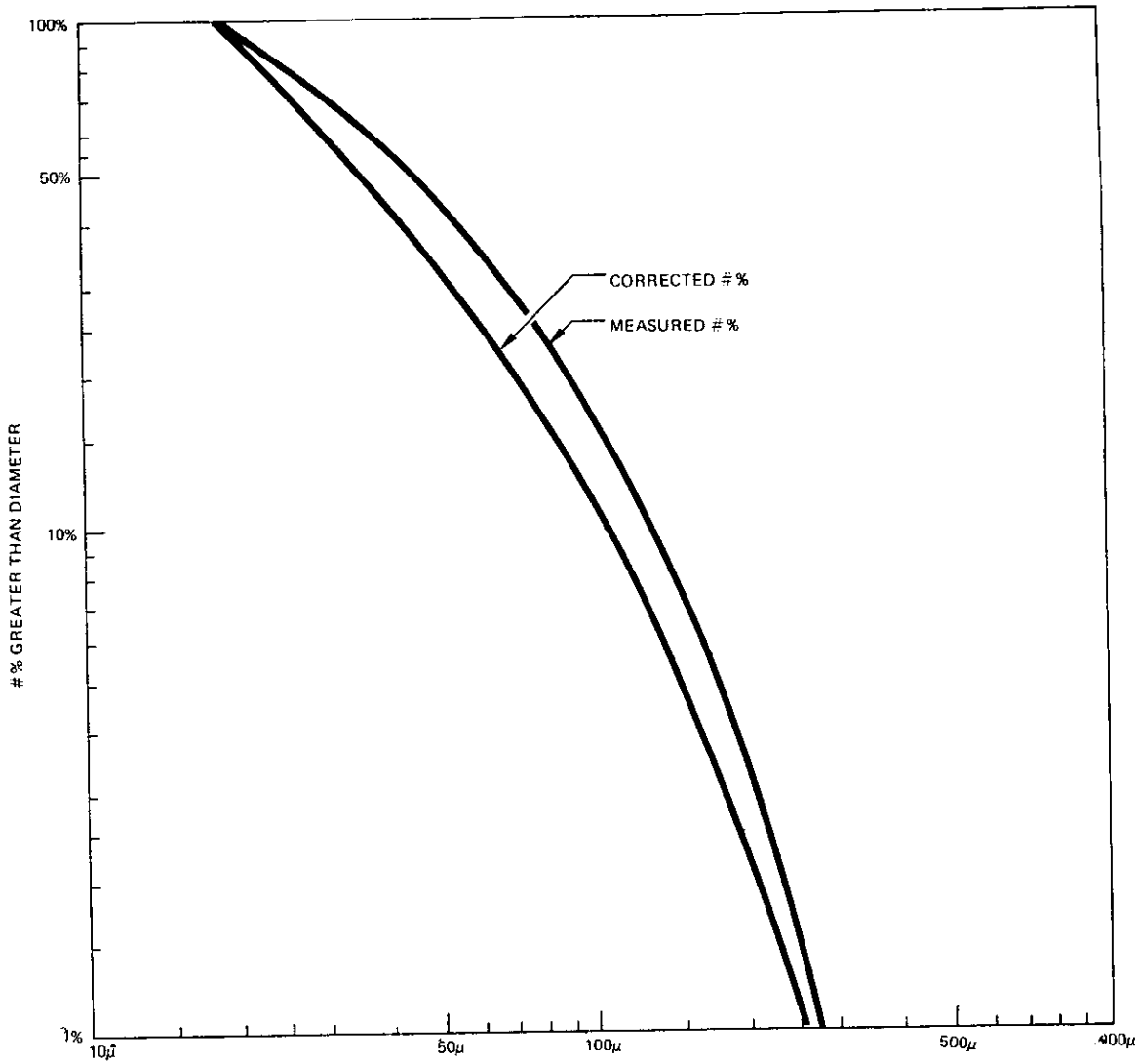


FIGURE E-5
CUMULATIVE SIZE DISTRIBUTION–PARTICLE NUMBER PERCENT

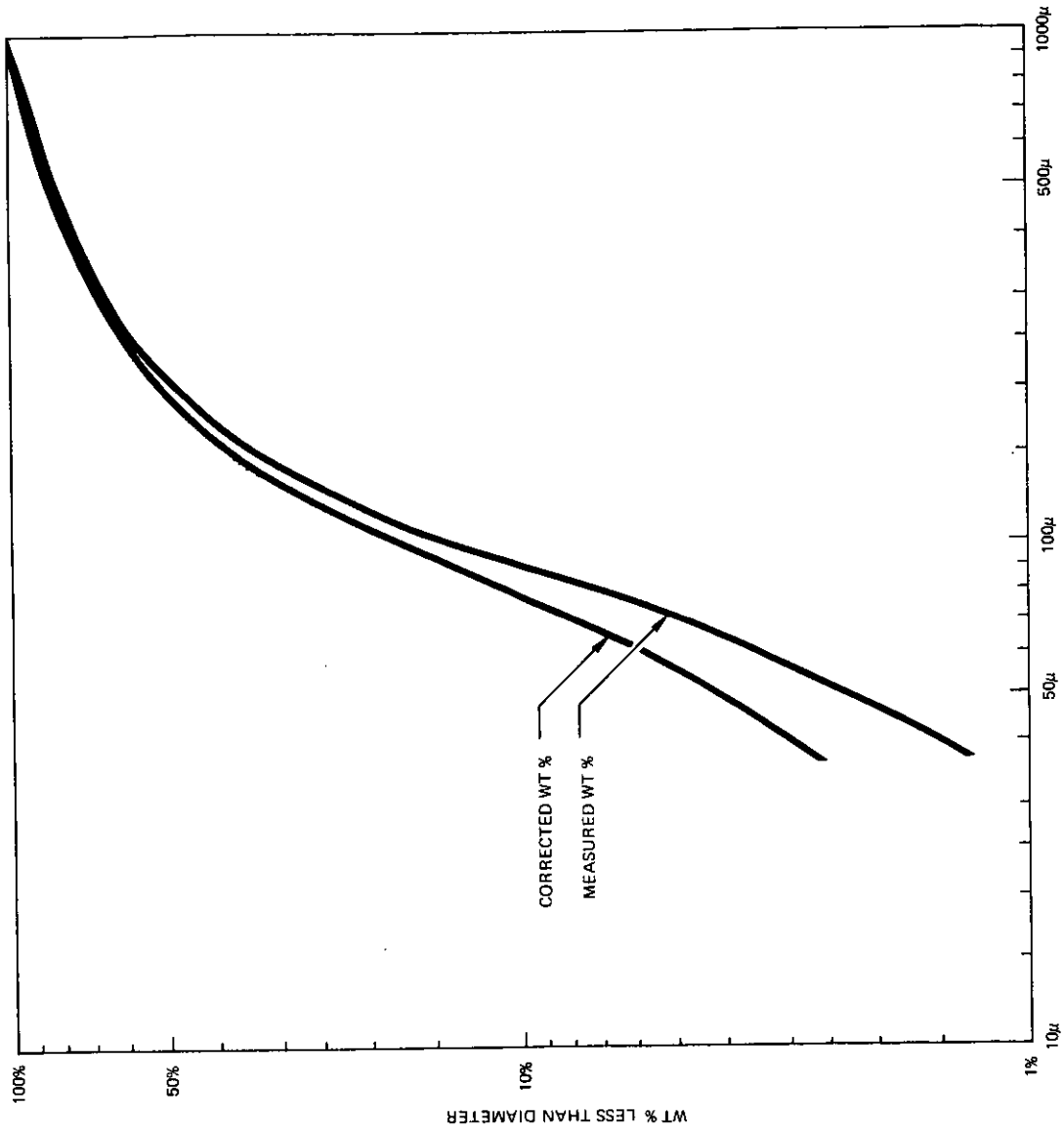


FIGURE E-6
CUMULATIVE SIZE DISTRIBUTION–WEIGHT PERCENT

The mean mass diameter for particles >18μm after corrections are applied was determined to be 200μm.

The results of the corrected weight percent data will be combined with results obtained from an Andersen sampler to produce an overall size distribution for coke oven particulate matter.

CALCULATION OF COLLECTION EFFICIENCY

Since the microscope slides were exposed to the pollution plume for less than a second (therefore were never overloaded) and were greased, two assumptions were made in determining the collection efficiency of the slides:

1. Every particle that impacted on the slide was retained by the greased surface
2. Little or no reentrainment occurred.

These two assumptions simplify the calculation of collection efficiency, which determines which fraction of the particles in each size range actually reach the surface of the slide.

Langmuir and Blodgett developed graphs* of impaction efficiency (Figure E-7) vs an inertial parameter K for a ribbon where

$$K = 2\rho_s a^2 \mu / 9 \eta c \qquad \text{(E-3)}$$

and

ρ_s = density of particle (≃ 1.2 specific gravity) in gm/cm^3

a = radius of particle (cm)

μ = velocity of gas stream - cm/sec

c = size of impaction surface (width of slide)

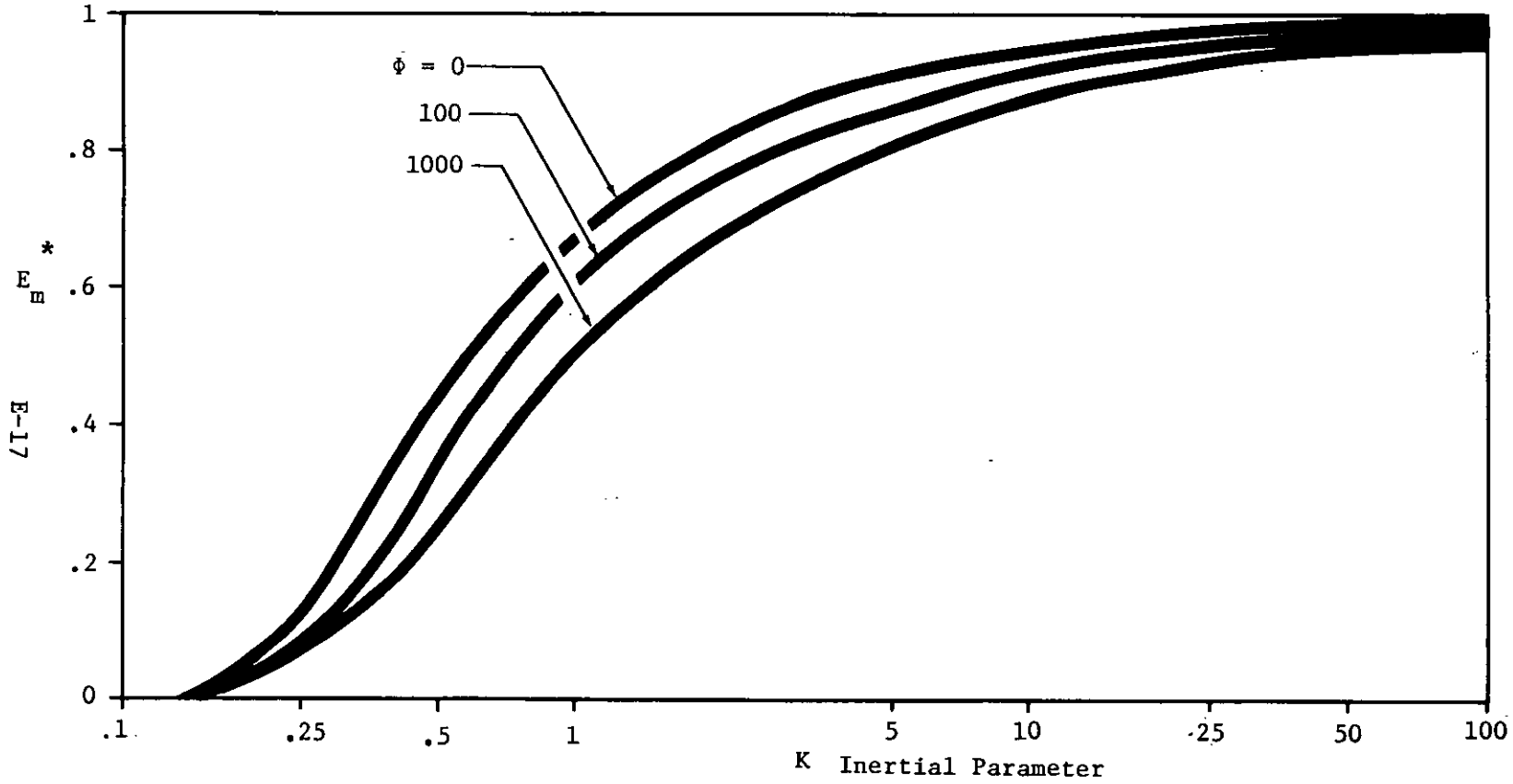
η = viscosity of the gas (poise)

Figure E-7 gives values for ϕ between 0 and 1000 where $\phi = R_\mu^2 / K$

and

$$R_\mu = 2 a \rho_A \mu / \eta \text{ for } \rho_A = \text{density of air.} \qquad \text{(E-4)}$$

*"Mathematical Investigations of Water Droplet Trajectories", Langmuir and Blodgett, 1946, Army Air Force Report, PB 27565.



* Deposition Efficiency

FIGURE E-7
EFFICIENCY CURVES

Table E-1 is the collection efficiency for average conditions experienced during operation of this system.

The values of the variables used to produce Table E-1 are:

$$\rho_s \simeq 1.2 \text{ gm/cm}^3$$

$$\mu \simeq 30 \text{ ft/sec} = 914 \text{ cm/sec}$$

$$c = 2.54 \text{ cm}$$

$$\eta \simeq 200 \times 10^{-6} \text{ poise}$$

$$\rho_A \simeq .001 \text{ g/cm}^3$$

$$\Rightarrow R\mu \simeq 9{,}100 \text{ a}$$

then

$$\phi = 172.$$

Table E-1 indicates that the collection efficiency of particles smaller than 20μm in diameter drops off too rapidly, implying correction factors for ranges 1 and 2 would be erroneous. Therefore, all calculations that apply to coke oven particles will be for sizes >18μm. Table E-8 and Table E-9 list the average cumulative size distribution relative to weight percent and number percent as measured and as corrected (for collection efficiency of the system) for all particles >18μm. The averages of the corrected values (in a size range) in Table E-9 are to be combined with the Andersen data to produce a complete size distribution. Figures E-5 and E-6 are graphs of the arithmetic means found from Tab les E-8 and E-9.

PARTICULATE DATA FORMS

Tables E-2 through E-6 present the particle data in its original form. The tables include:

- number of particles counted in each range
- area of slide that was analyzed
- particle density of slide for particles larger than 18μm and for particles larger than 1000μm.

TABLE E-3

TEST 24A

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER: 300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	TOTAL PARTICLES
4.6 to 9.2		1 - 2			
9.2 to 18.4		2 - 4	279	1 - 2	
18.4 to 36.8		4 - 8	80	2 - 4	
36.8 to 73.6		8 - 16	58	4 - 8	
73.6 to 147.2		16 - 32	46	8 - 16	
147.2 to 230			14	16 - 25	
>230			1	>25	
TOTAL			478		
# of Scans		Area/Scan 241 μ^2		Area/Scan 965 μ^2	
Area Scanned					Particles > 18 μ Per/Area 11,400/mm^2
	TOTAL AREA SCANNED	17,370 μ^2			Particles > 1,000μ Per/Area .003/mm^2

* 1 Division of Microscope Reticle equals 4.6 microns

** 1 Division on Microscope Reticle equals 9.2 microns

TABLE E-4

TEST 26A

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER: 300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	TOTAL PARTICLES
4.6 to 9.2		1 - 2			
9.2 to 18.4		2 - 4		1 - 2	
18.4 to 36.8		4 - 8	94	2 - 4	94
36.8 to 73.6		8 - 16	84	4 - 8	84
73.6 to 147.2		16 - 32	42	8 - 16	42
147.2 to 230			11	16 - 25	11
>230			7	>25	7
TOTAL			349		349
# of Scans		Area/Scan 241 μ^2	33	Area/Scan 965 μ^2	
Area Scanned			241		Particles >18 μ Per/Area 7,400/mm^2
	TOTAL AREA SCANNED	31,845 μ^2			Particles >1,000 μ Per/Area .003/mm^2

* 1 Division on Microscope Reticle equals 4.6 microns

** 1 Division on Microscope Reticle equals 9.2 microns

TABLE E-5

TEST 27

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER: 300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	TOTAL PARTICLES
4.6 to 9.2	355	1 - 2	1,270		1,625
9.2 to 18.4	59	2 - 4	245	1 - 2	304
18.4 to 36.8	29	4 - 8	112	2 - 4	141
36.8 to 73.6	36	8 - 16	106	4 - 8	142
73.6 to 147.2	17	16 - 32	43	8 - 16	60
147.2 to 230	2		9	16 - 25	11
>230	2		4	>25	6
TOTAL	500		1,789		2,289
# of Scans	52	Area/Scan 241 μ^2	35	Area/Scan 965 μ^2	
Area Scanned	12,532		33,775		
	TOTAL AREA SCANNED		46,307		

Particles >18 μ Per/Area 7,700/mm^2

Particles >1000 μ Per/Area .003/mm^2

* 1 Division on Microscope Reticle equals 4.6 microns

** 1 Division on Microscope Reticle equals 9.2 microns

TABLE E-6

TEST 28

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER: 300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	TOTAL PARTICLES
4.6 to 9.2	200	1 - 2	1,856		2,146
9.2 to 18.4	25	2 - 4	248	1 - 2	273
18.4 to 36.8	24	4 - 8	68	2 - 4	92
36.8 to 73.6	20	8 - 16	92	4 - 8	112
73.6 to 147.2	6	16 - 32	72	8 - 16	78
147.2 to 230	2		16	16 - 25	18
> 230	1		4	> 25	5
TOTAL	368		2,356		2,724
# of Scans	11	Area/Scan $241\mu^2$	18	Area/Scan $965\mu^2$	
Area Scanned	$2,651\ \mu^2$		$17,370\mu^2$		Particles >18μ Per/Area $15,200/mm^2$
	Total Area Scanned	$20,021\mu^2$			Particles >1000μ Per/Area $.003/mm^2$

* 1 Division on Microscope Reticle equals 4.6 microns
** 1 Division on Microscope Reticle equals 9.2 microns

Tables E-3 and E-4 do not include any values for the 300 power batch. Poor condition of the slides caused by extra heavy silicon coating caused identification problems for particles in the smaller size ranges.

Table E-7 gives numerical number percent versus size range for all tests. Calculation of numerical percent was done for all ranges sized, for ranges greater than 9.2μ, and finally for ranges greater than 18.4μ. As discussed in the body of this paper, all computations after this point were done only for particles greater than 18.4μ, i.e., ranges 3 to 7.

Table E-8 gives both the cumulative number percent and the cumulative weight percent for each size range greater than 18.4μ with no corrections for collection efficiency applied. The 1000μ range was found from the ratio of the >18μ density to the >1000μ density given in Tables E-2 through E-6.

Table E-9 presents the same data corrected for collection efficiency. The correction factors used were derived by extrapolating Table E-1 values to the values for the mid-point (arithmetic average) of each range. The correction factors were:

Range	Correction Factor
3	2.0
4	1.25
5	1.06
6	1.02
7	1
>1000μ	1

The average values in Tables E-8 and E-9 are used for Figures E-5 and E-6 in this section.

PARTICLE PHOTOGRAPHS

Figures E-8 to E-12 are a number of the photographs taken of scanned regions. The scans pictured below represent the typical particle shape and number distribution as observed during optical analysis of the samples.

TABLE E-7

NUMERICAL NUMBER PERCENT VS. SIZE RANGE

		TEST 22			TEST 24A			TEST 26A			TEST 27			TEST 28		
	SIZE RANGE in μ m	1 - 7	2 - 7	3 - 7	1 - 7	2 - 7	3 - 7	1 - 7	2 - 7	3 - 7	1 - 7	2 - 7	3 - 7	1 - 7	2 - 7	3 - 7
1.	4.6 to 9.2	55.3									70.9			78.7		
2.	9.2 to 18.4	23.2	51.9			58.3			31.8		13.2	45.3		10.0	47.2	
3.	18.4 to 36.8	9.8	21.9	45.3		16.7	40.2		26.9	39.5	6.1	20.9	39.3	3.3	15.9	30.2
4.	36.8 to 73.6	6.2	13.8	28.8		12.1	29.1		24.0	35.3	6.1	20.9	39.3	4.1	19.3	36.8
5.	73.6 to 147.2	3.3	7.3	15.3		9.6	23.1		12.0	17.7	2.6	8.9	16.7	2.8	13.4	25.5
6.	147.2 to 230	1.5	3.3	7.2		2.9	7.0		3.1	4.6	.4	.8	3.0	.6	3.1	5.9
7.	> 230	.7	1.5	3.3		.2	.5		2.0	2.9	.2	.4	1.6	.2	.8	1.6

TABLE E-8

CUMULATIVE PERCENT FOR PARTICLES > 18 μ - UNCORRECTED

DIAMETER D ↓ in μ m	TEST 22		TEST 24A		TEST 26A		TEST 27		TEST 28		AVERAGE	
	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D
18.4	0	100	0	100	0	100	0	100	0	100	0	100
36.8	1.1	54.7	1.8	59.8	1.1	60.5	1.6	60.7	1.0	69.8	1.3	61.1
73.6	3.8	25.9	7.0	30.7	5.0	25.2	8.3	21.4	5.8	33.0	6.0	27.2
147.2	15.6	10.6	39.9	7.6	20.7	7.5	30.7	4.7	32.7	7.5	27.9	7.6
230	39.3	3.4	82.8	.6	38.3	2.9	48.1	1.7	59.4	1.6	53.6	2.0
1000	99.85	.00034	99.98	.00003	99.98	.00004	99.97	.00004	99.96	.00007	99.95	.0001

TABLE E-9

CUMULATIVE PERCENT FOR PARTICLES > 18 μ - CORRECTED

DIAMETER D ↓ in μ m	TEST 22		TEST 24A		TEST 26A		TEST 27		TEST 28		AVERAGE	
	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D	Cum. Wt. % < D	Cum. # % > D
18.4	0	100	0	100	0	100	0	100	0	100	0	100
36.8	2.3	41	3.4	46	2.1	47	3.2	48	2.1	57	2.62	47.8
73.6	5.9	18	9.6	21.6	6.8	17	11.4	15	8.4	24	8.42	19.12
147.2	18.4	8	42.8	5.1	23.2	4	35.2	3	37.3	5	31.38	5.02
230	39.9	4	84	.3	39.4	1	52.2	1	63.4	1	55.78	1.46
1000	99.87	.0002	99.98	.00002	99.99	.000026	99.98	.000026	99.97	.000046	99.95	.000063



FIGURE E-8
TEST 27, 150 X



FIGURE E-9
TEST 27, 150 X

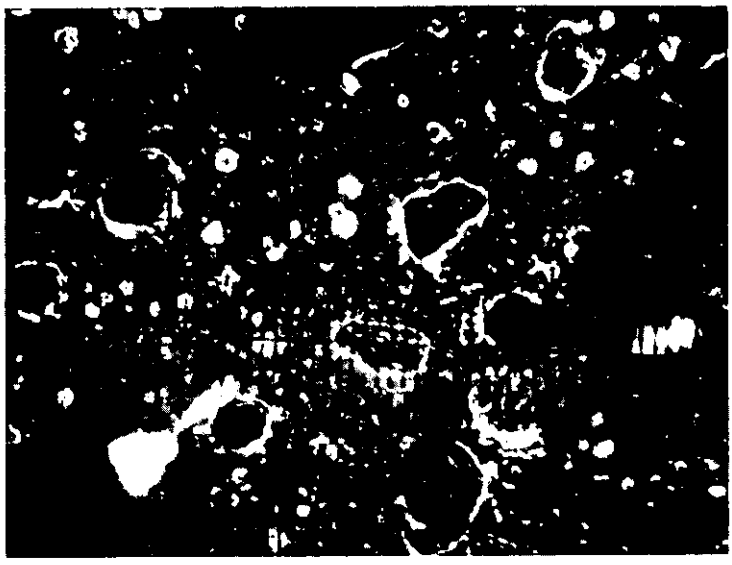


FIGURE E-10
TEST 28, 150 X



FIGURE E-11
TEST 28, 150 X

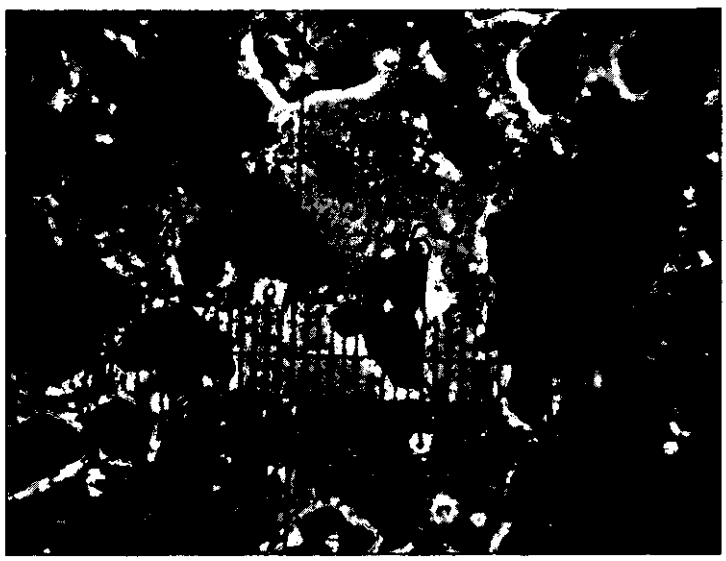


FIGURE E-12
TEST 28, 150 X

The particles were primarily of two basic types, coal or coke balls. The major portion of the particles in the ranges sized were not aggregated. However, in the larger size ranges, many particles were aggregates and condensation flocs probably held together by hydrocarbons condensed on the particle surfaces. The scale shown in the pictures was calibrated at 9.2μ per division.

PRELIMINARY PARTICULATE TESTS

During set-up of the coke oven monitoring system, a series of particulate size samples were taken for preliminary information. The prime purpose of the tests was to determine the difference if and of particle size distributions of samples collect approximately 30 feet from the oven floor as opposed to those collected in the emission guide. The Brinks impactor preceded by a cyclone used for the tests.

The results of the tests are given in Tables E-10 through E-13. All tests were qualitative and stack velocity was not measured during any test. Tests 1, 2 and 3 (Tables E-10, E-11, E-12, respectively) were samples taken 20 to 30 feet above the oven floor. The sampling unit was attached to the boom and was swung out over the larry car as it was charging. The results of these tests were very inconsistent, which was probably due to sampling conditions. As the sampler was extended over the car, wind changes caused the plume to be moving almost perpendicular to the sampling nozzle during some tests while it was parallel during others. Test #4 was performed in an emission guide. The data compares favorably with the Andersen data. Sedegraph analyses was also performed on some of the cyclone catches. Figure E-13 plots the cumulative curves; the straight line for each test signifies the lognormal approximation for the data.

COULTER ANALYSIS

One test was performed with the coulter counter prior to set-up of the field operation. During the testing of the vortex breakers for the emission guides, some particulate matter was collected on a 1/4" wire screen. This sample was analyzed with a coulter counter and results

TABLE E-10

Test #1

Boom

(1) 144 mm Filter

Volume Sampled	Mass Loading	Volume Sampled
11.45 scf	5.9 mg	(.324 m^3)

(2) Cyclone Sizing

95%	less than	50μ
88%	less than	41μ
81.5%	less than	32μ
76%	less than	25.5μ
70.5%	less than	20.5μ
65%	less than	16μ
61%	less than	12.9μ
55%	less than	10μ
45%	less than	8μ
44%	less than	6.3μ
23.5%	less than	5.1μ
15%	less than	4μ
10%	less than	3.3μ
5%	less than	2.55μ

(3) Brinks

99.4%	less than	2.74μ
98.5%	less than	1.6μ
97.9%	less than	1.08μ
97.1%	less than	.51μ
2.17%	less than	.12μ

TABLE E-11

Test #2

Boom

(1) 144 mm Filter

Volume Sampled	Mass Loading	Volume Sampled
7.24 scf	35.6 mg	(.204 m^3)

(2) Cyclone Sizing

None

(3) Brinks

73.3%	less than	2.74μ
13.7%	less than	1.6μ
3.7%	less than	1.08μ
.95%	less than	.51μ
0%	less than	.12μ

TABLE E-12

Test #3

Boom

(1)	144 mm Filter Volume Sampled 9.4 scf	Mass Loading 10.9 mg	Volume Sampled (.27 m^3)
(2)	Cyclone Sizing	None	
(3)	Brinks		
	92.3%	less than	3.18μ
	82.3%	less than	1.87μ
	73.8%	less than	1.27μ
	63.9	less than	.65μ
	56.0	less than	.32μ

TABLE E-13

Test #4

Emissions Guide

2 types of particles

a) solid - generally round (popcorn shaped)
b) tar - spherical

(1) 144 mm Filter

Volume Sampled	Mass Loading	Volume Sampled
17.4 scf	60.1 mg	(.49 m^3)

(2) Cyclone Sizing

87%	less than	50μ
73%	less than	41μ
65%	less than	32μ
52%	less than	25.5μ
38%	less than	20.5μ
31%	less than	16μ
25%	less than	12.9μ
20%	less than	10μ
15%	less than	8μ
11%	less than	6.3μ
8%	less than	5.1μ
5%	less than	4μ
3.5%	less than	3.3μ
2%	less than	2.6μ

(3) Brinks

87%	less than	3.18μ
77%	less than	1.87μ
38%	less than	1.27μ
20%	less than	.65μ
5%	less than	.32μ

90% Weight in Cyclone

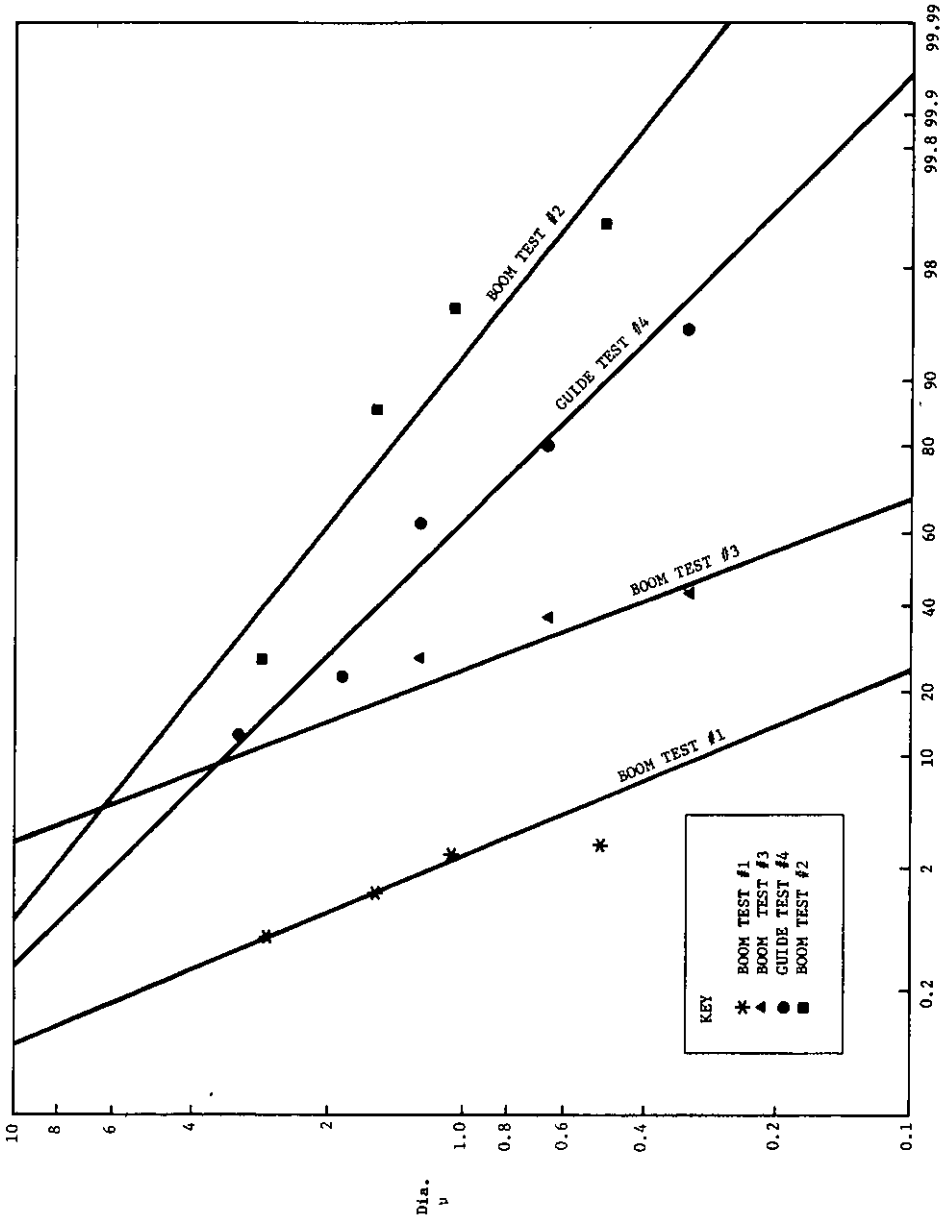


FIGURE E-13
BRINK DATA

are shown in Figure E-14. Aside from the biased collection method, the analysis probably broke up a considerable part of the agglomerated particles.

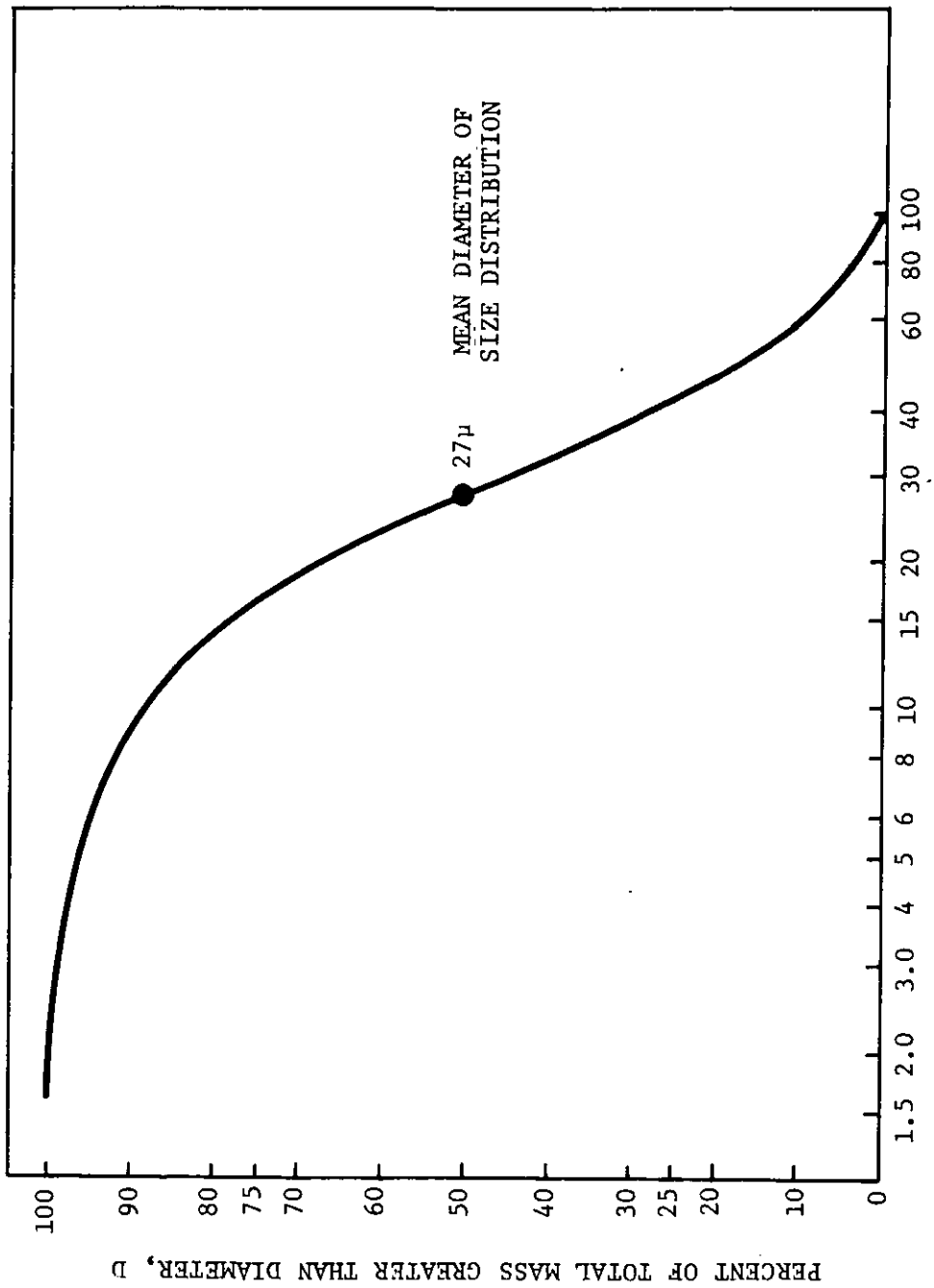


FIGURE E-14
COULTER ANALYSIS