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This is volume 2 of reference #9, ref_09c12s02_2000.pdf

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Vol. II

COKE OVEN CHARGING EMISSION CONTROL TEST PROGRAM

VOLUME II SUPPORTING APPENDICES

**R. W. BEE
G. ERSKINE
R. B. SHALLER
R. W. SPEWAK
A. WALLO III
W. L. WHEATON**

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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			LOCATION 2			LOCATION 3		
	TEMPERATURE R°			TEMPERATURE R°			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 $\pm 10^\circ$

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

TEST NO.		FLOW IN SCFM						GUIDE 1	GUIDE 2	GUIDE 3	DESCRIPTION OF TEST		
		STACK 1	STACK 2	STACK 3	STACK 1	STACK 2	STACK 3						
OB	SIDE 1								149.9 @		Wilputte Prototype Guide		
	SIDE 2								44.9				
1	SIDE 1								215.4 @		Wilputte Prototype Guide		
	SIDE 2								28.8				
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

[illegible]

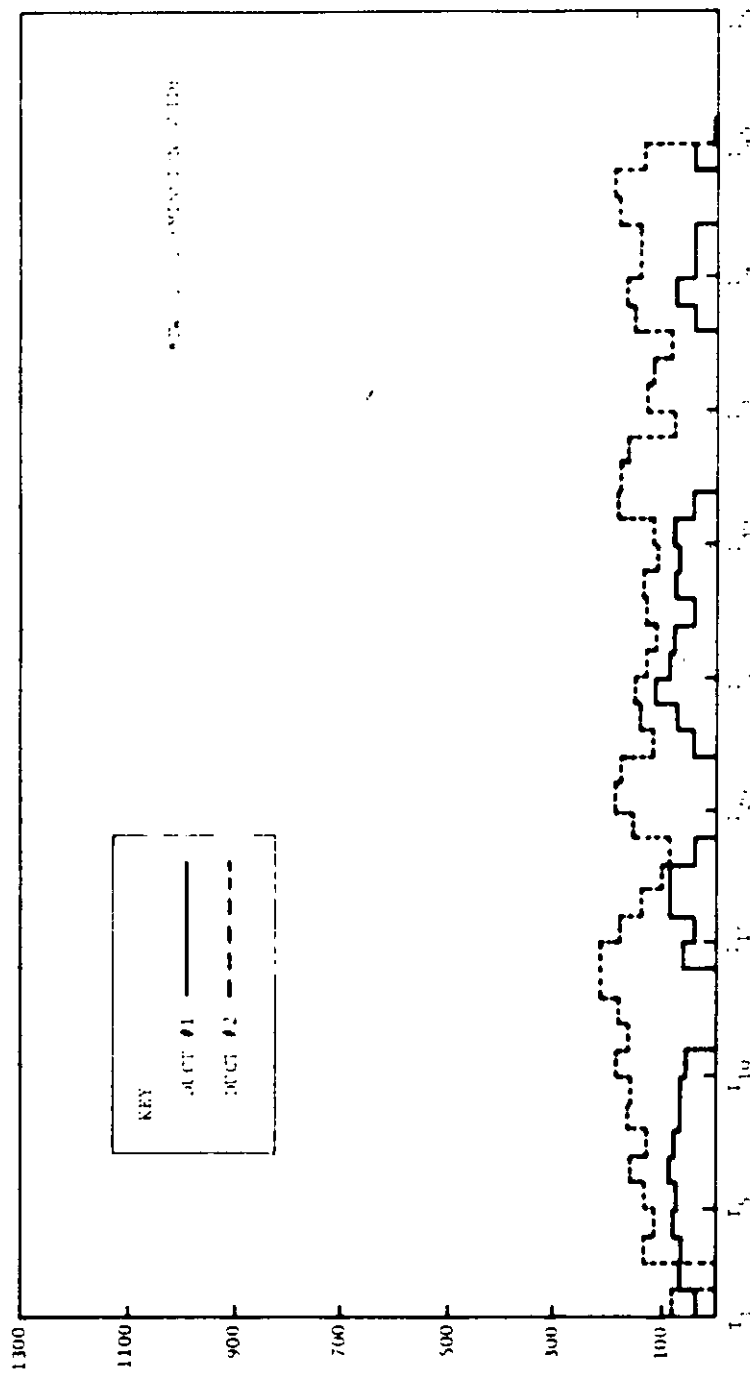


FIGURE A-1
TEST OB #2 WILPUTTE GUIDE*
(VOLUME FLOW IN CU FT/MIN.)

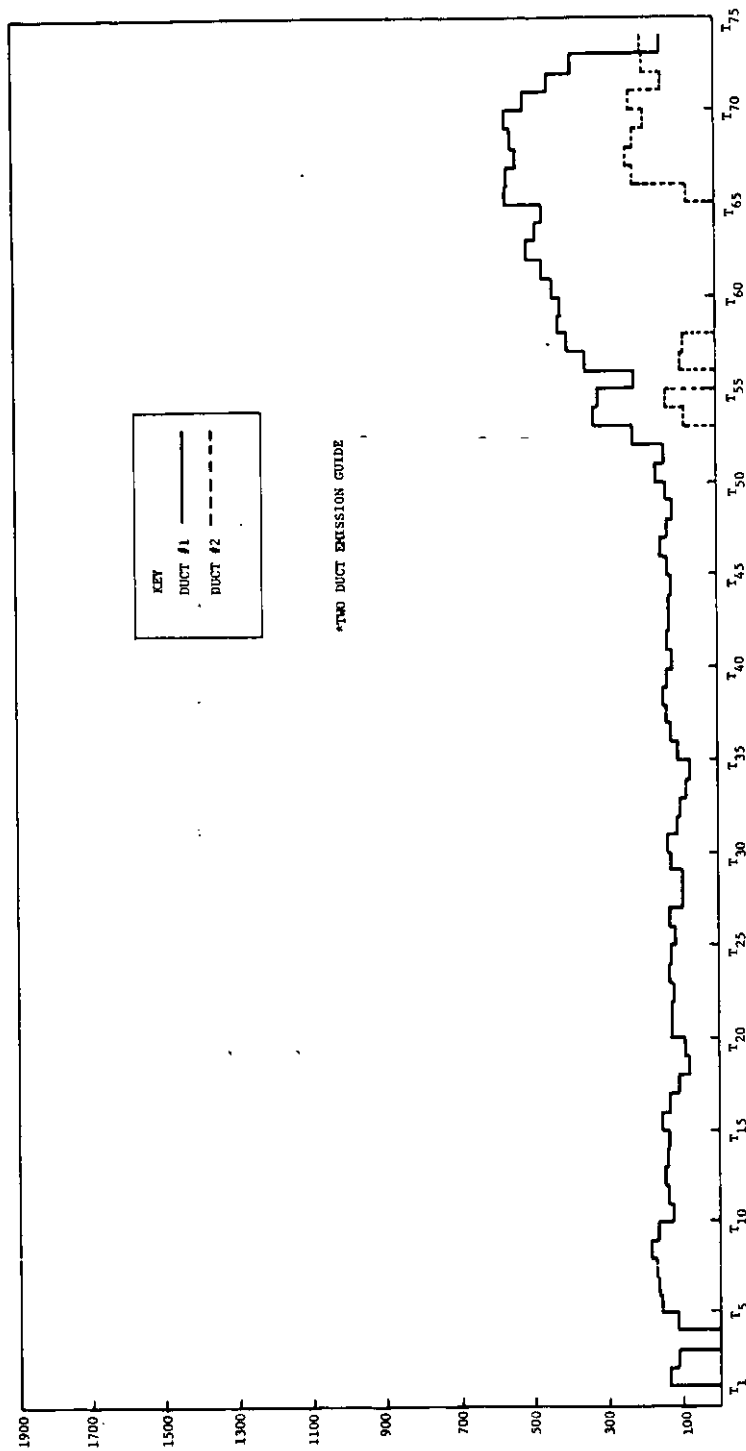


FIGURE A-2
TEST #1, #2 WILPUTTE GUIDE*
(VOLUME FLOW IN CU. FT./MIN.)

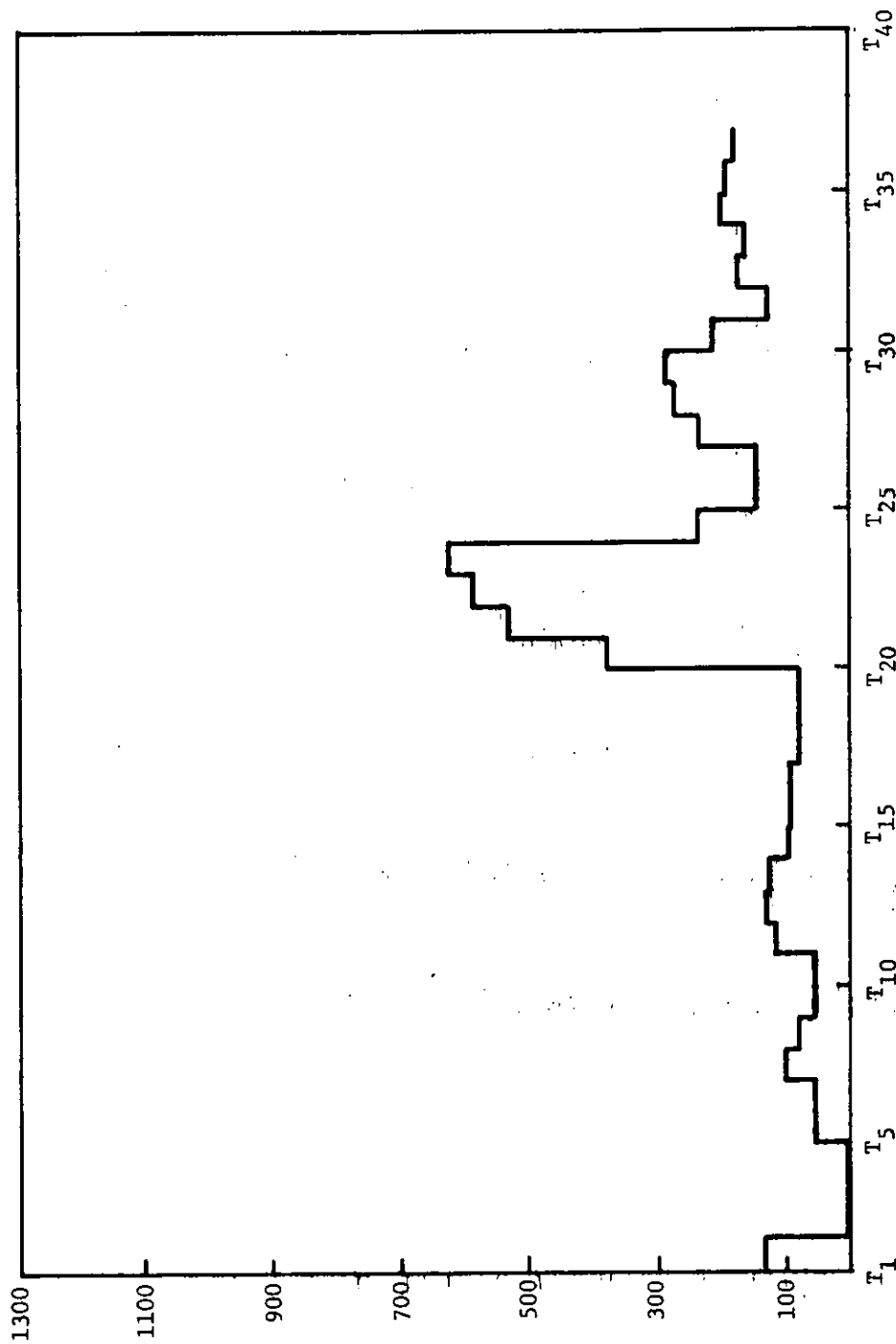


FIGURE A-3
TEST #1A, #2 WILPUTTE STACK
(VOLUME FLOW IN CU. FT./MIN.)

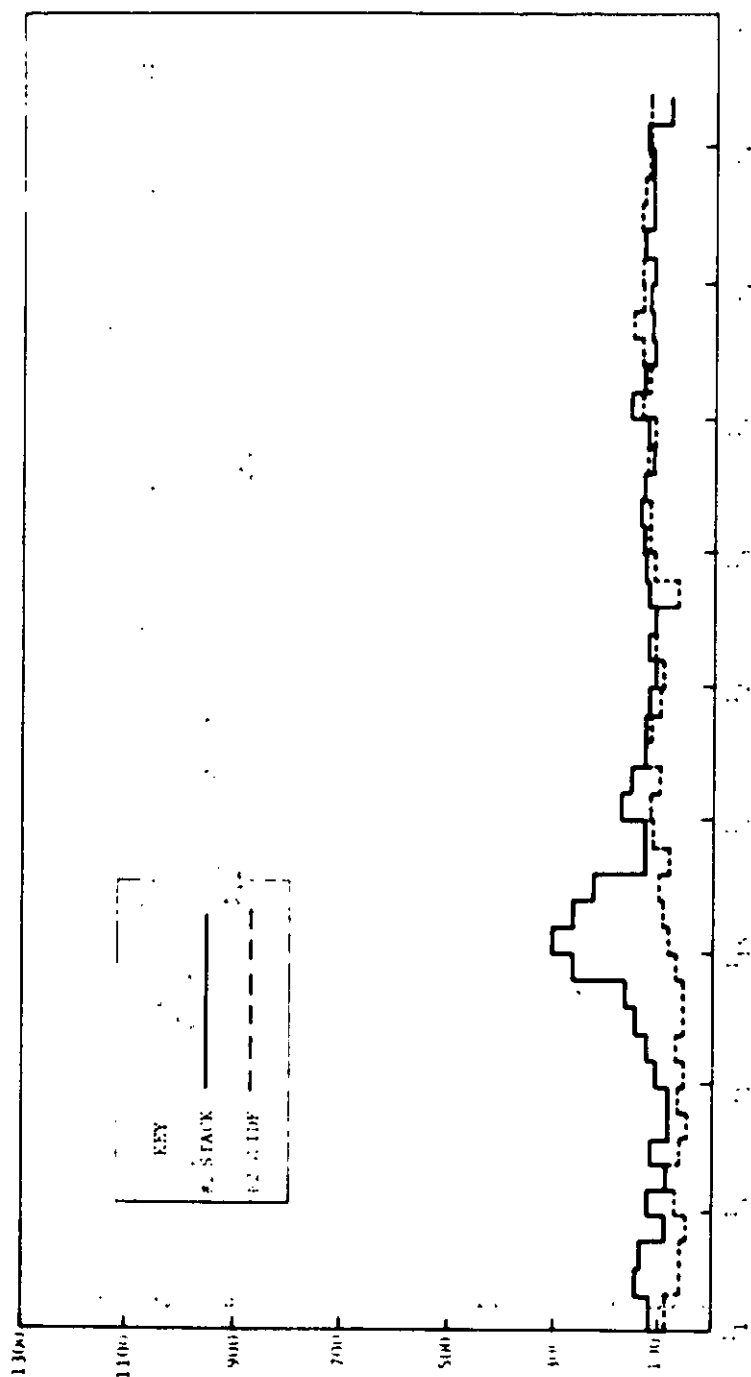


FIGURE A 4
 TEST #18 - #2 WILPUTTE GUIDE AND STACK
 (VOLUME FLOW IN CU FT MIN) - #2 STACK - #2 GUIDE

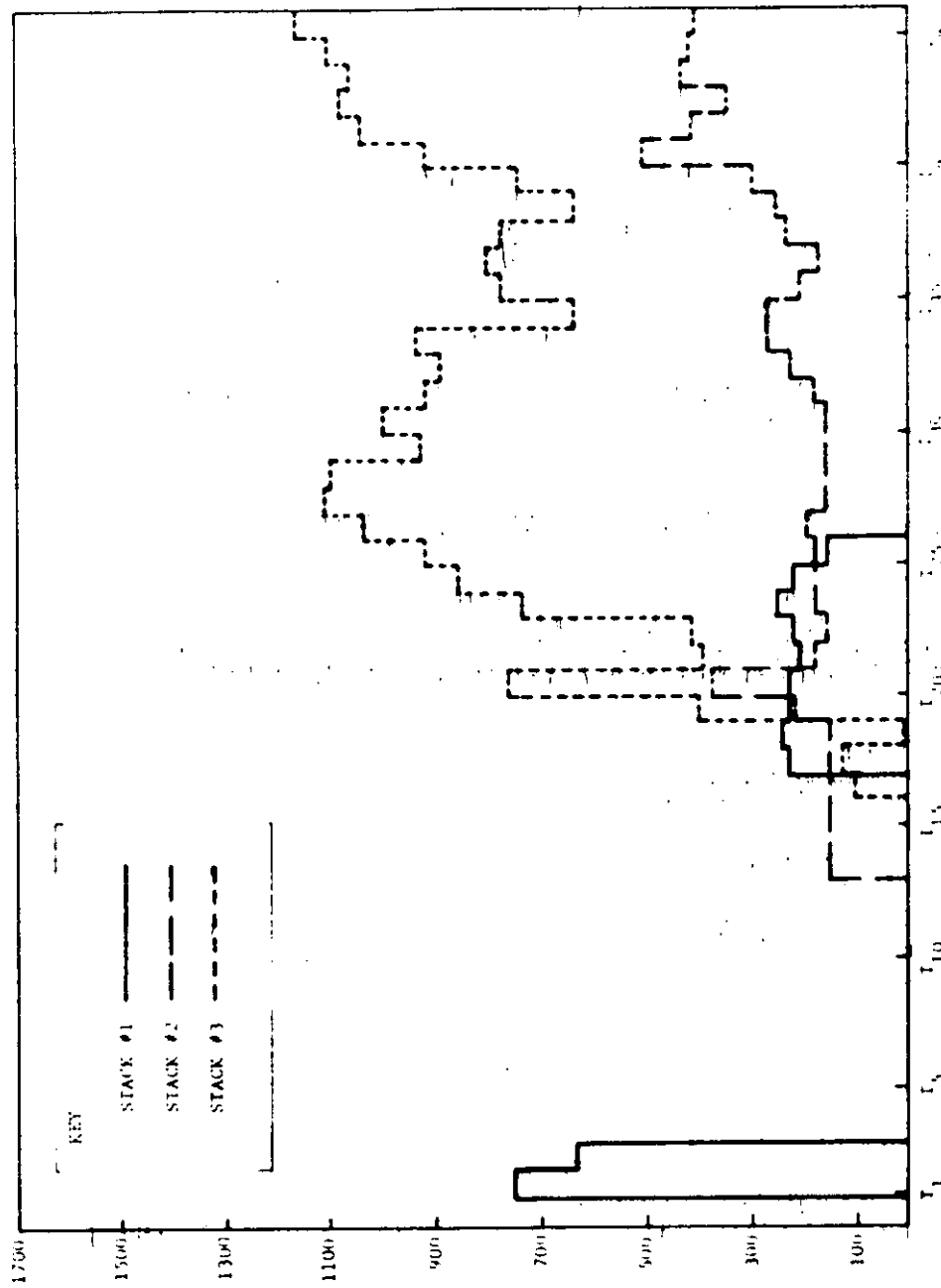
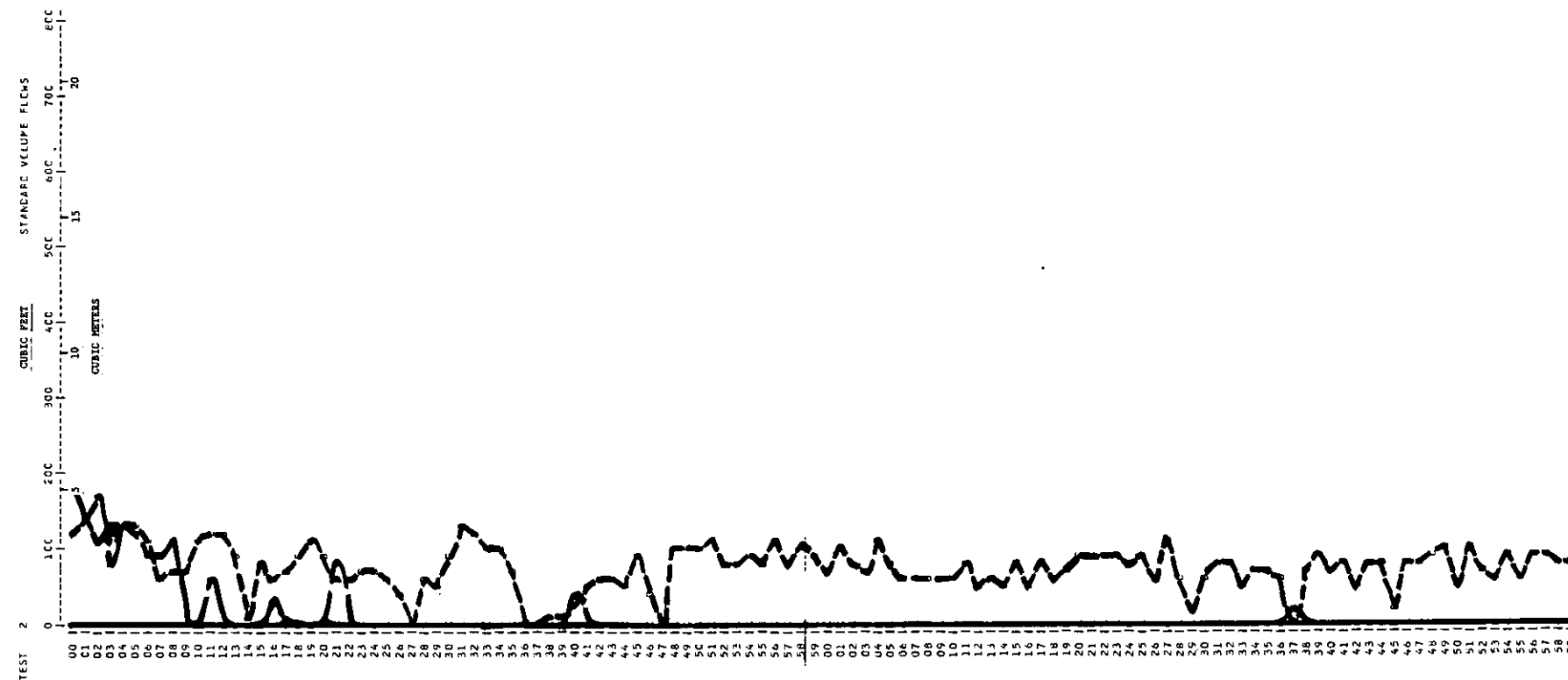
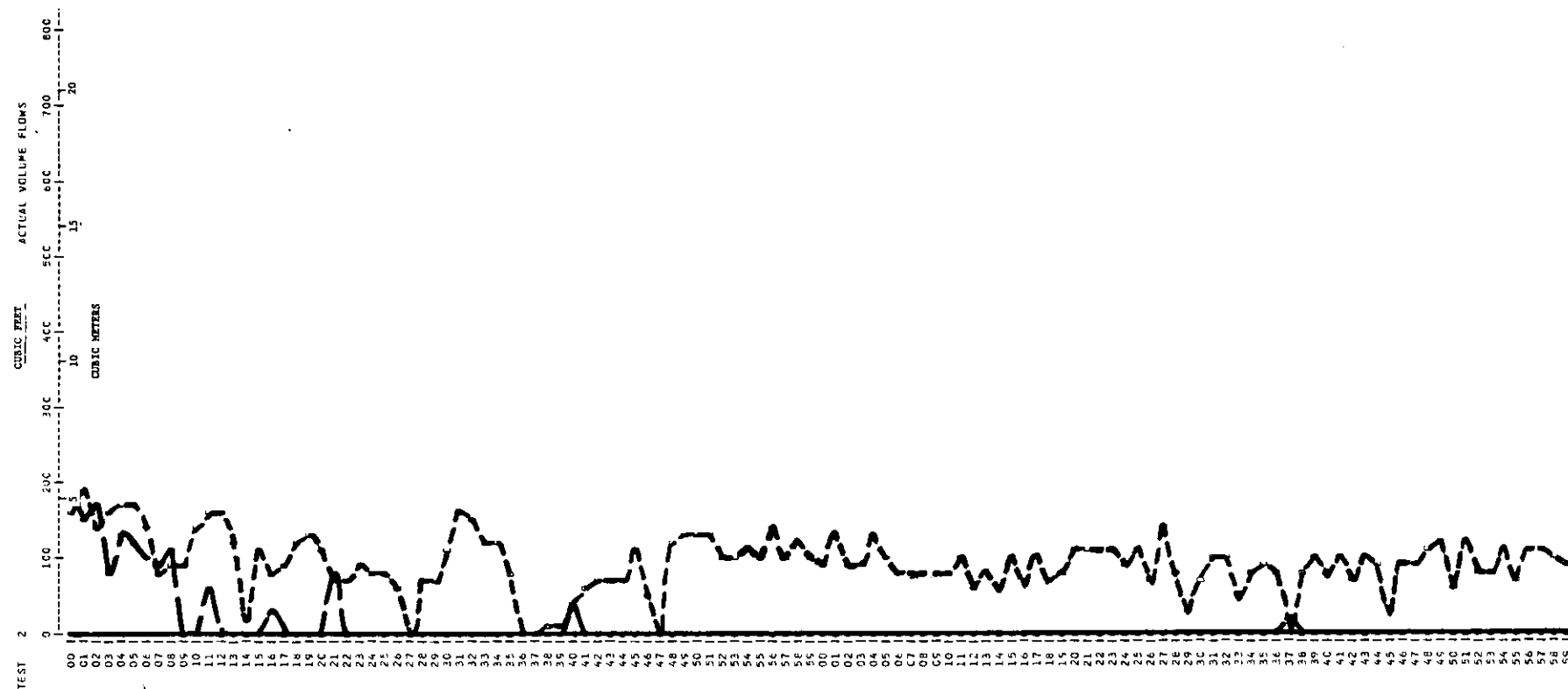


FIGURE A-5
TEST 0A, 3 WILPUTTE STACKS
(VOLUME FLOW-INCUB. FT/MIN)

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

FIGURE A-6

TEST 3

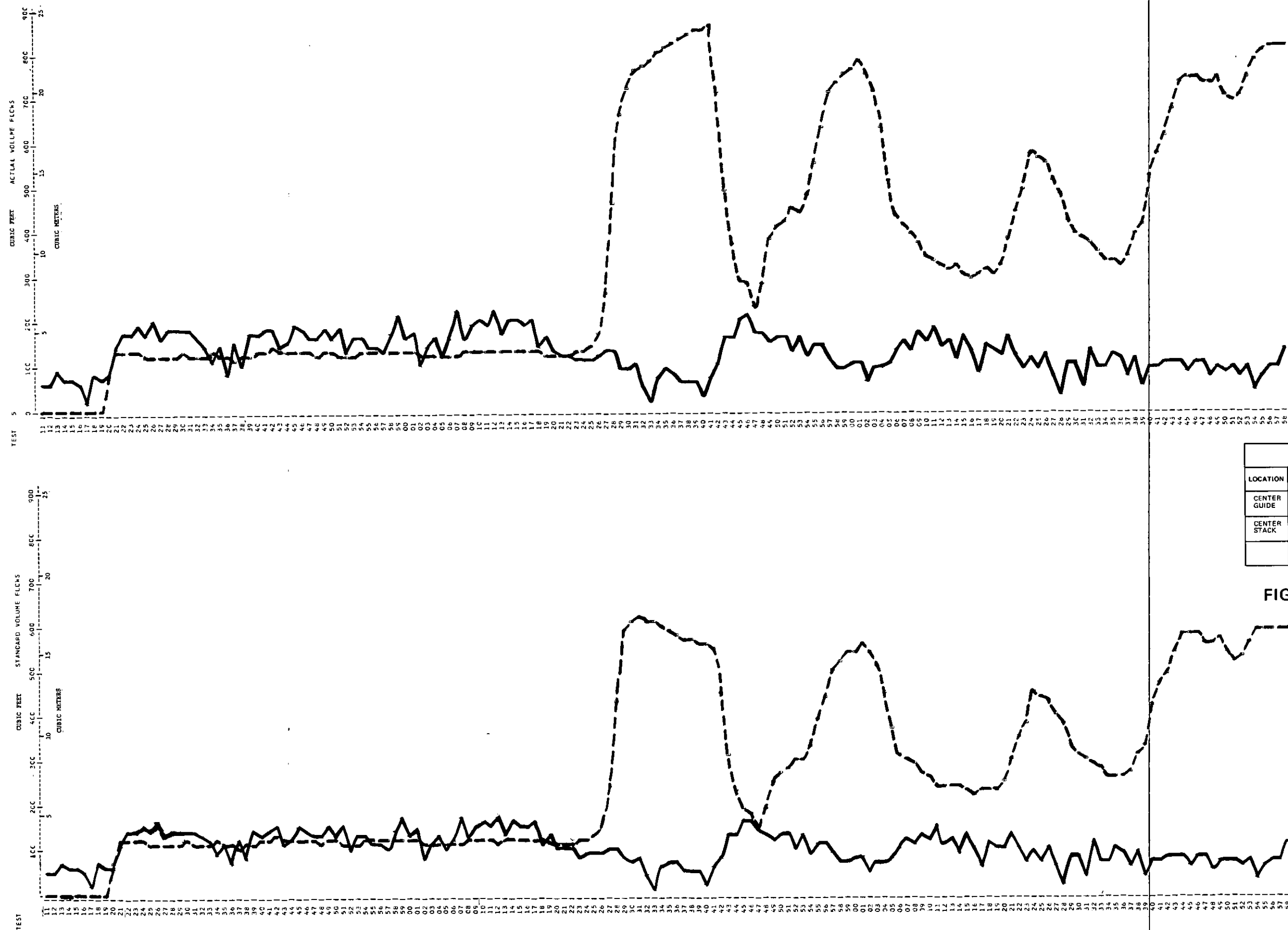
A malfunction of the volume flow differential pressure system caused the loss of volume flow data for this test.

FIGURE A-7

TEST 4

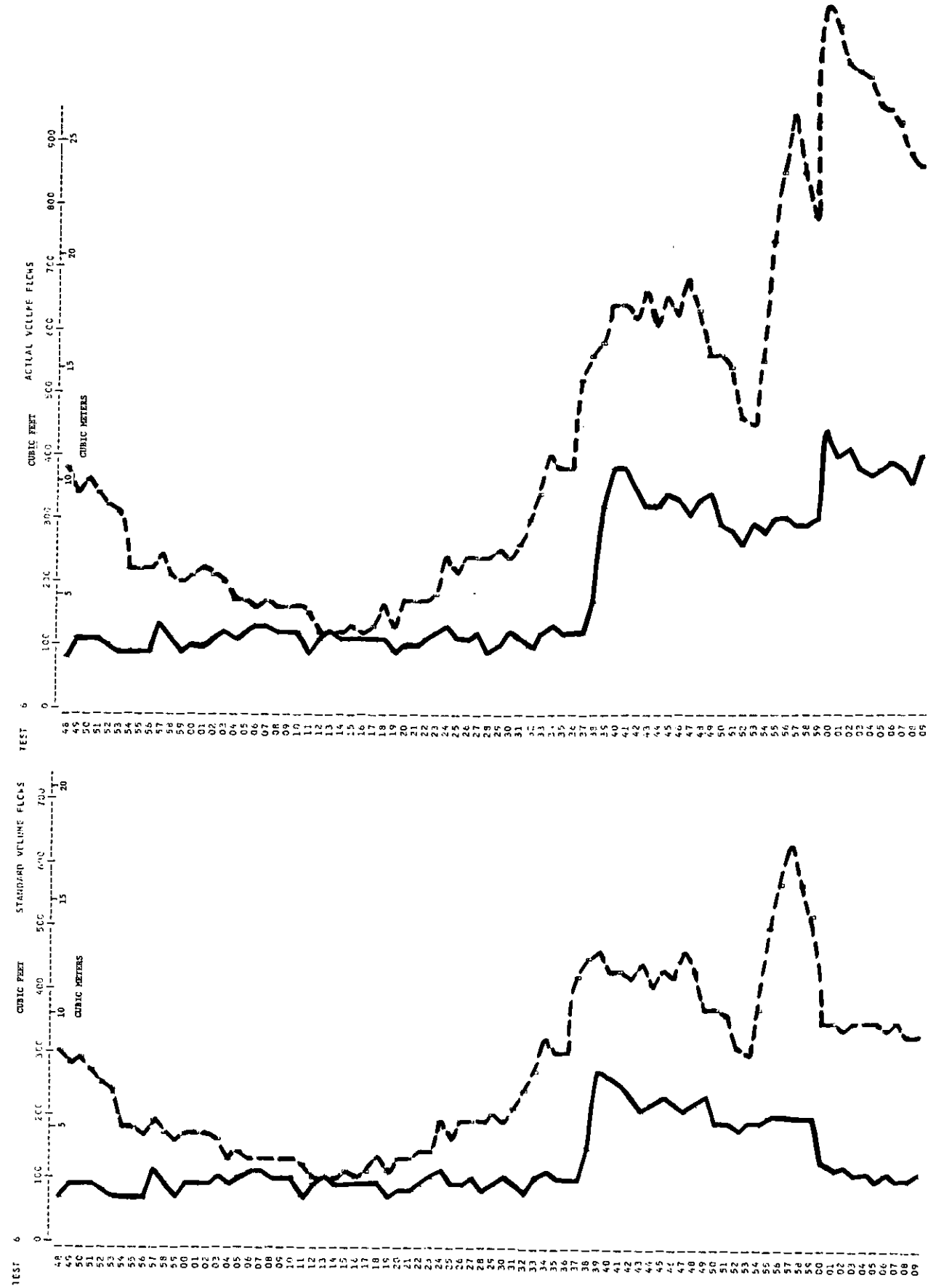
A malfunction of the volume flow differential pressure system caused the loss of volume flow data for this test.

FIGURE A-8



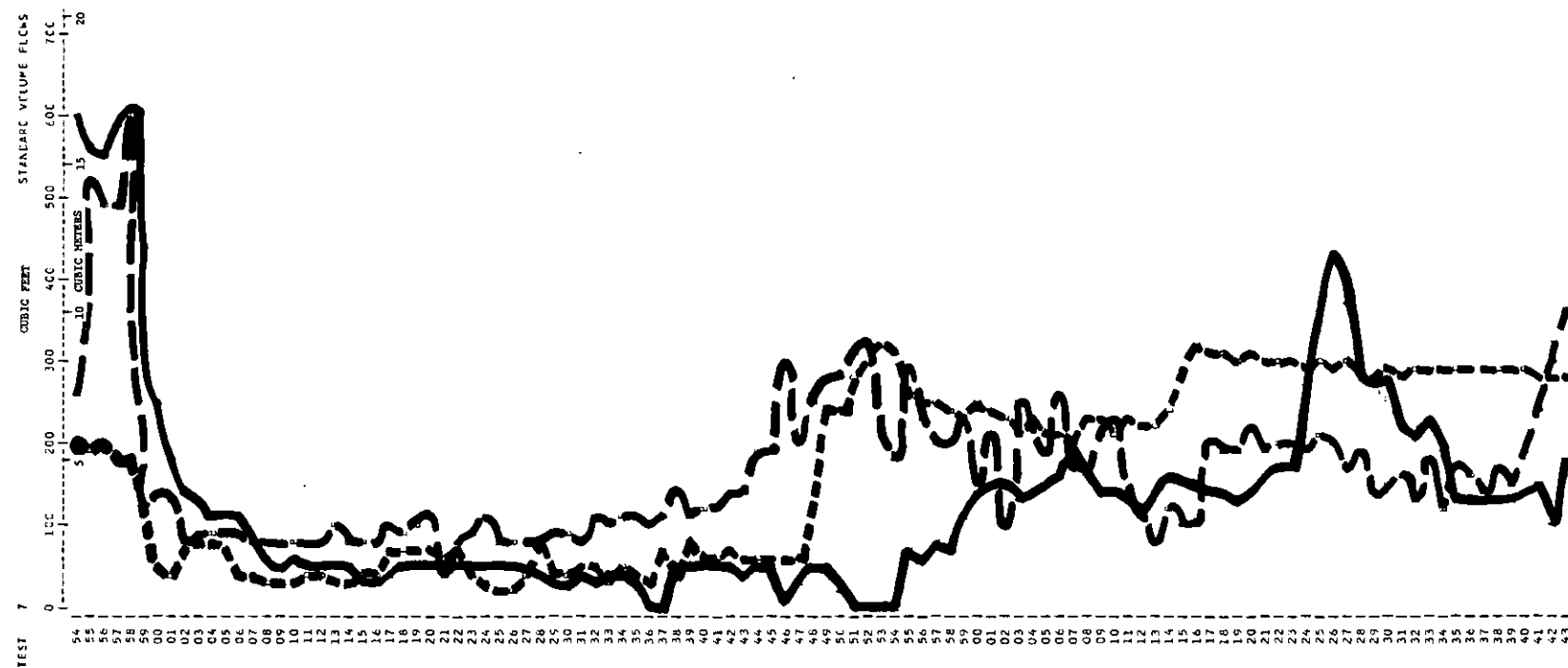
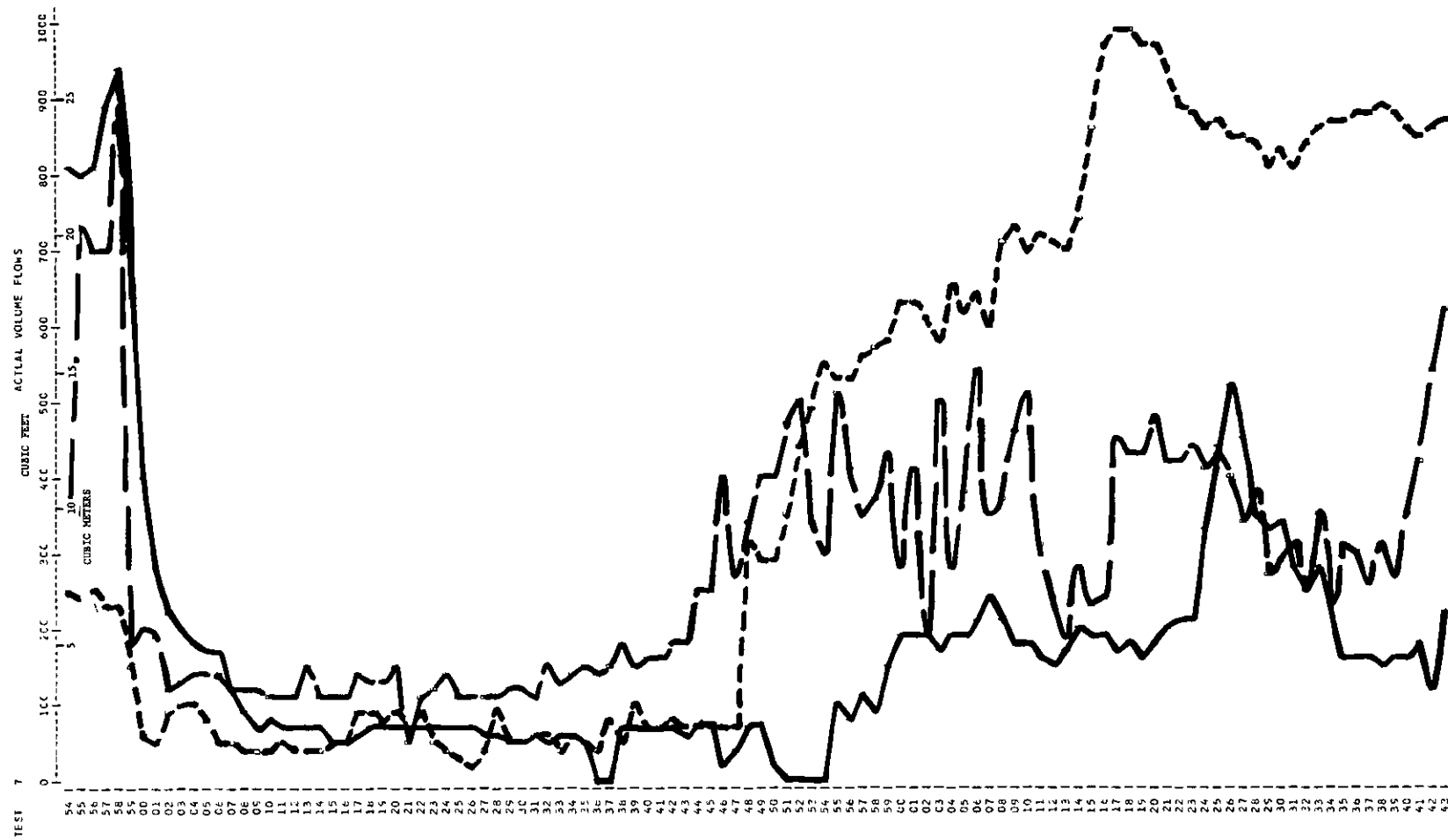
KEY, TEST 5	
LOCATION	SYMBOL
CENTER GUIDE	————
CENTER STACK	-----

FIGURE A-9



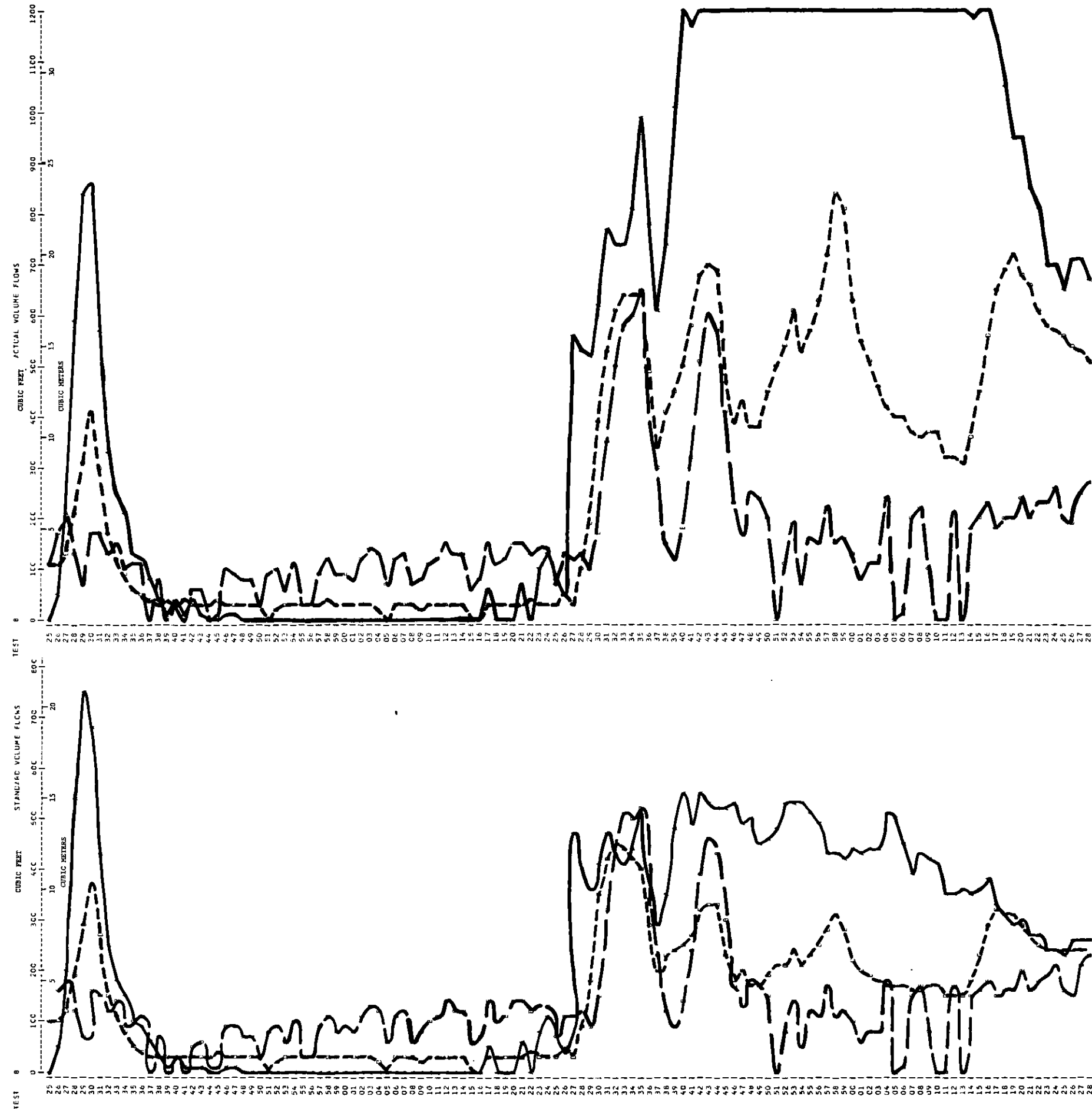
KEY, TEST 6	
LOCATION	SYMBOL
COKE GUIDE	—————
COKE STACK	- - - - -

FIGURE A-10



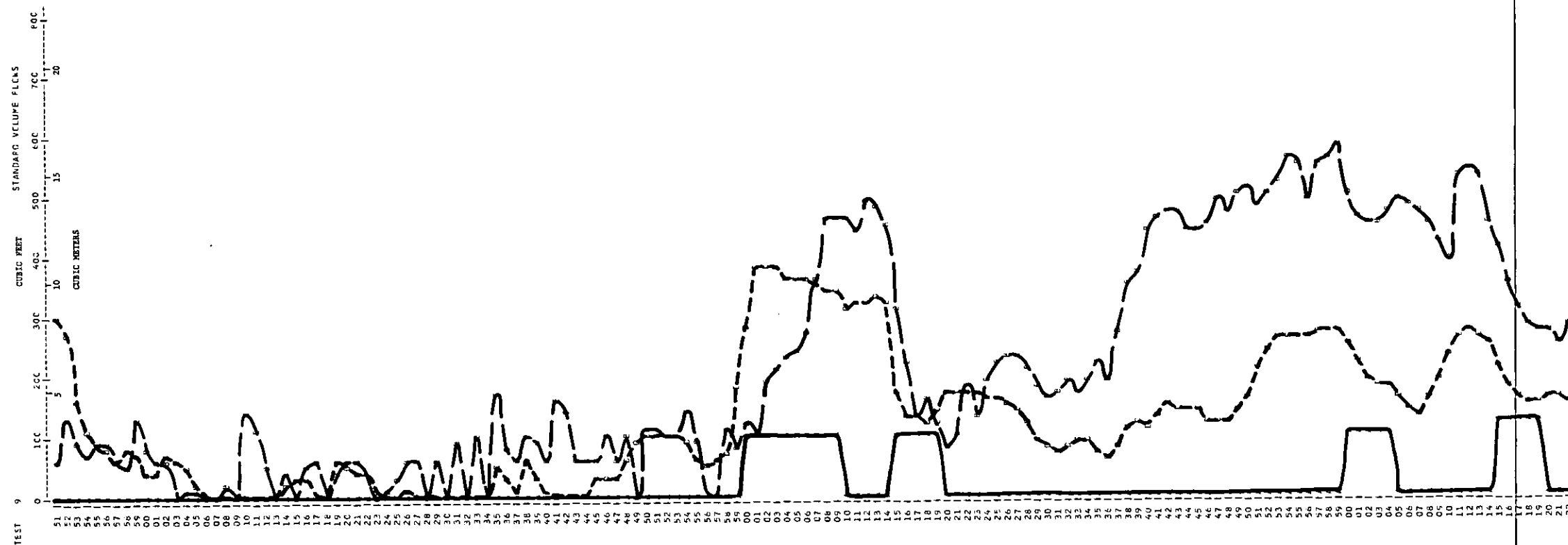
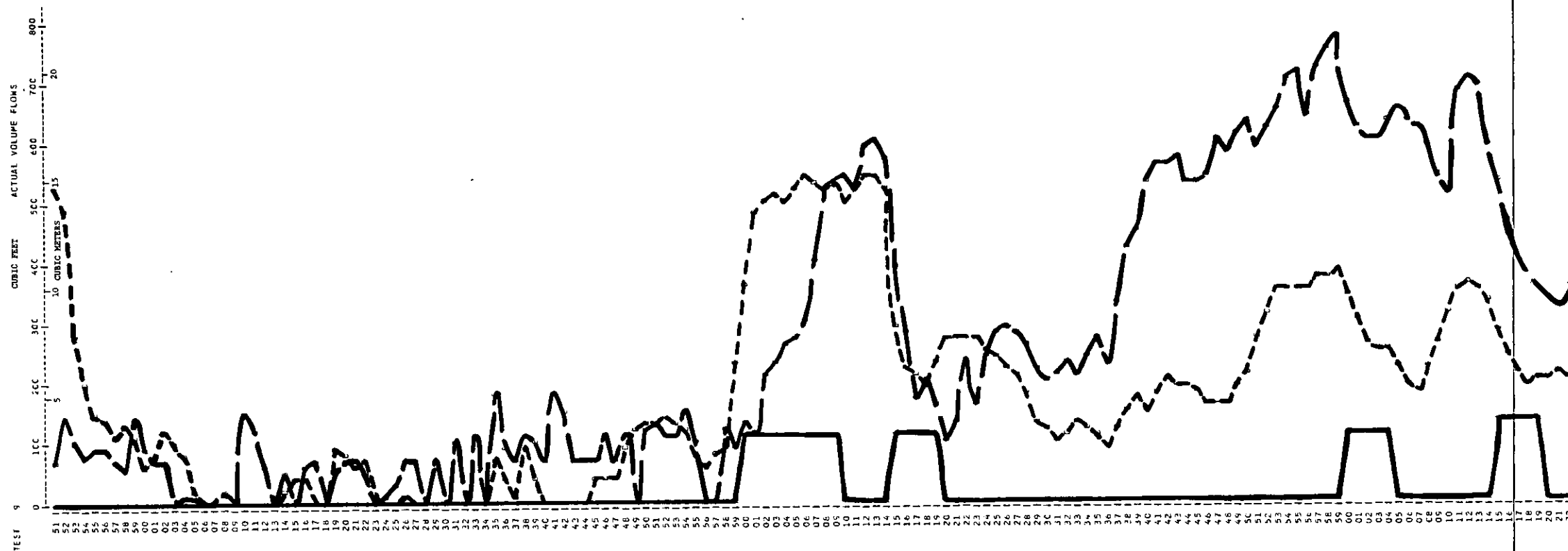
KEY, TEST 7	
LOCATION	SYMBOL
PUSHER STACK	—————
CENTER STACK	- - - - -
COKE STACK	

FIGURE A-11



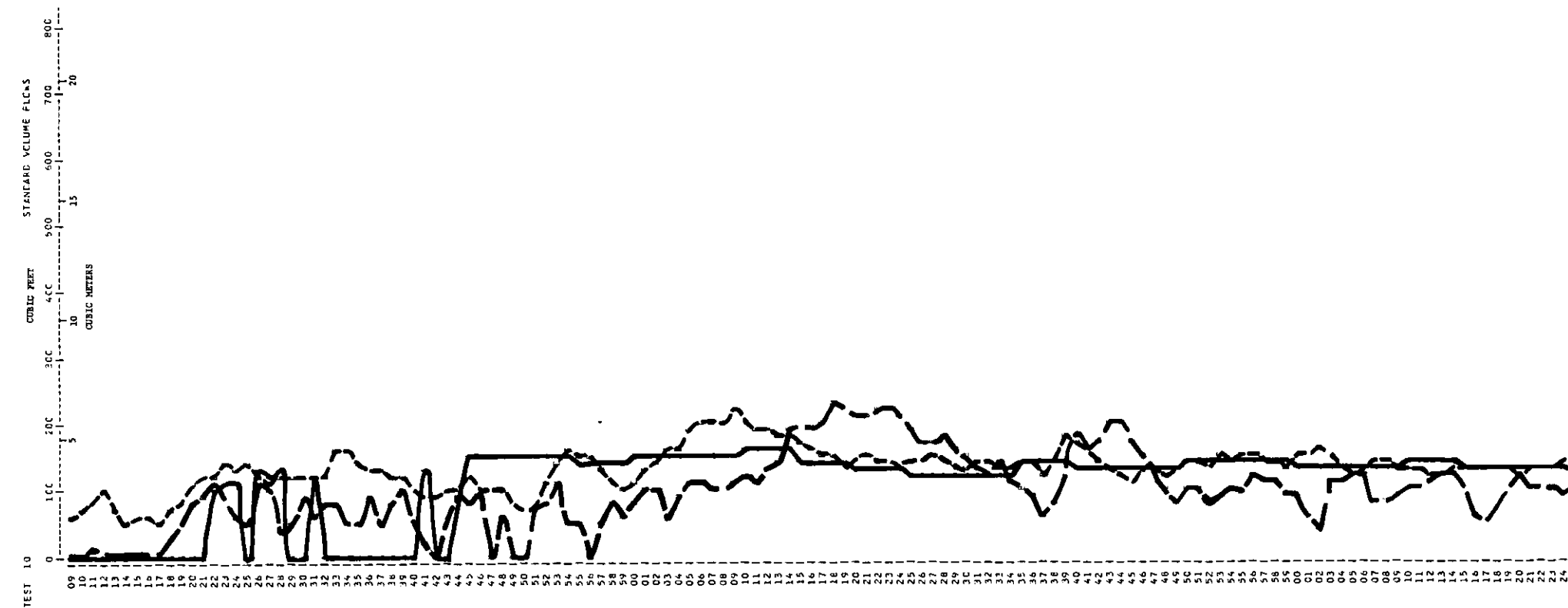
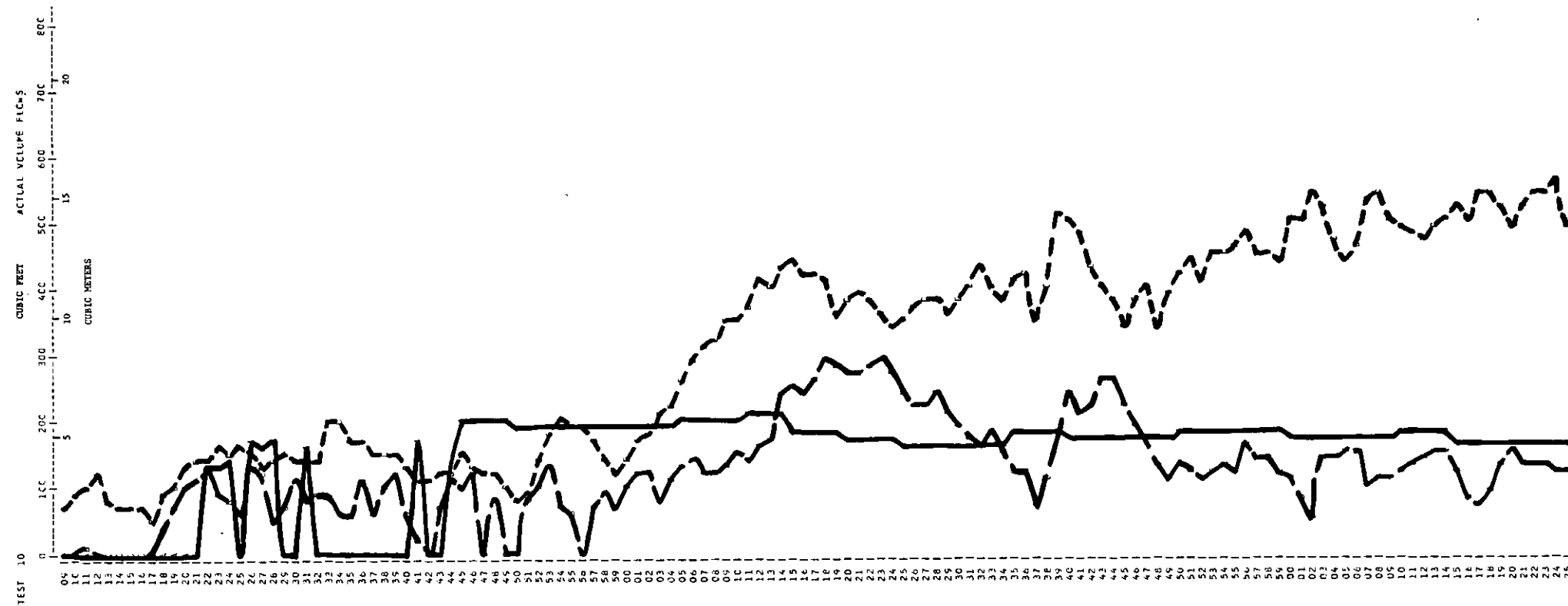
KEY, TEST 8	
LOCATION	SYMBOL
PUSHER STACK	————
CENTER STACK	- - - - -
COKE STACK	· · · · ·

FIGURE A-12



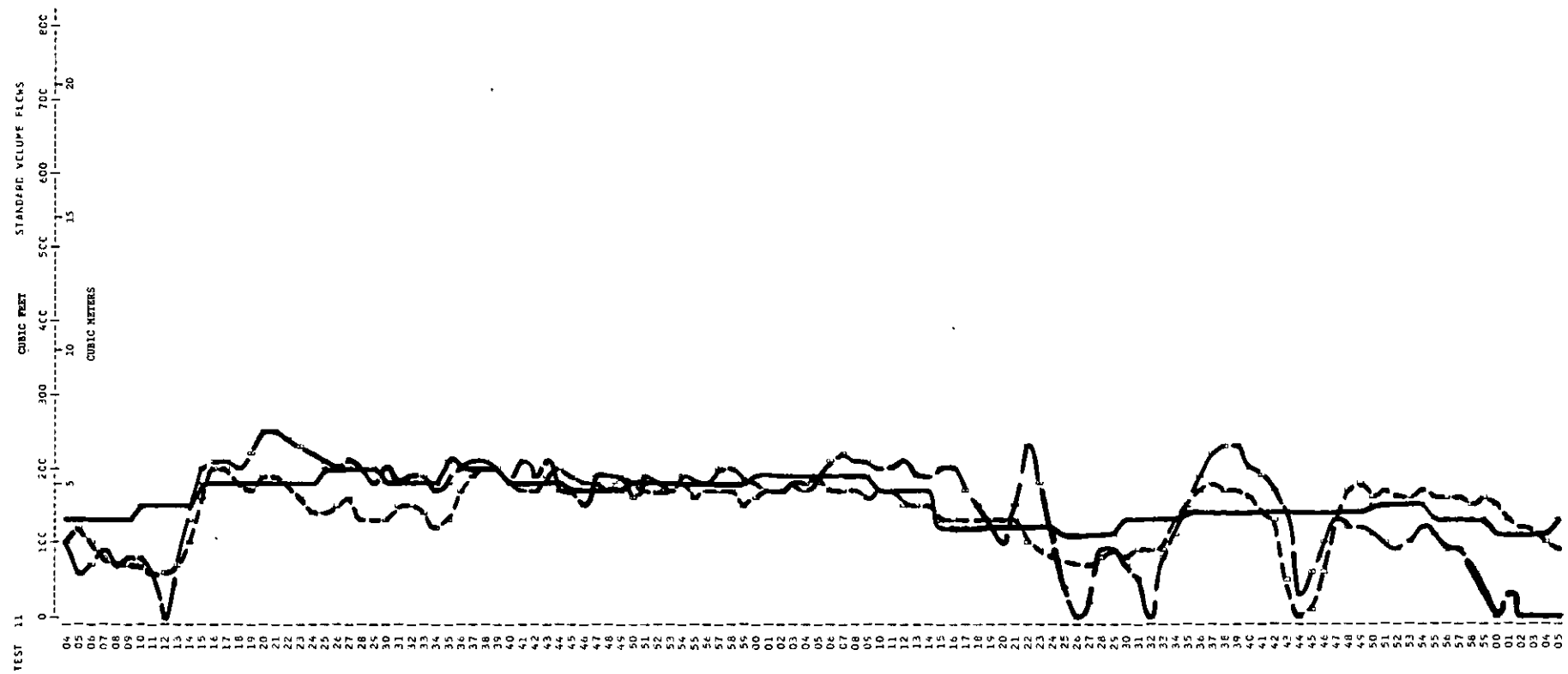
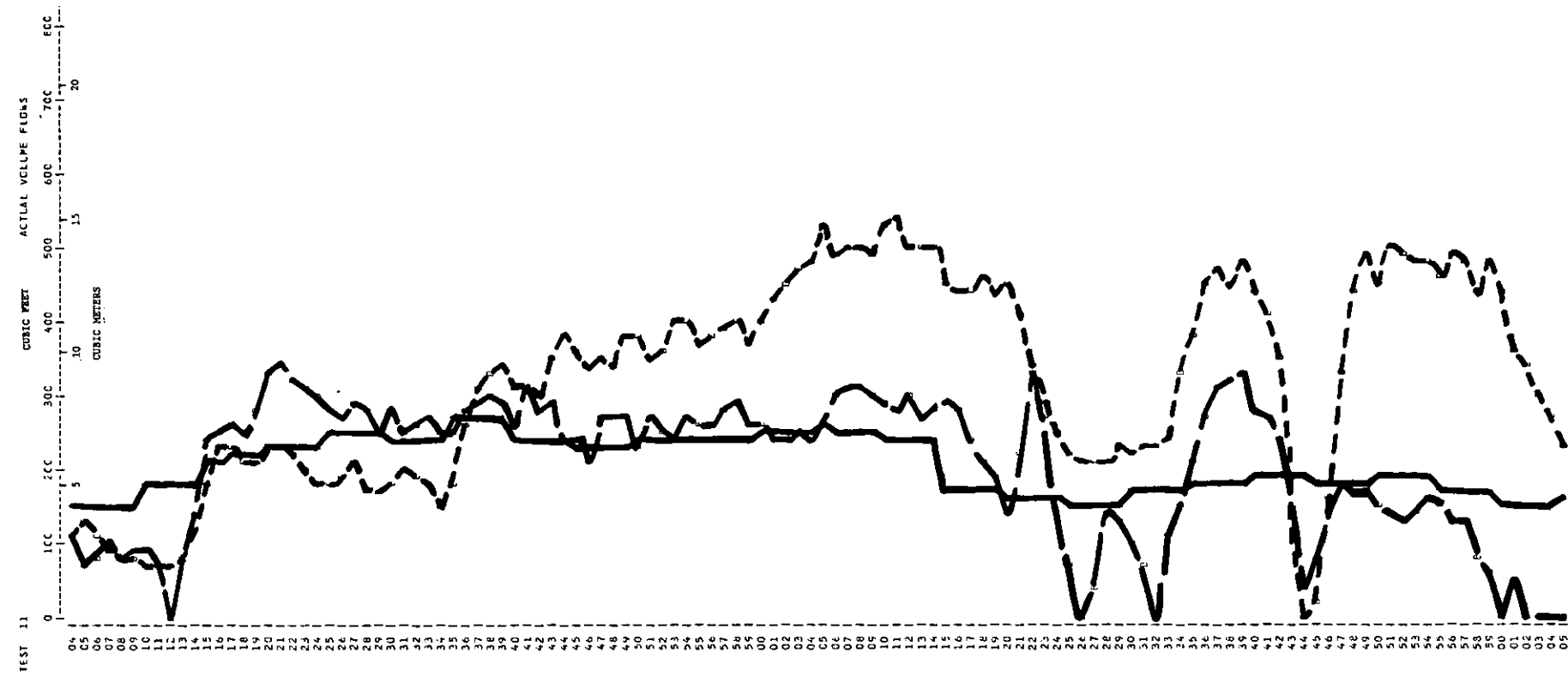
KEY, TEST 9	
LOCATION	SYMBOL
PUSHER STACK	—————
CENTER STACK	- - - - -
COKE STACK	

FIGURE A-13



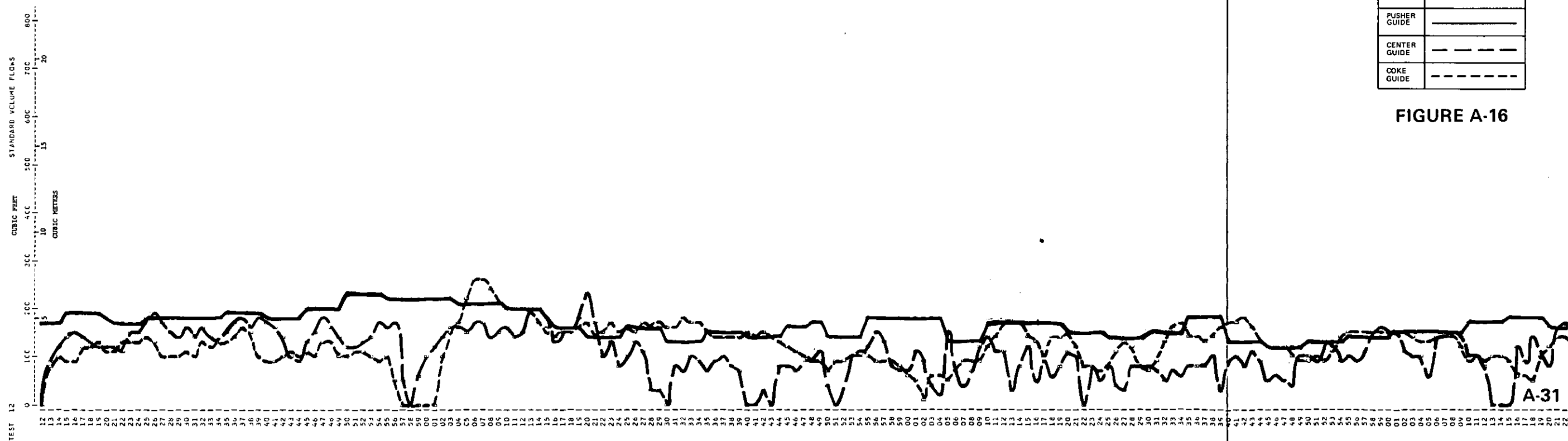
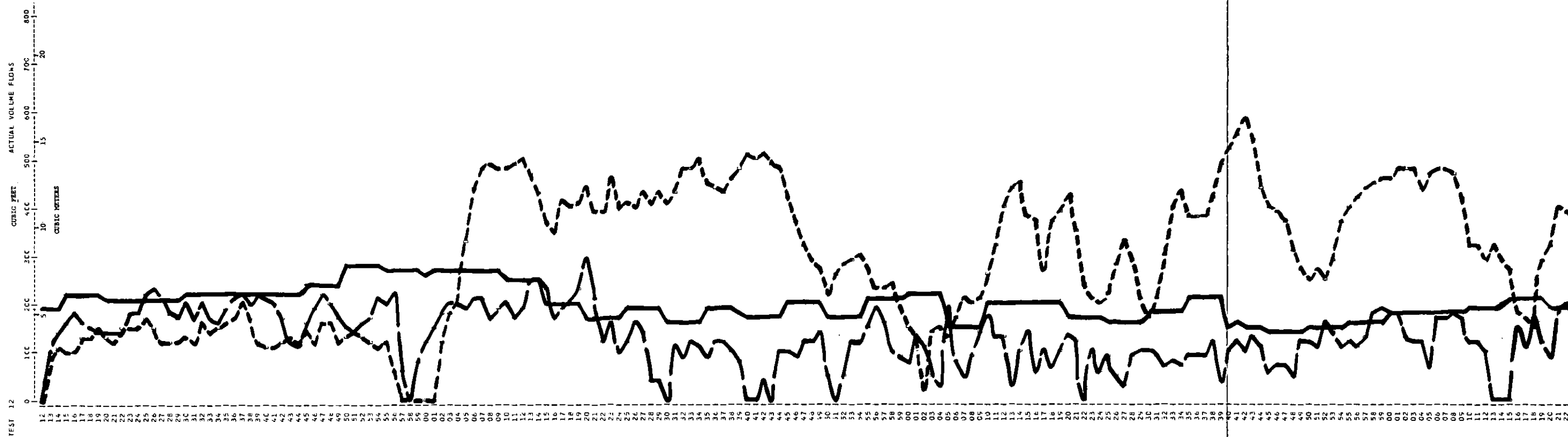
KEY, TEST 10	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	- . - . -

FIGURE A-14



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

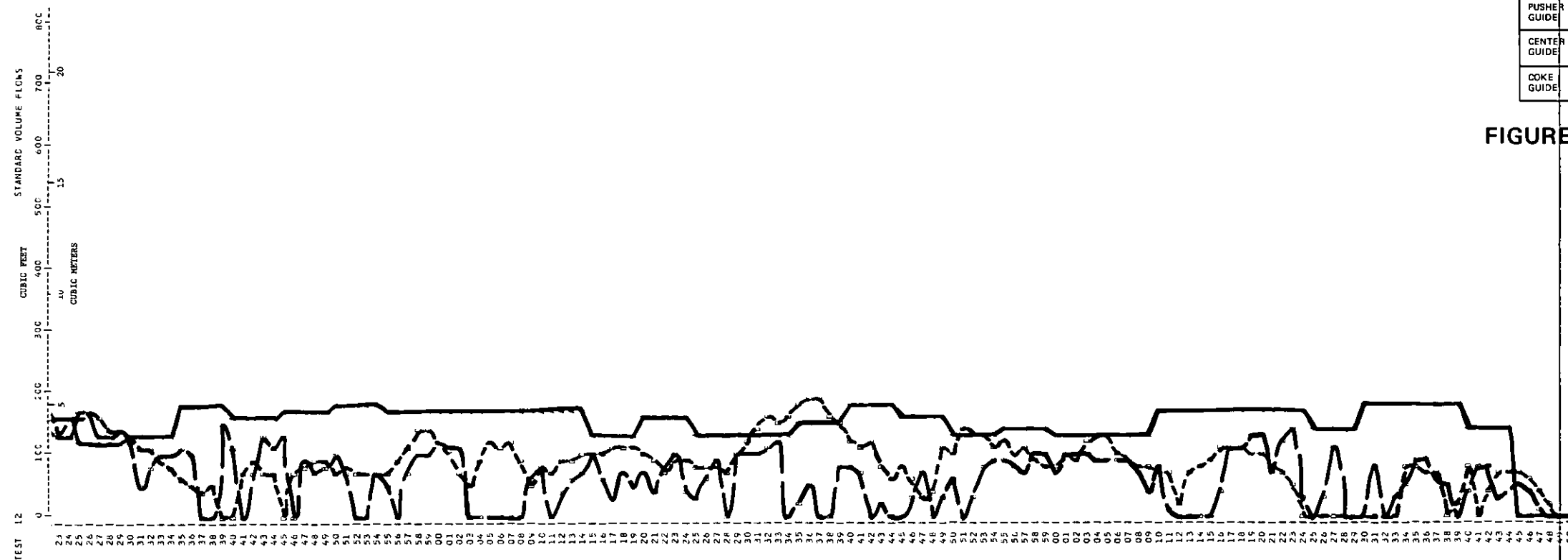
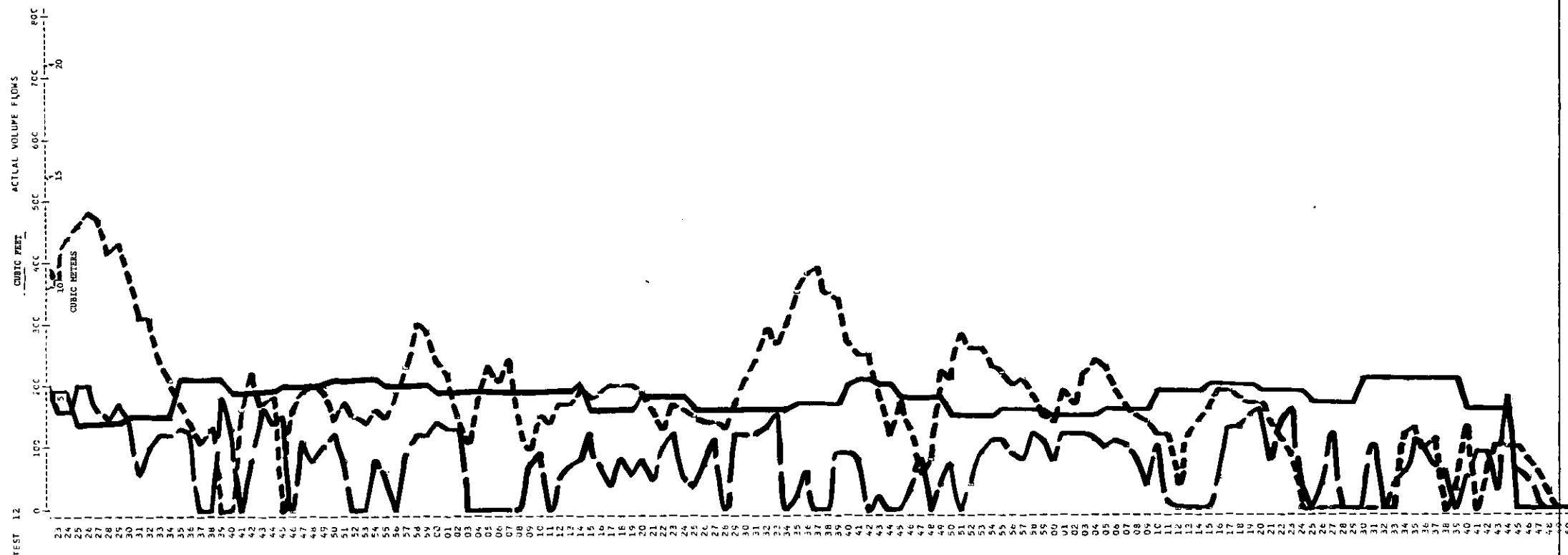
FIGURE A-15



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

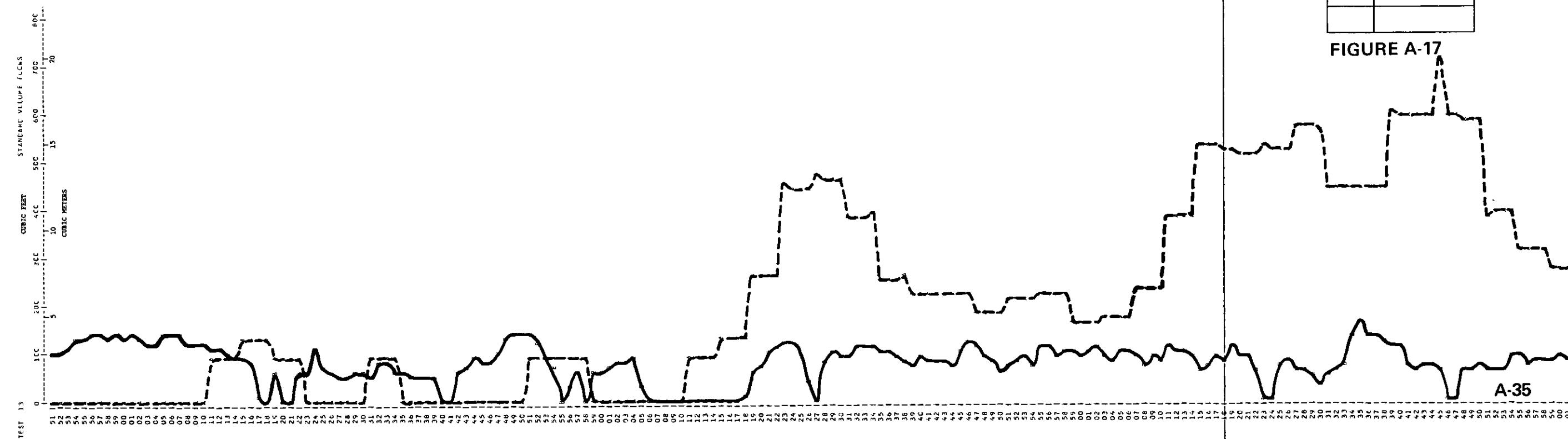
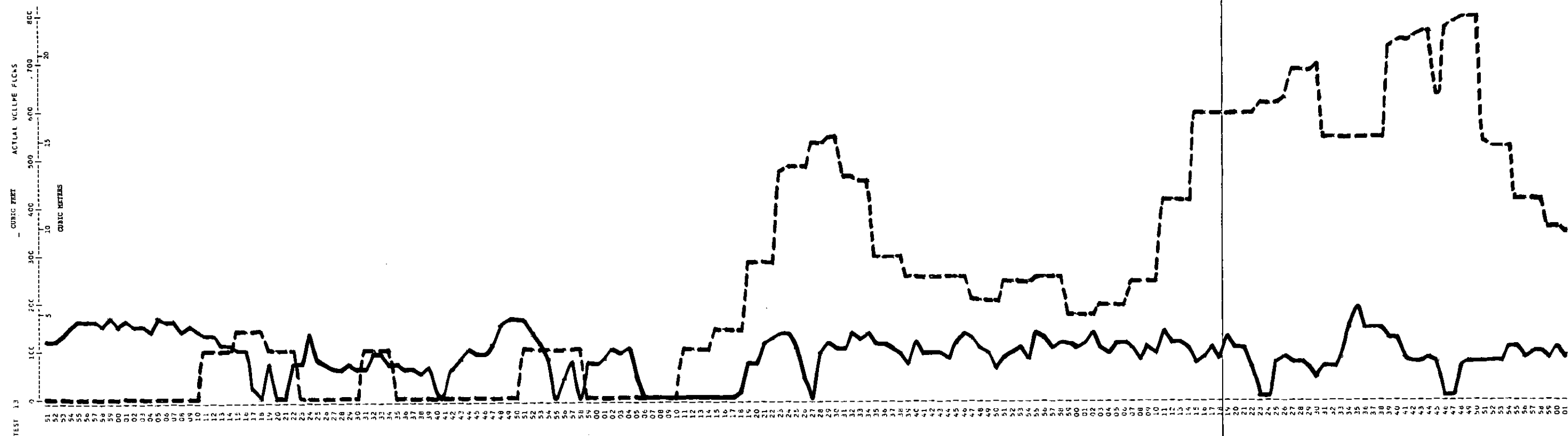
FIGURE A-16

A-31



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

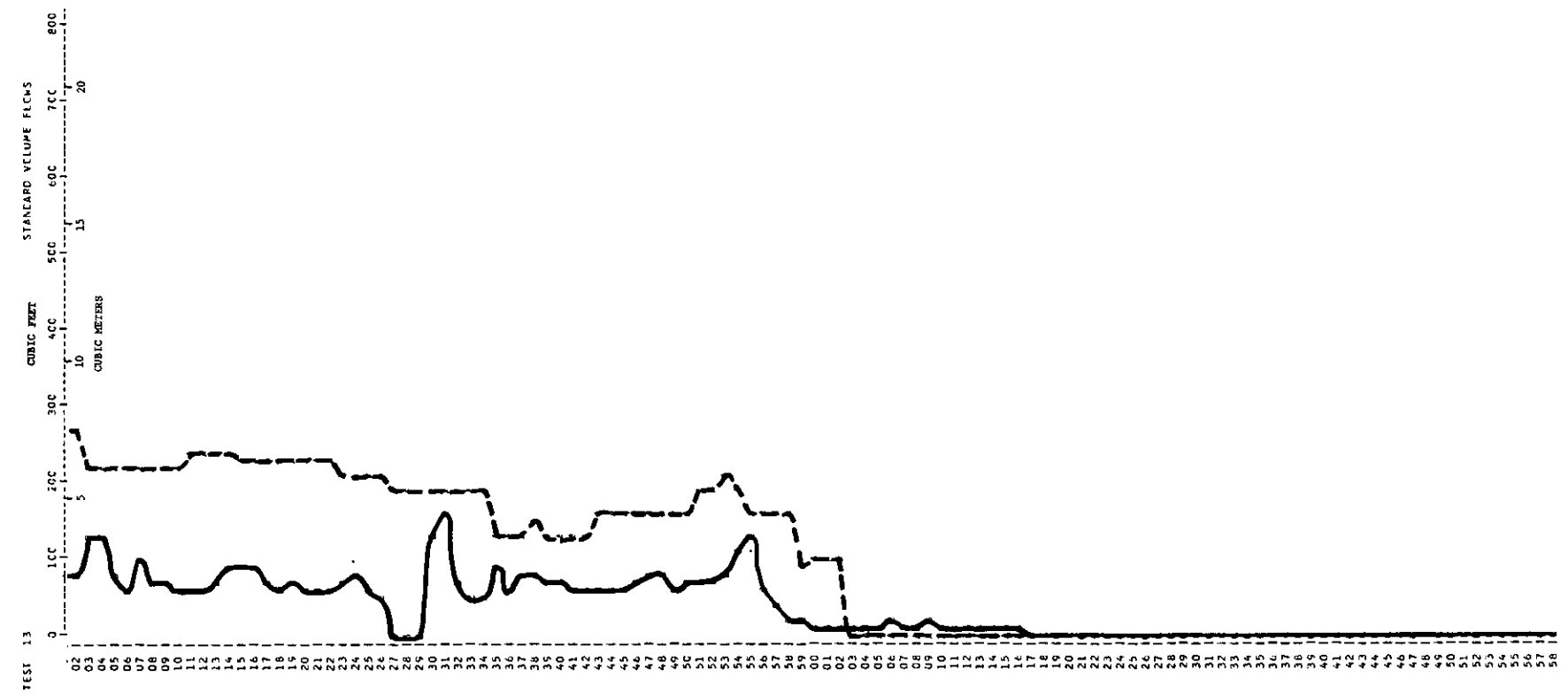
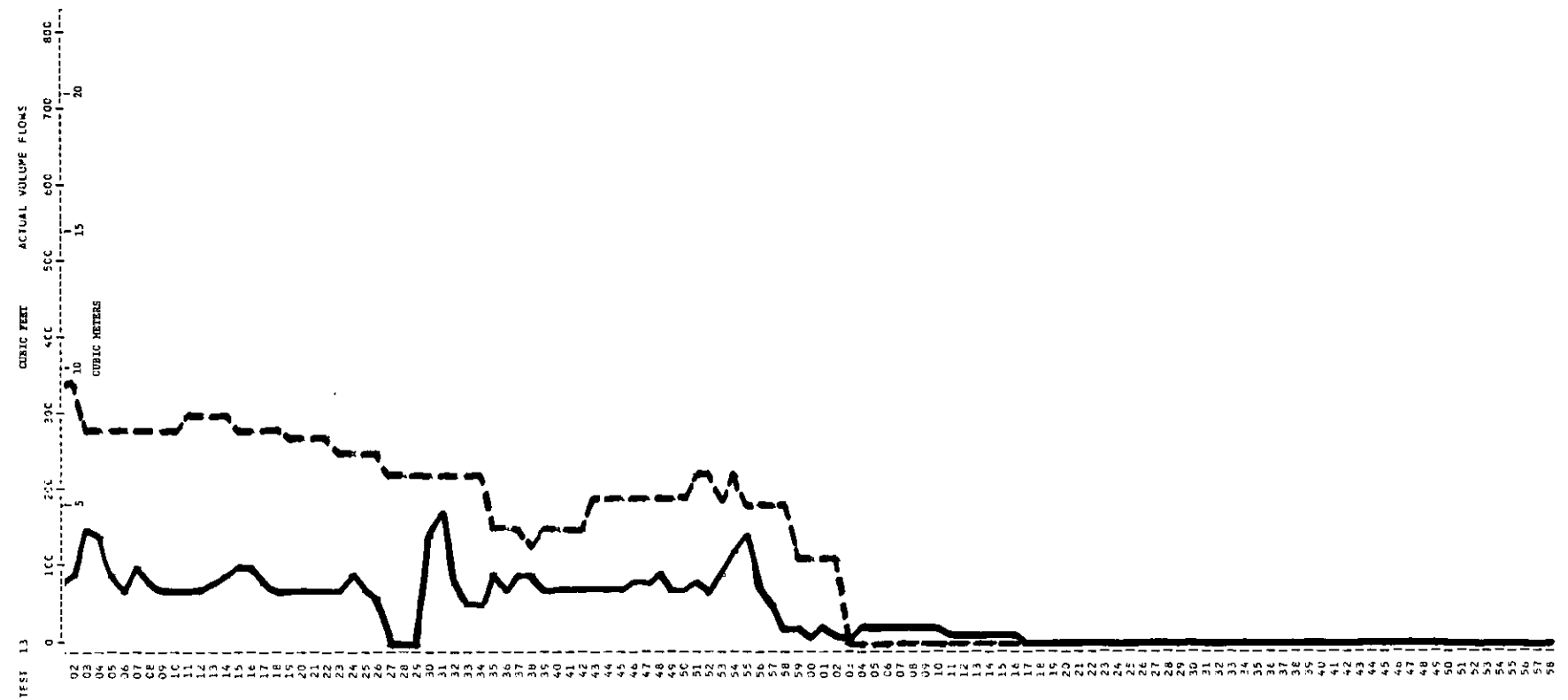
FIGURE A-16 (CONTINUED)



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

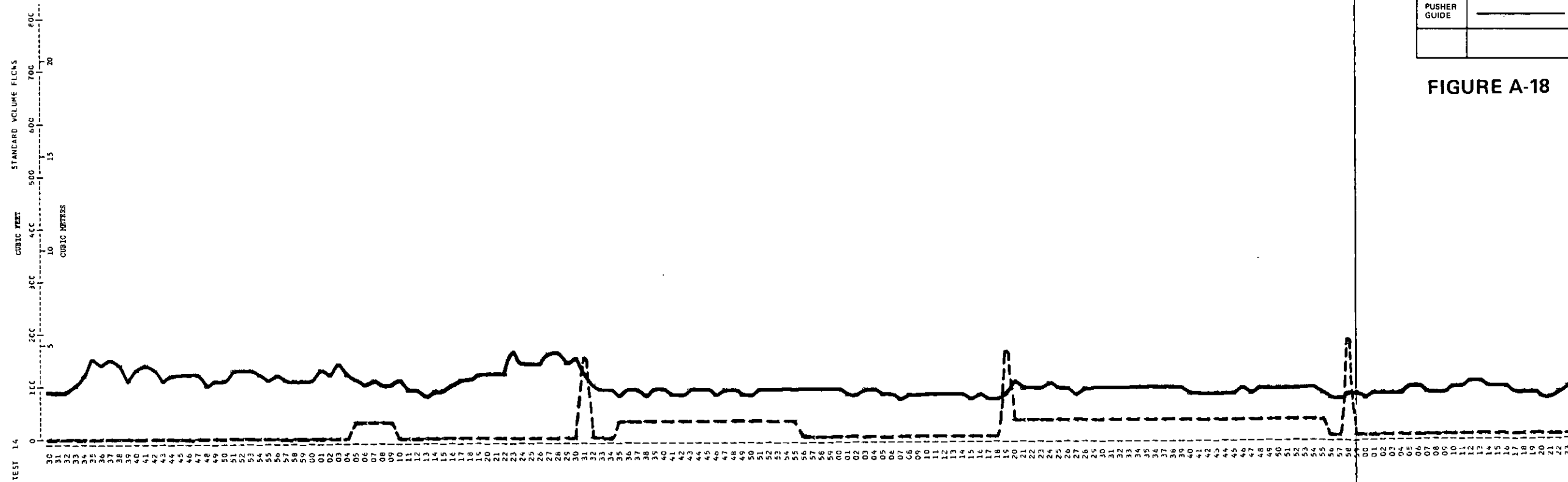
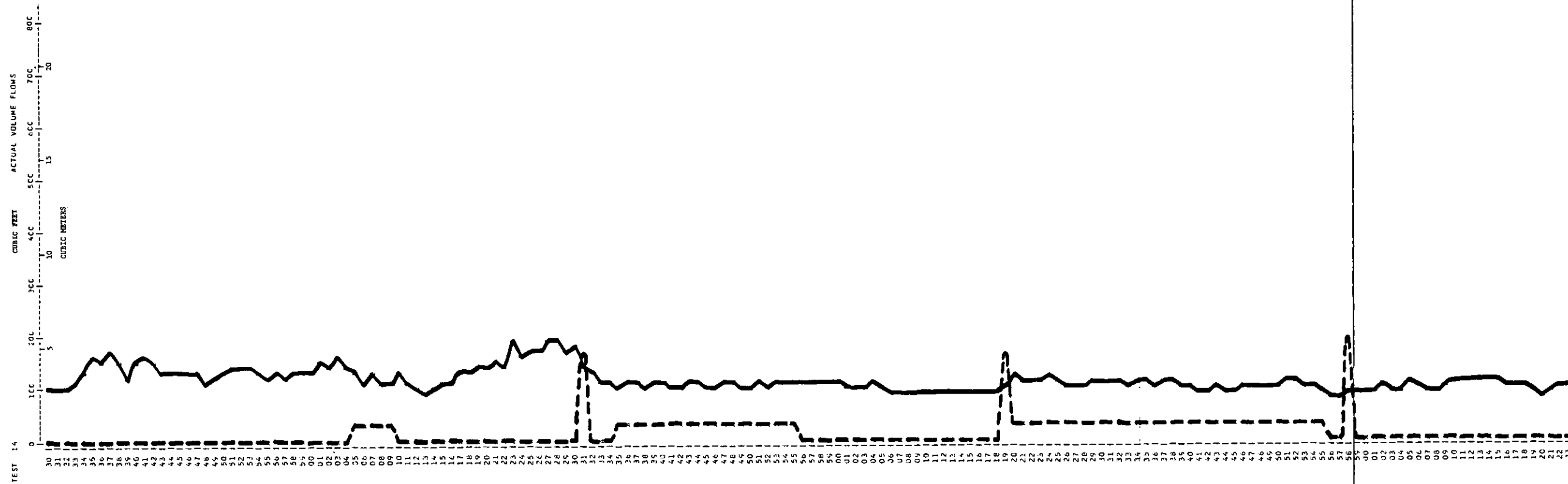
FIGURE A-17

A-35



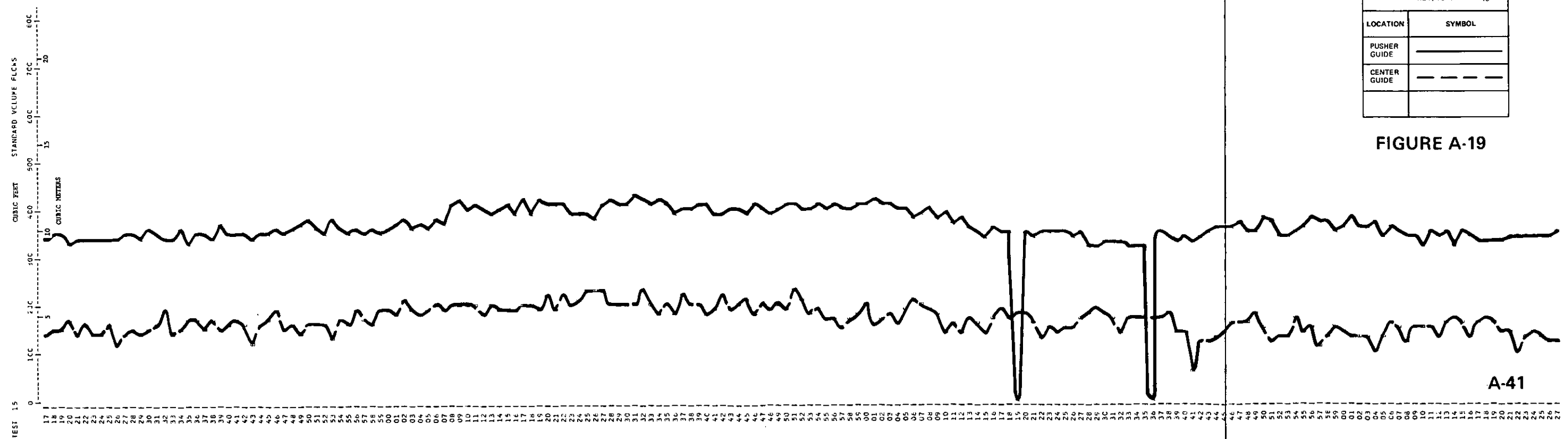
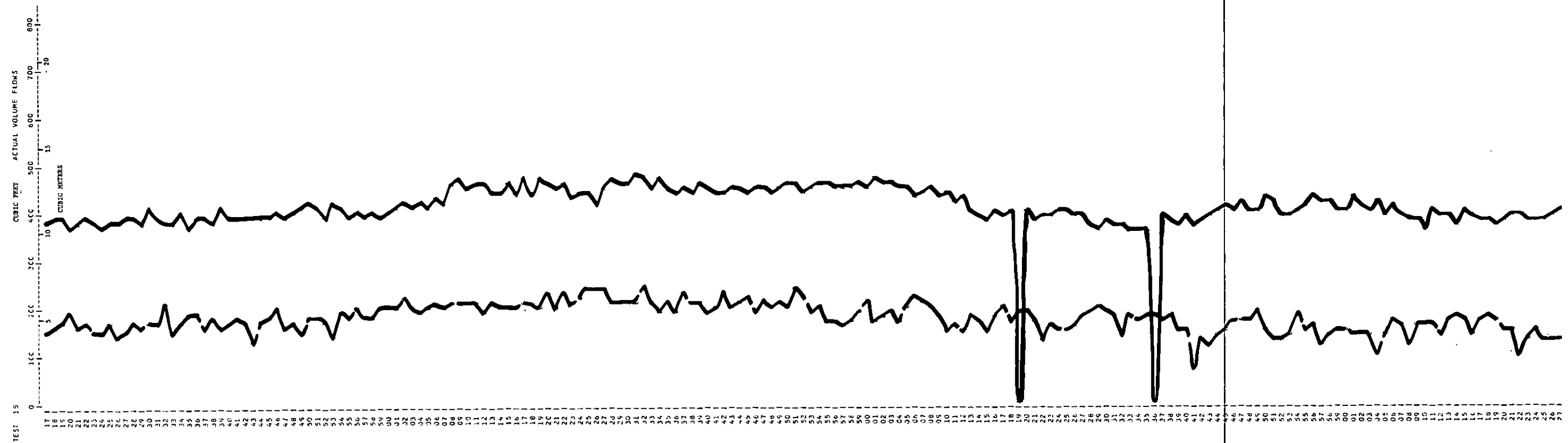
KEY, TEST 13	
LOCATION	SYMBOL
CENTER STACK	-----
CENTER GUIDE	—————

FIGURE A-17 (CONTINUED)



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

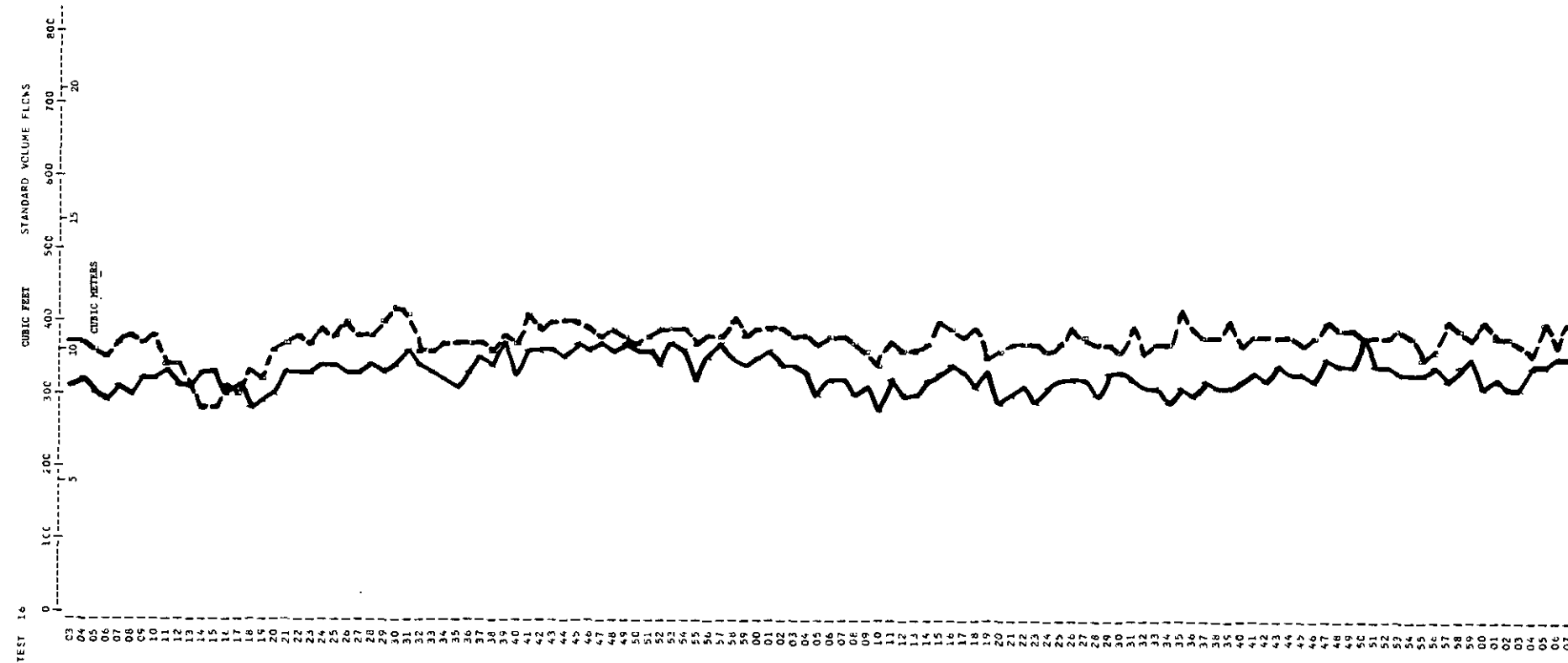
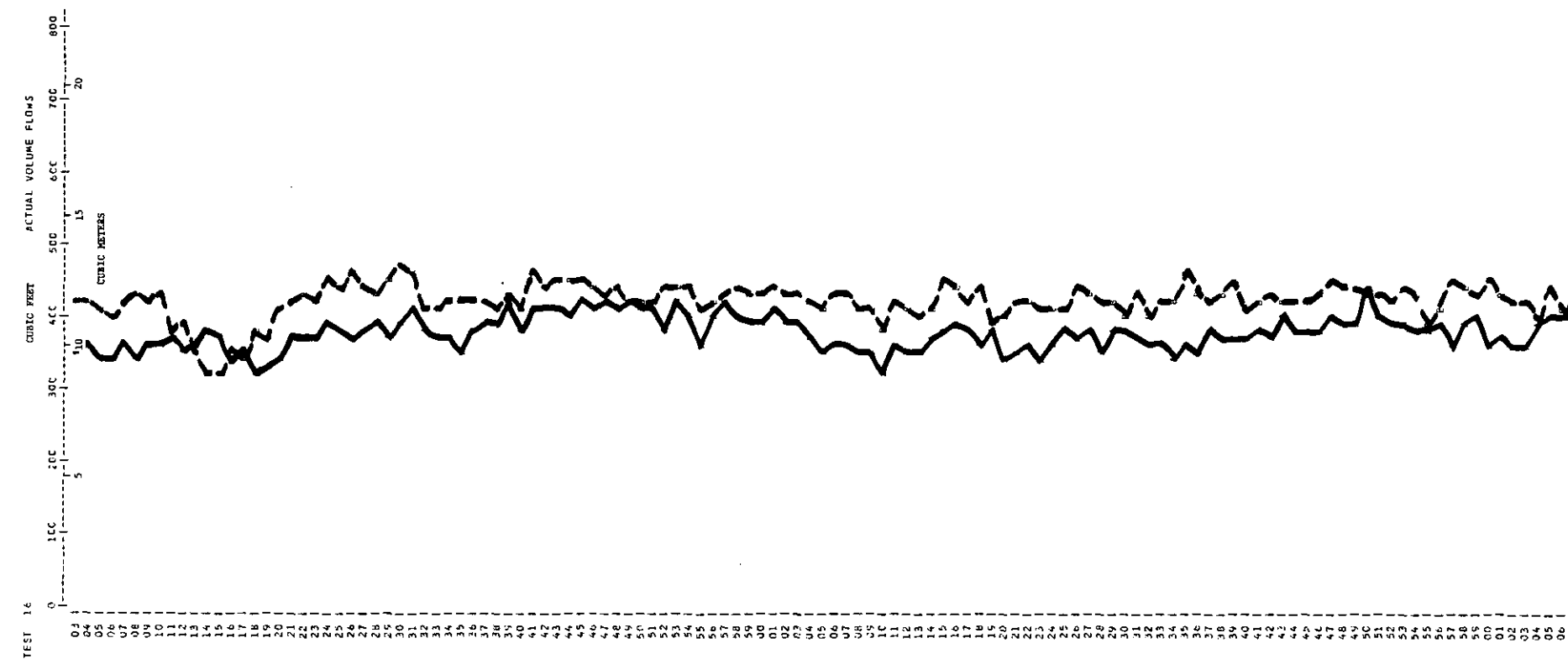
FIGURE A-18



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

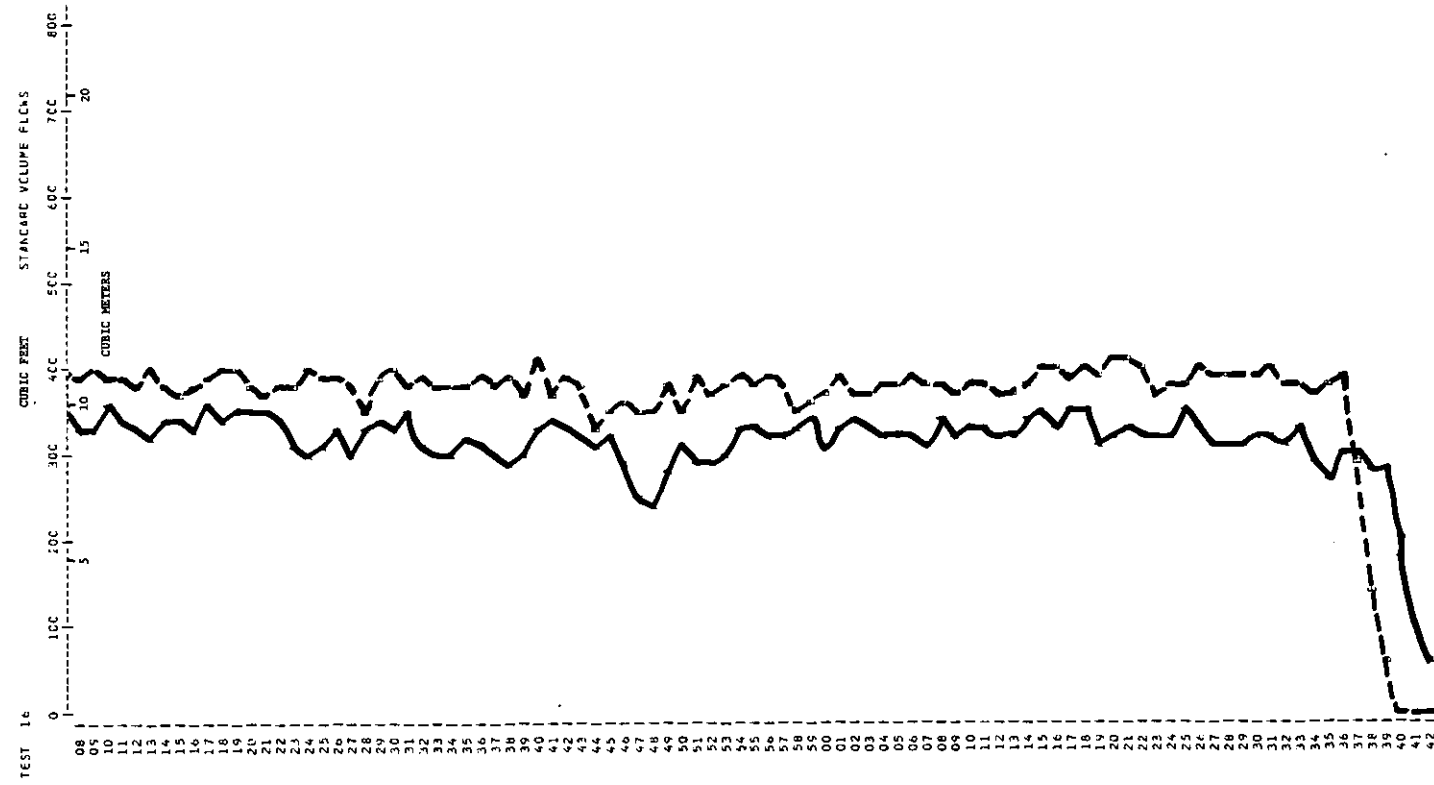
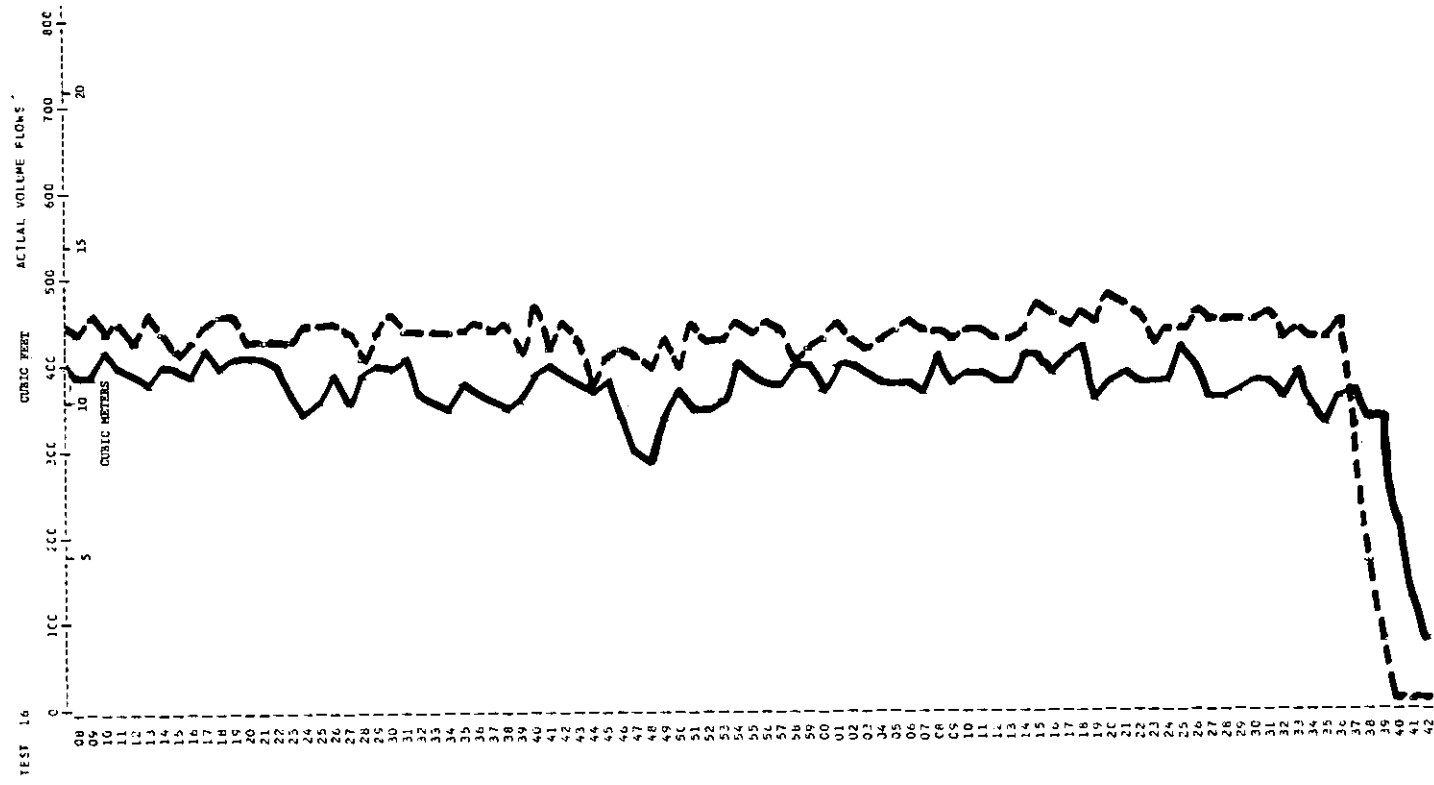
FIGURE A-19

A-41



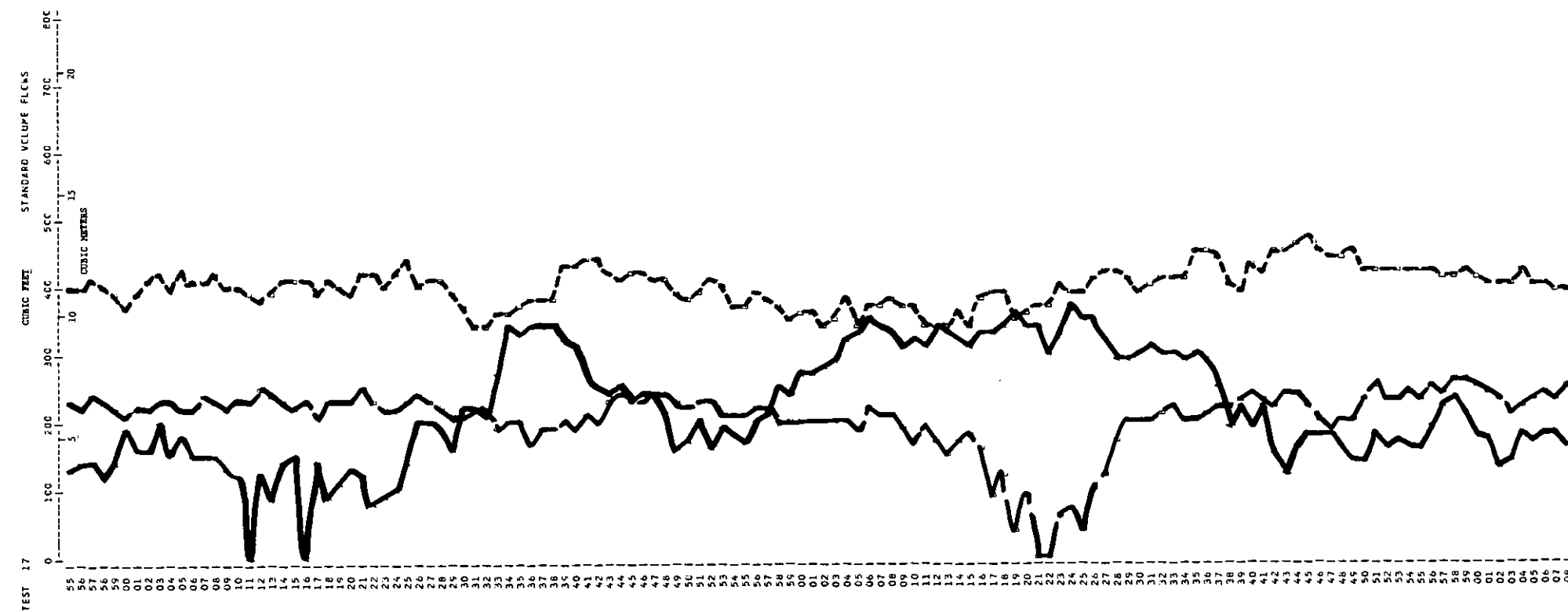
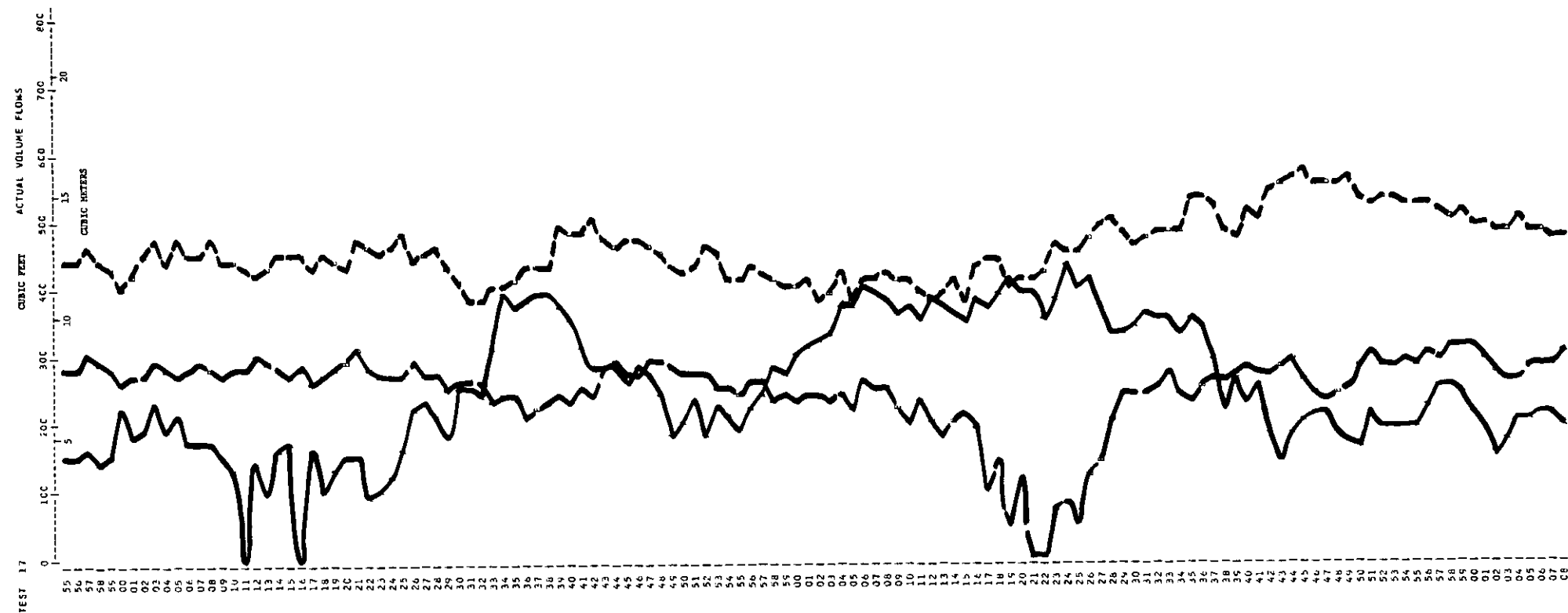
KEY, TEST 16	
LOCATION	SYMBOL
PUSHER GUIDE	—————
COKE GUIDE	- - - - -

FIGURE A-20



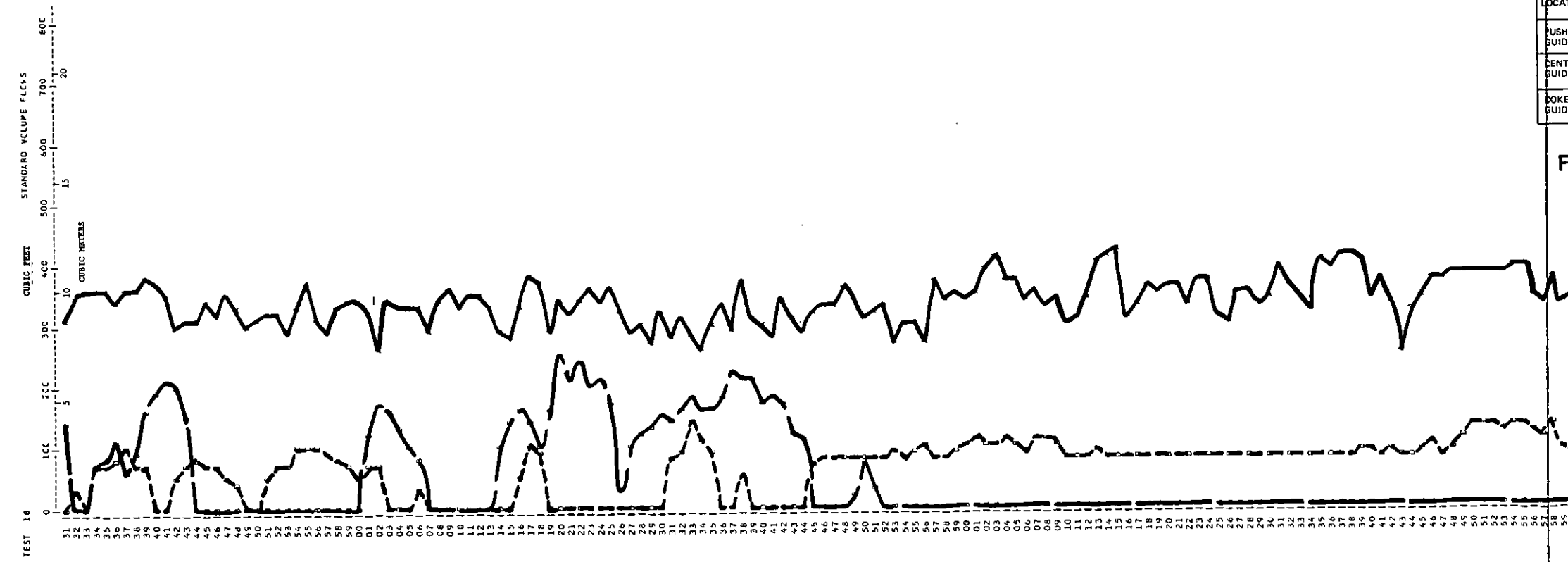
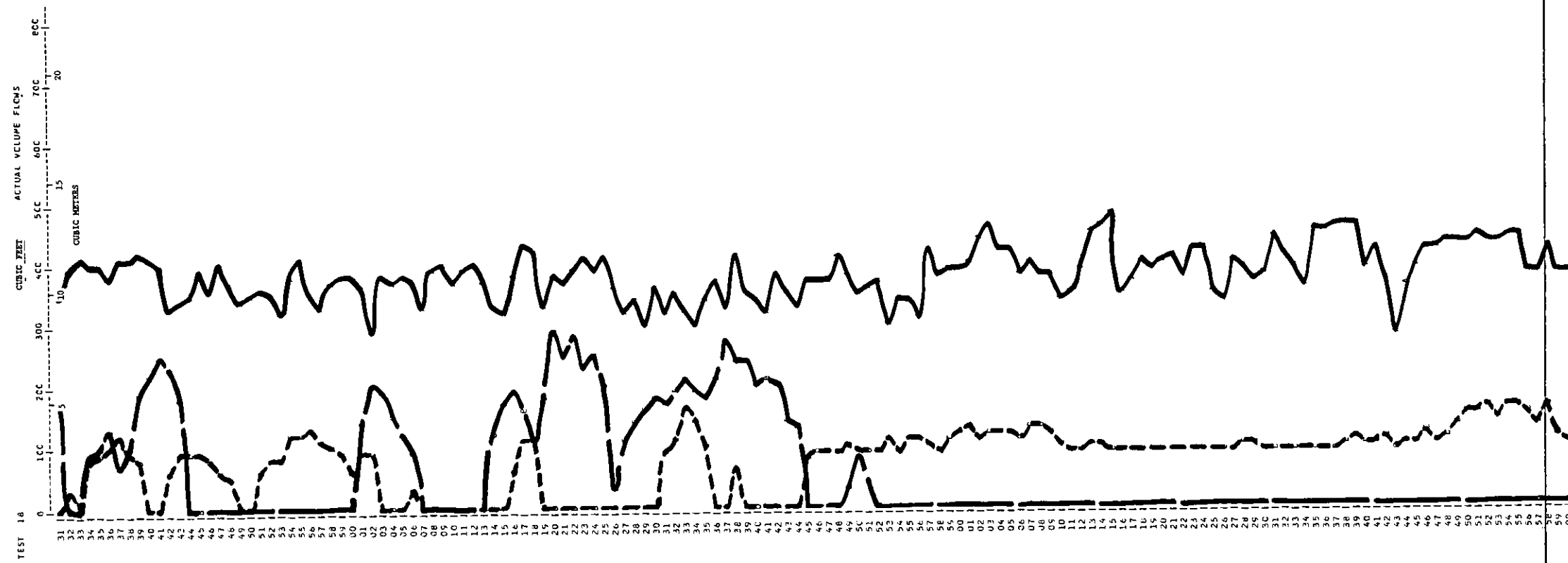
KEY, TEST 16	
LOCATION	SYMBOL
PUSHER GUIDE	————
COKE GUIDE	-----

FIGURE A-20 (CONTINUED)



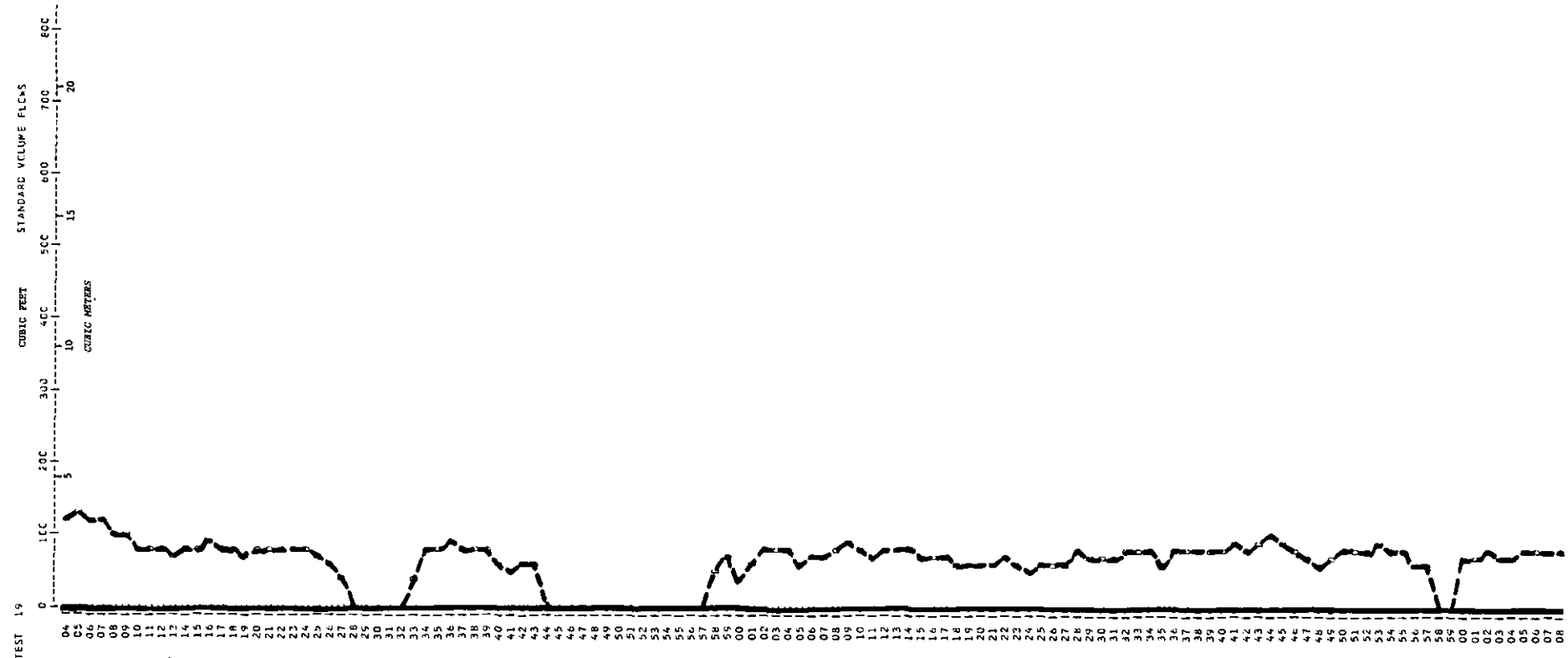
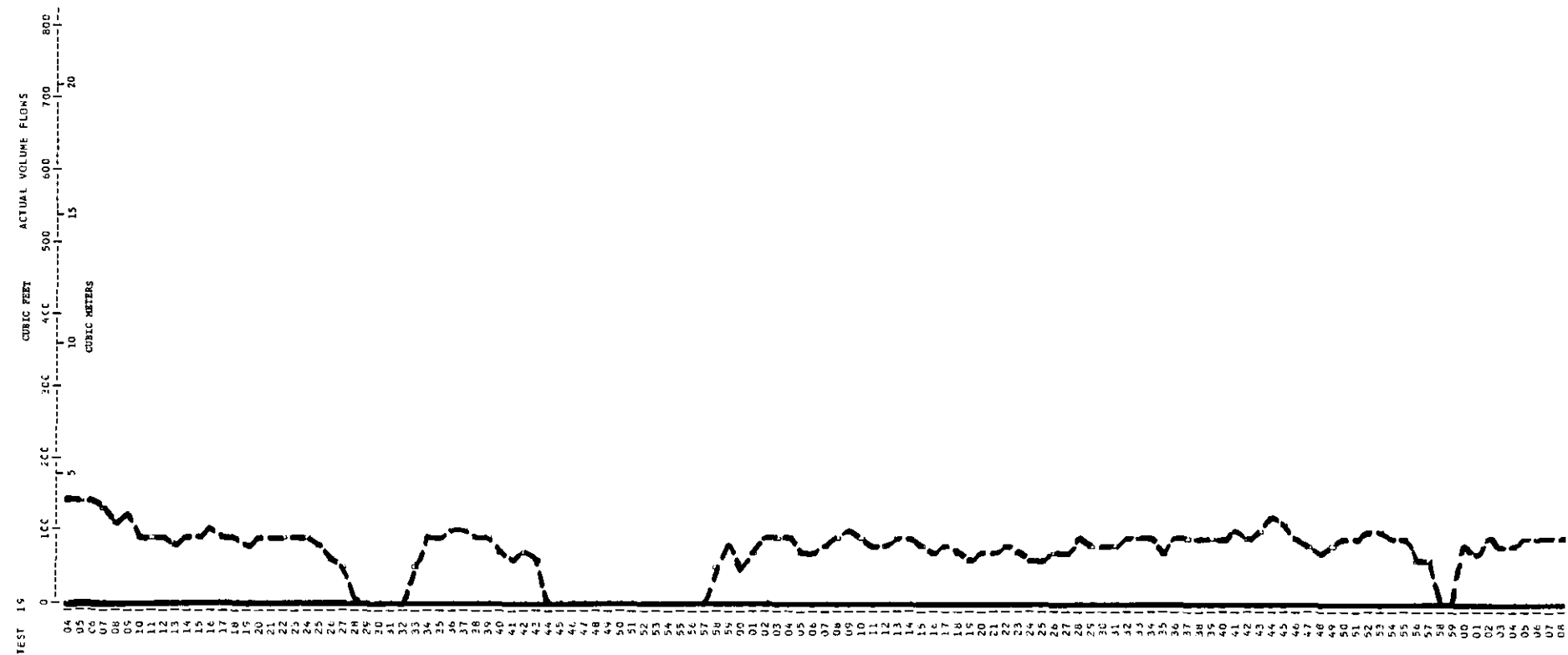
KEY, TEST 17	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	· · · · ·

FIGURE A-21



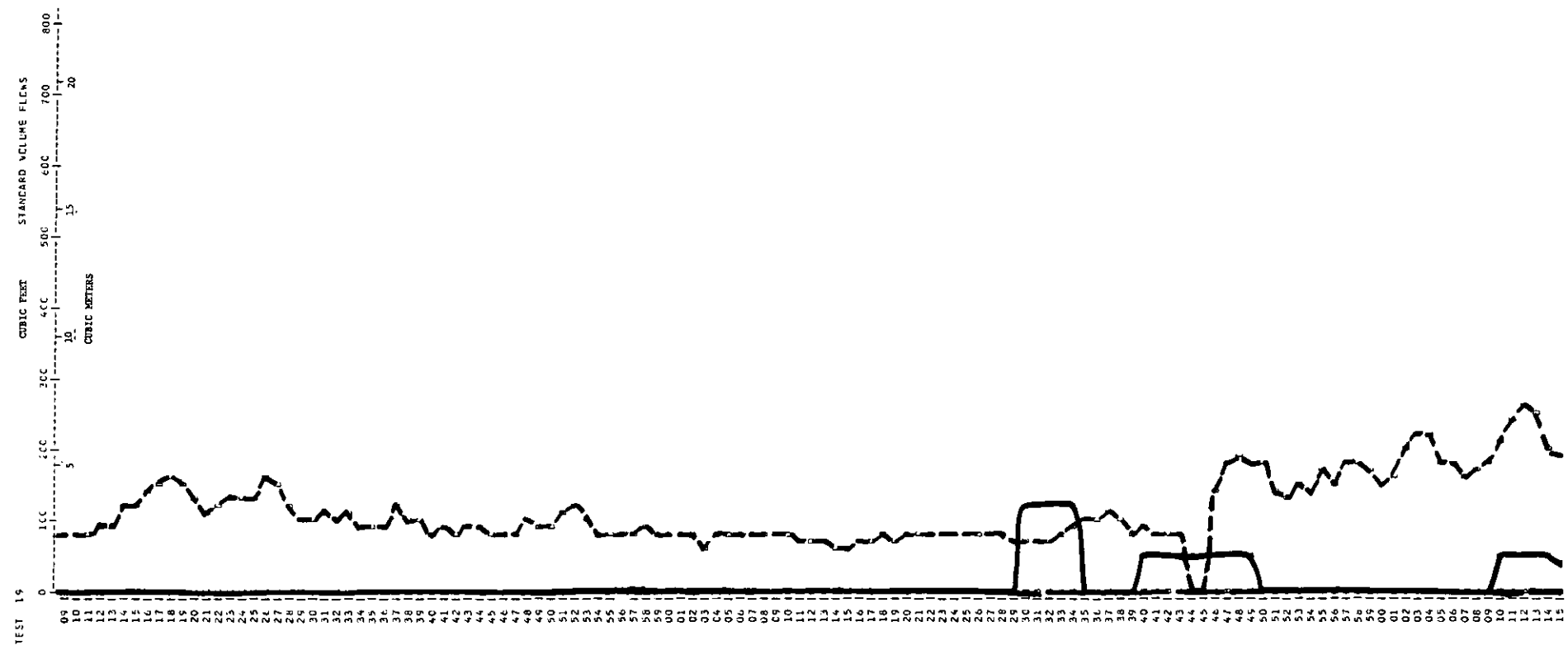
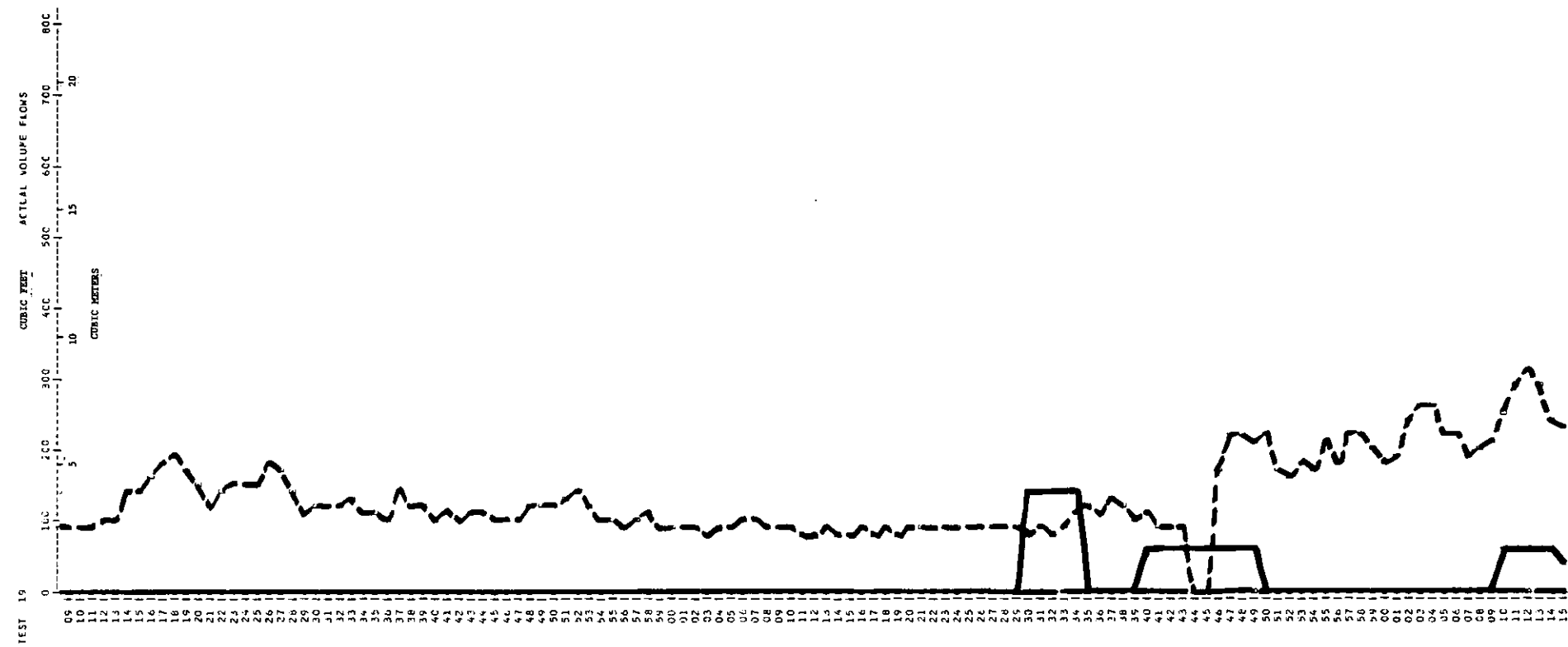
KEY, TEST 18	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	- . - . -

FIGURE A-22



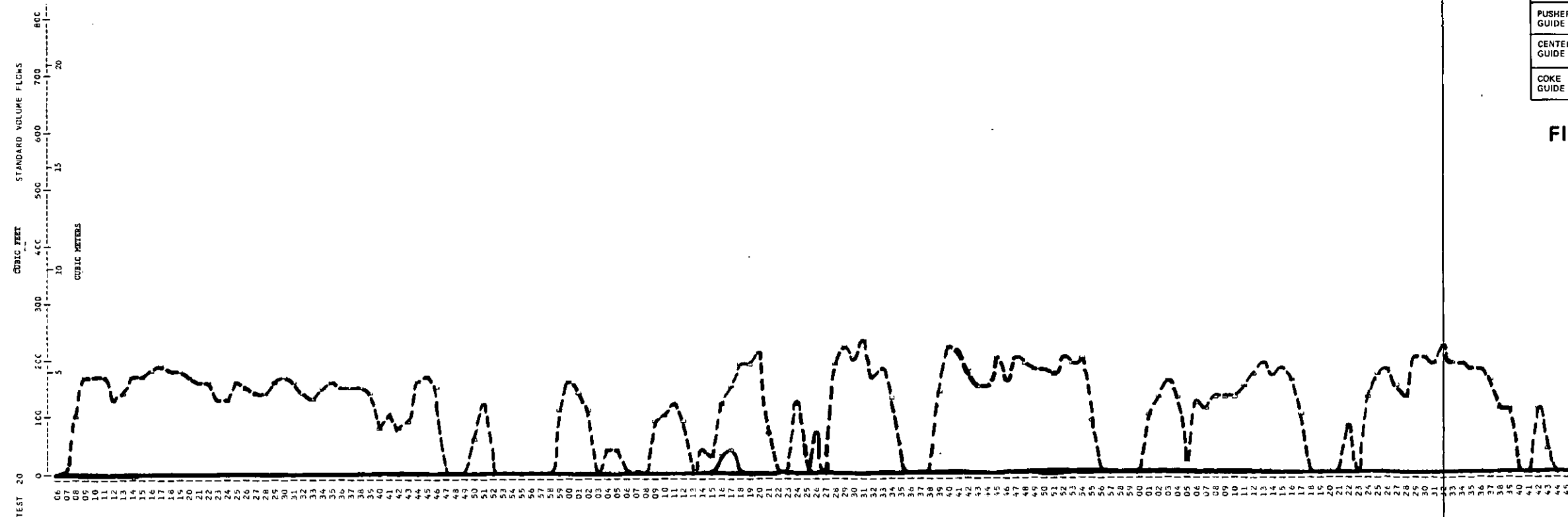
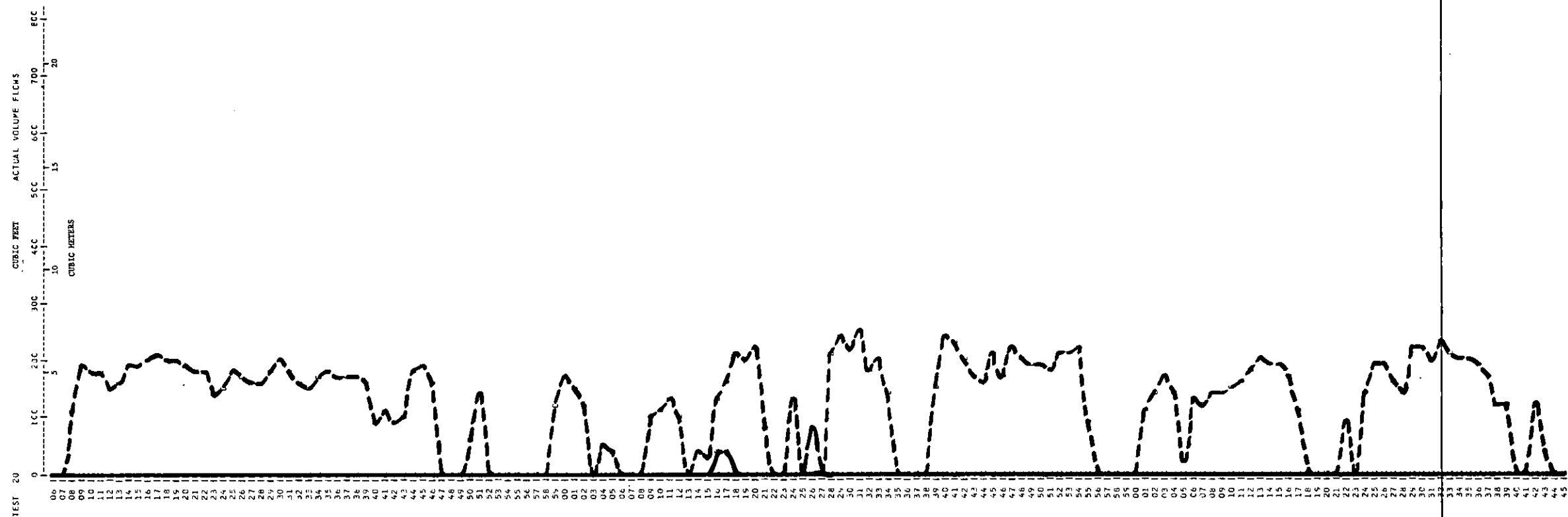
KEY, TEST 19	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	- - - - -

FIGURE A-23



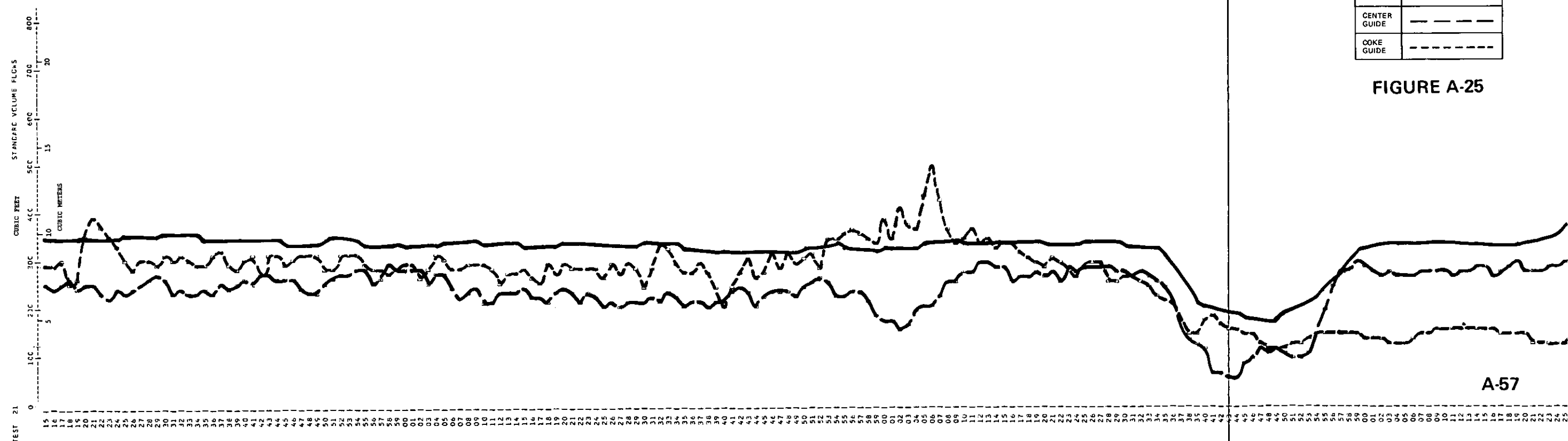
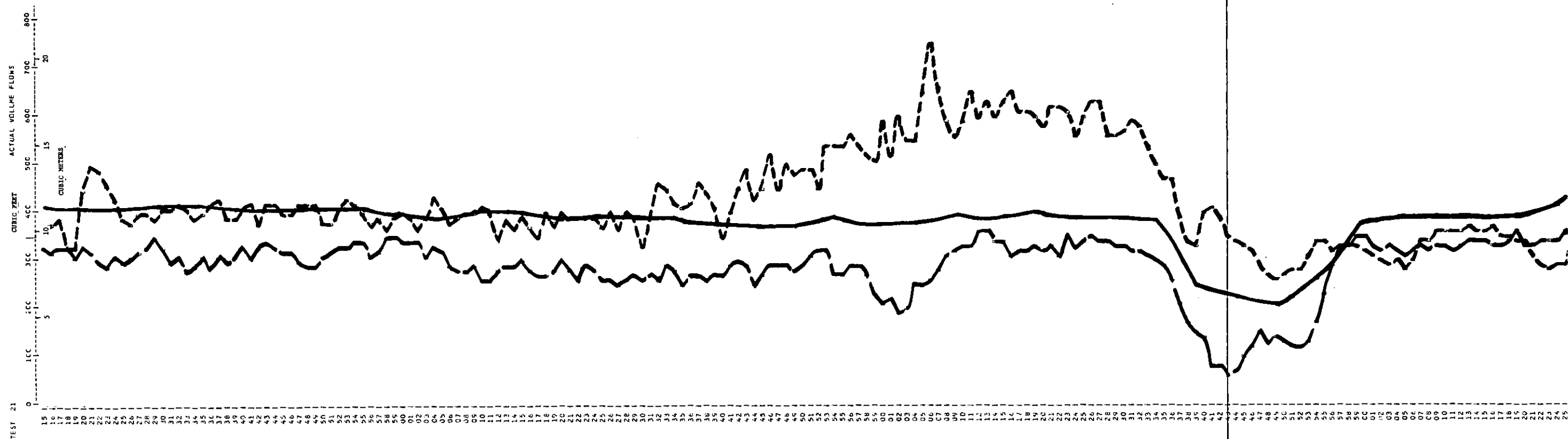
KEY, TEST 19	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	· · · · ·

FIGURE A-23 (CONTINUED)



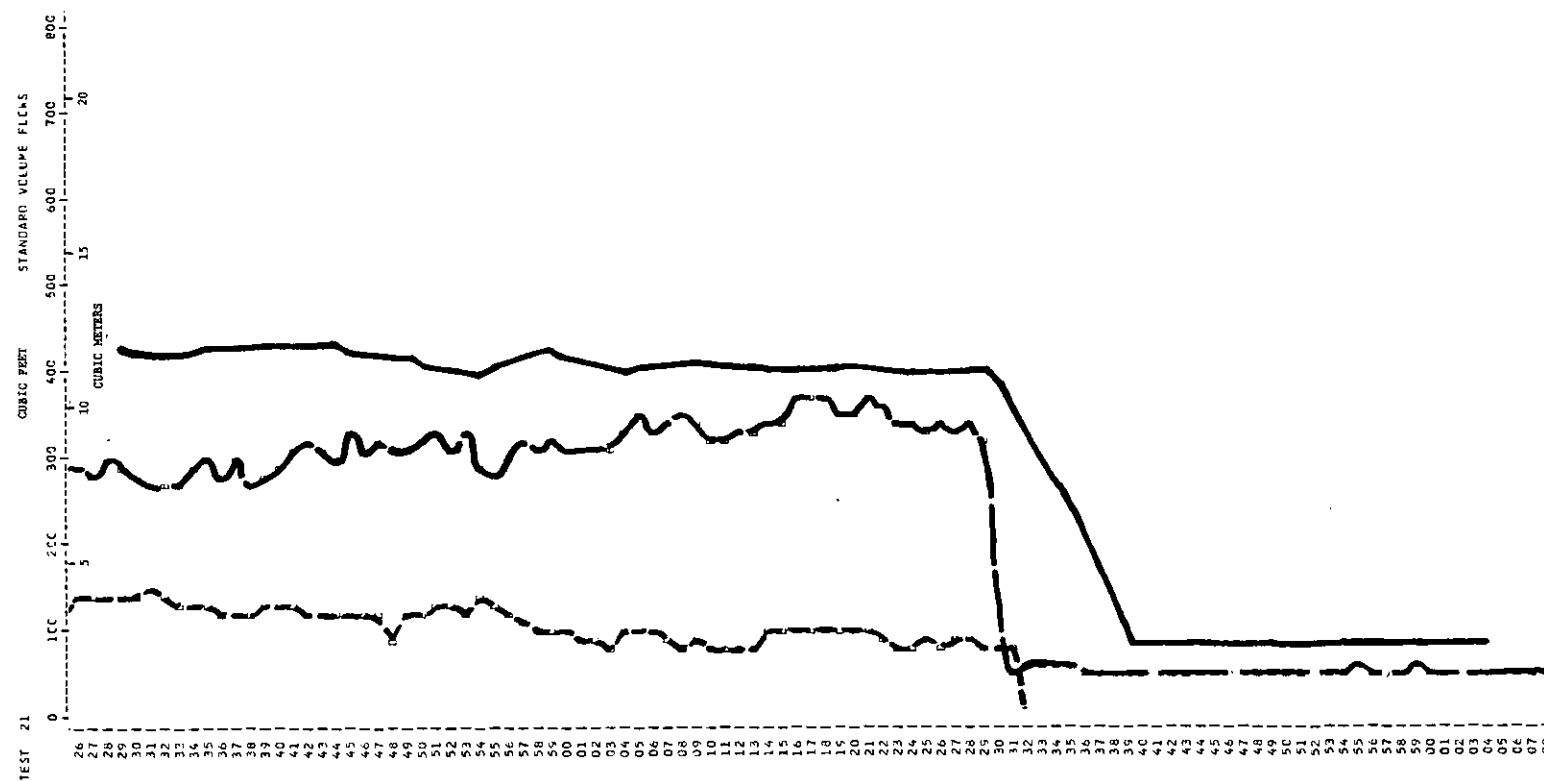
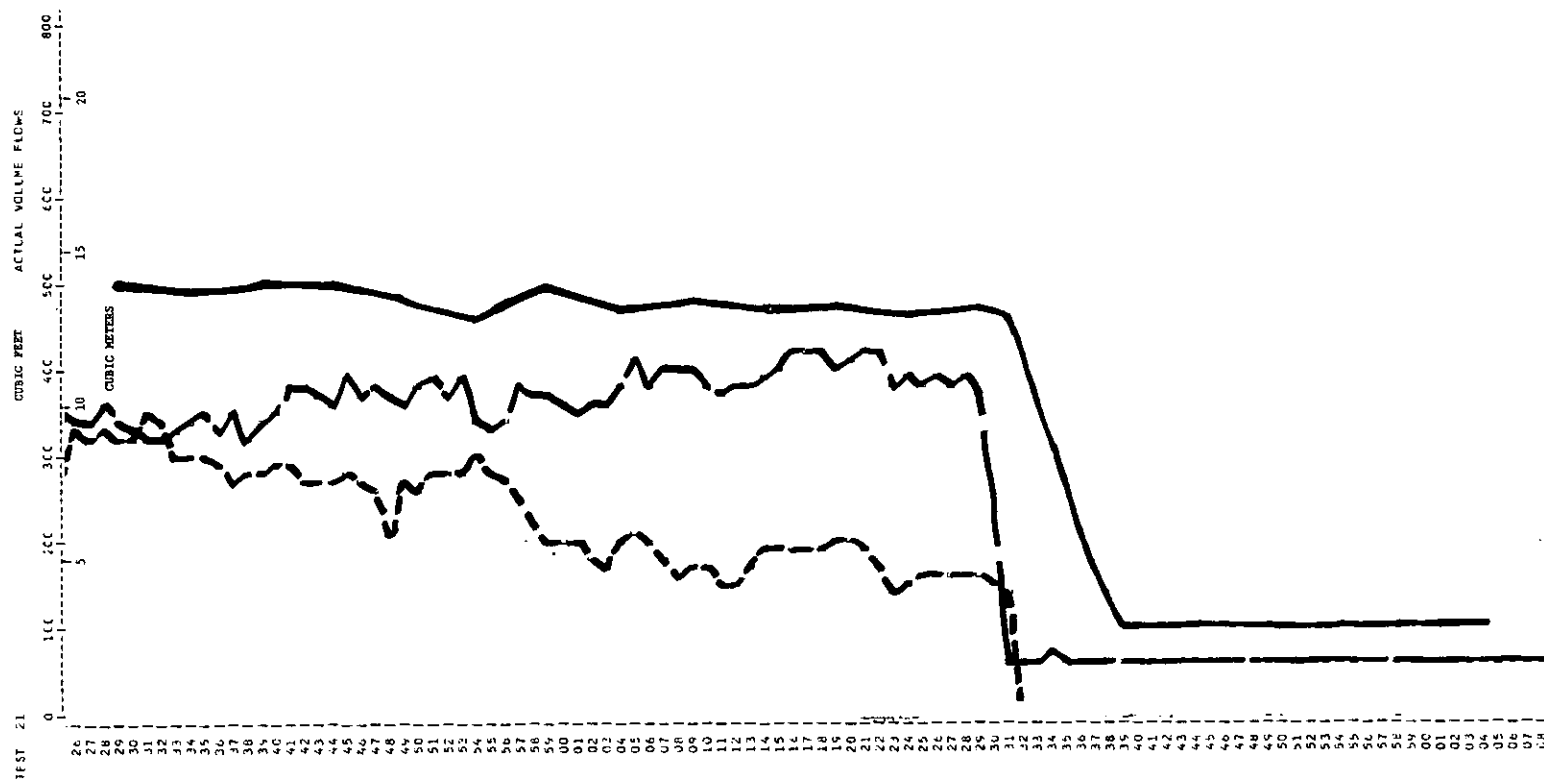
KEY, TEST 20	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	- - - - -

FIGURE A-24



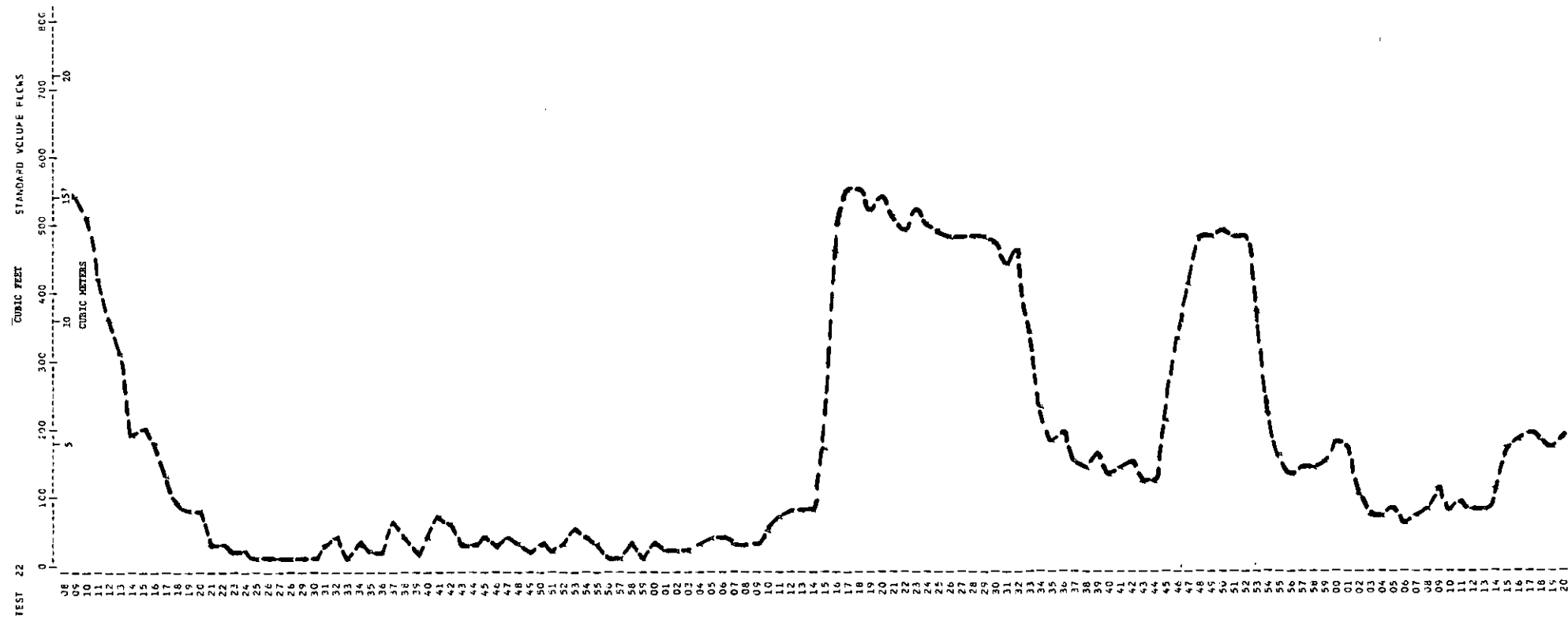
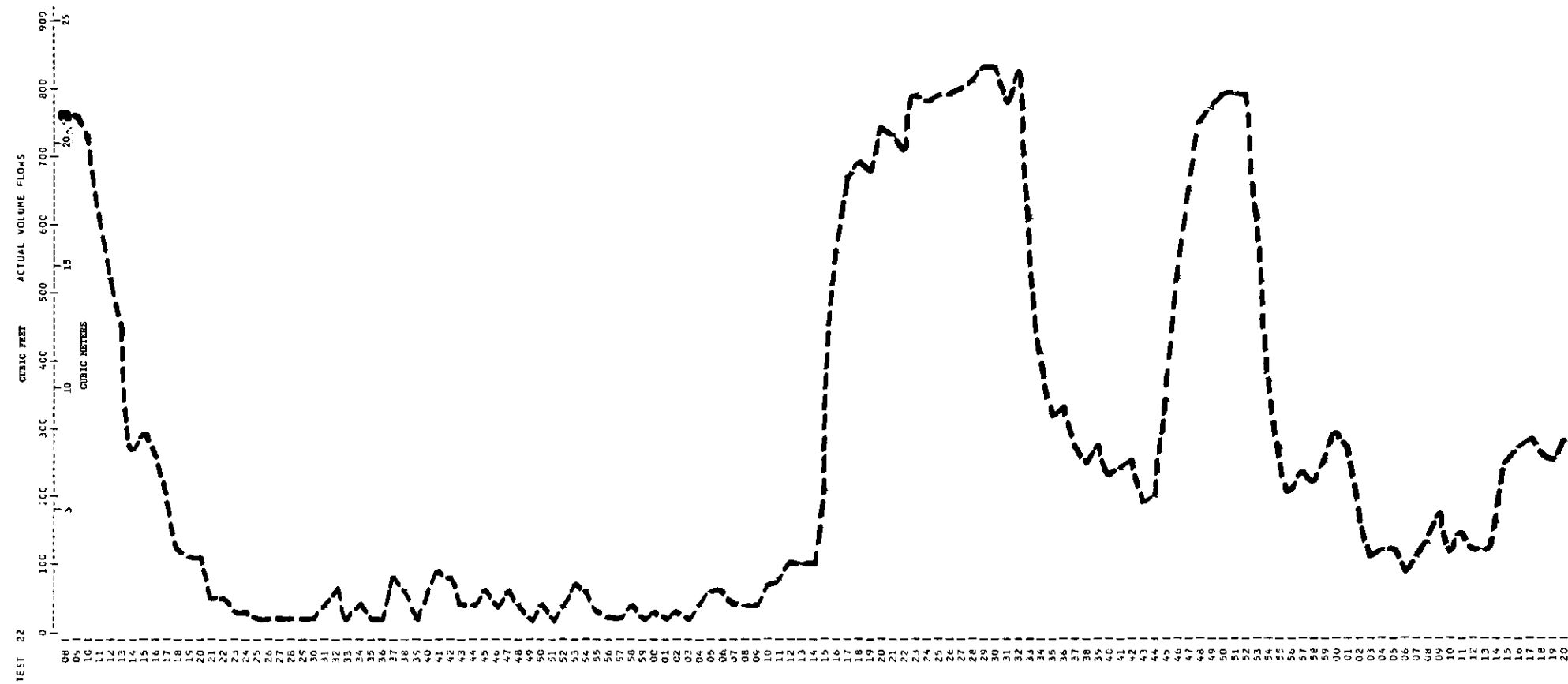
KEY, TEST 21	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	· · · · ·

FIGURE A-25



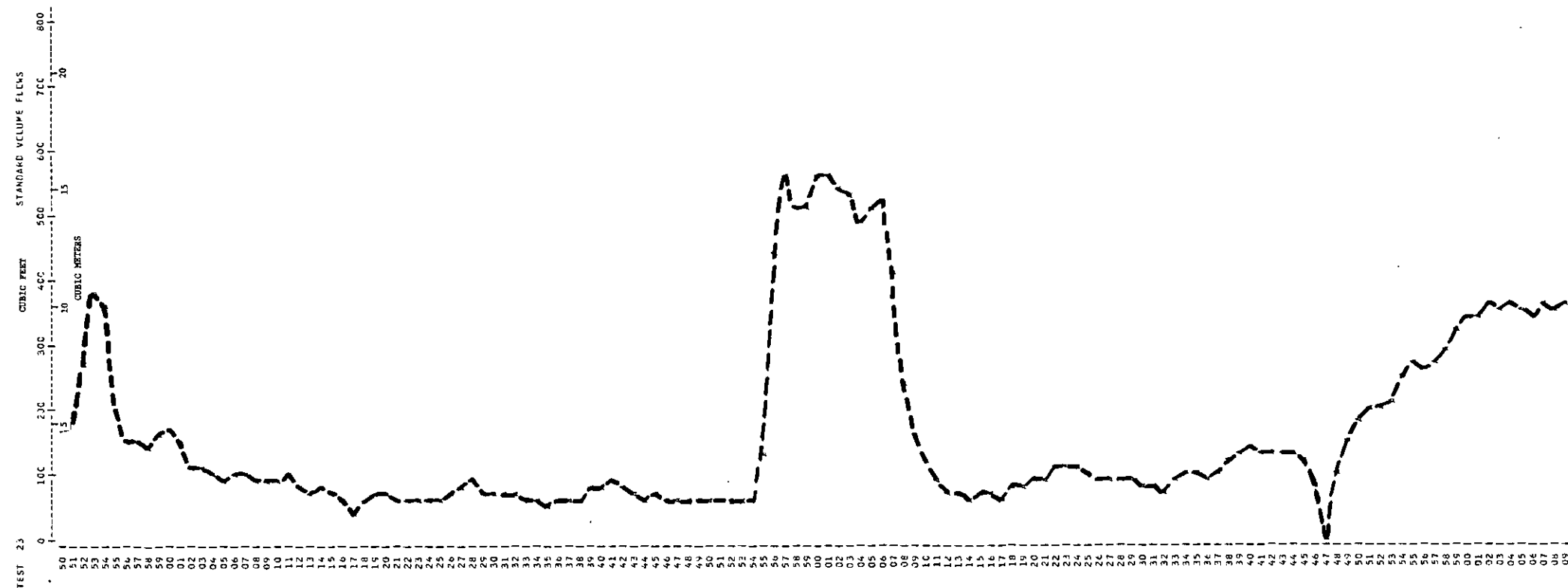
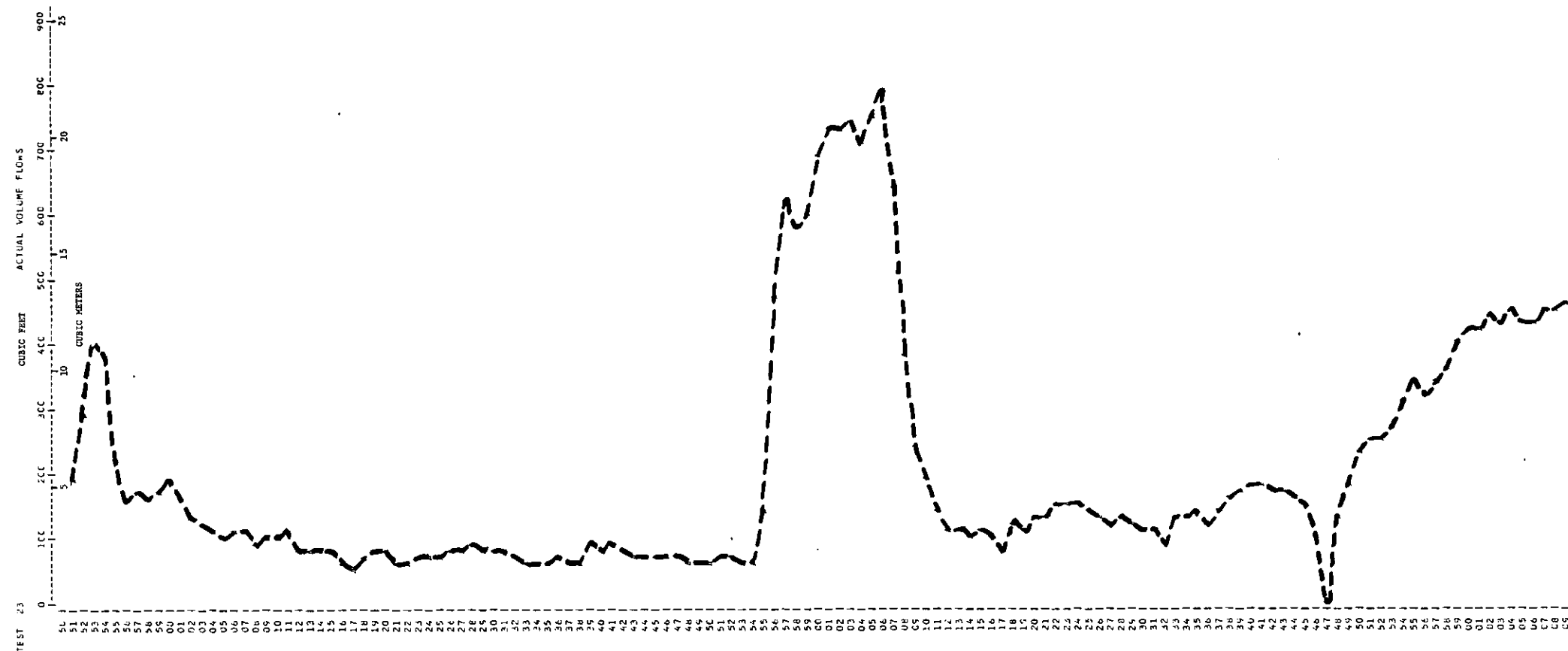
KEY, TEST 21	
LOCATION	SYMBOL
PUSHER GUIDE	—————
CENTER GUIDE	- - - - -
COKE GUIDE	- . - . -

FIGURE A-25 (CONTINUED)



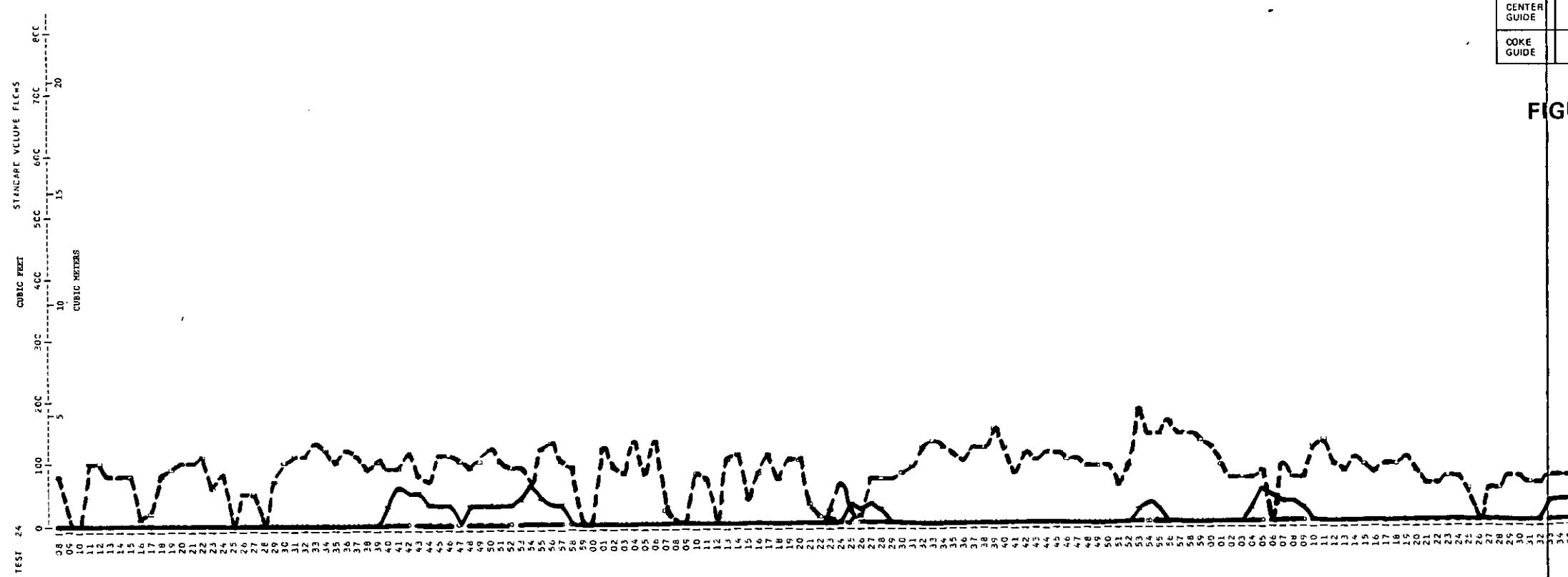
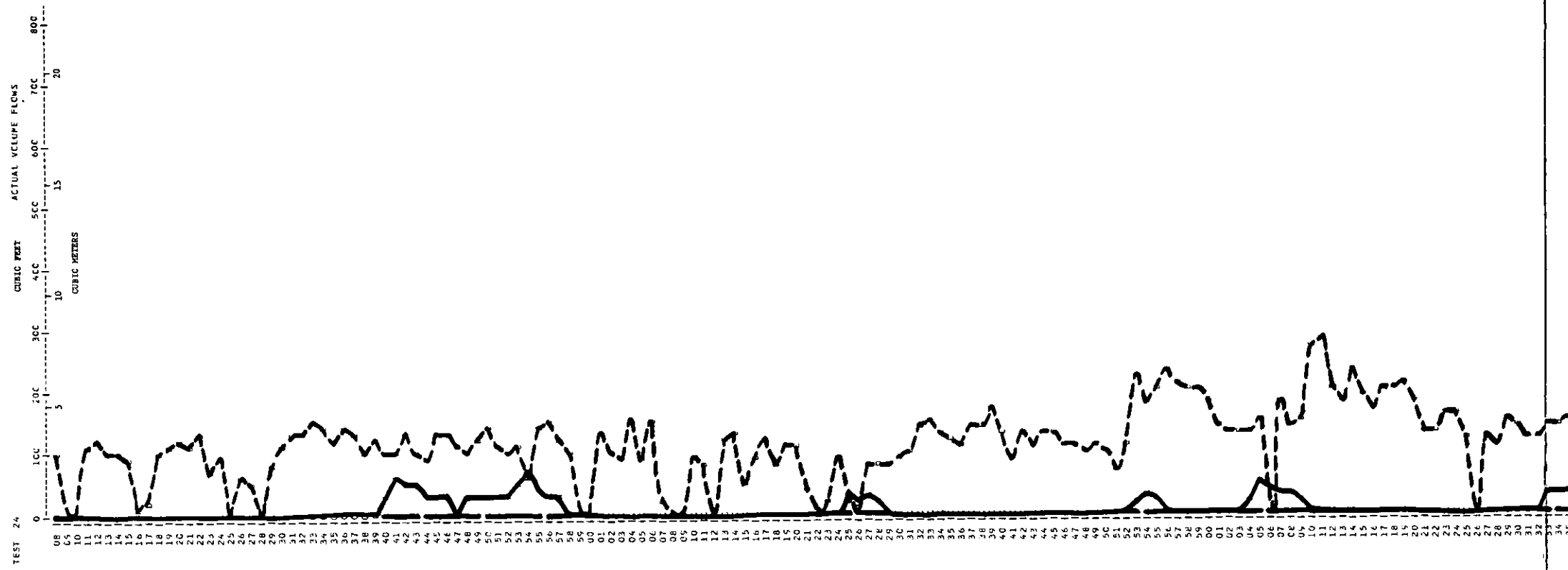
KEY, TEST 22	
LOCATION	SYMBOL
CENTER STACK	---

FIGURE A-26



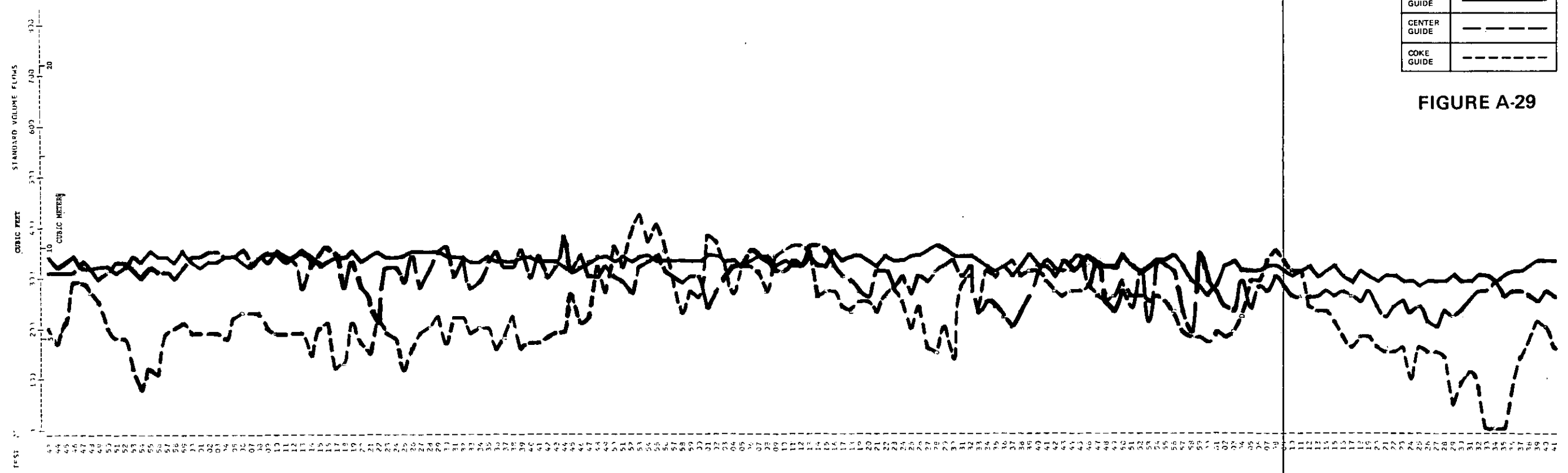
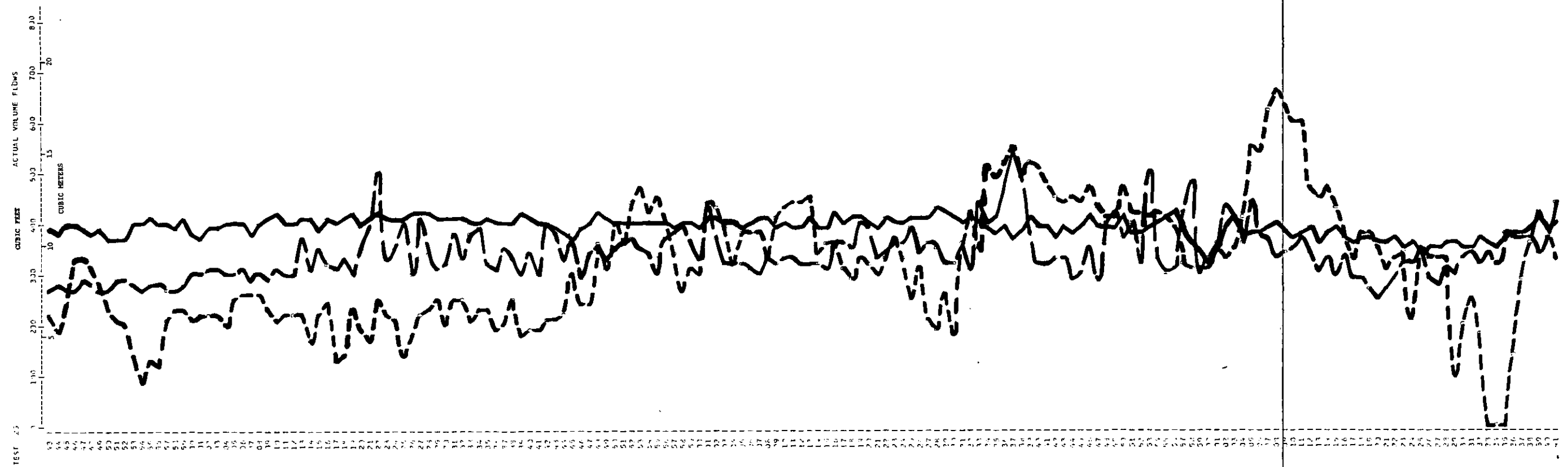
KEY, TEST 23	
LOCATION	SYMBOL
CENTER STACK	-----

FIGURE A-27



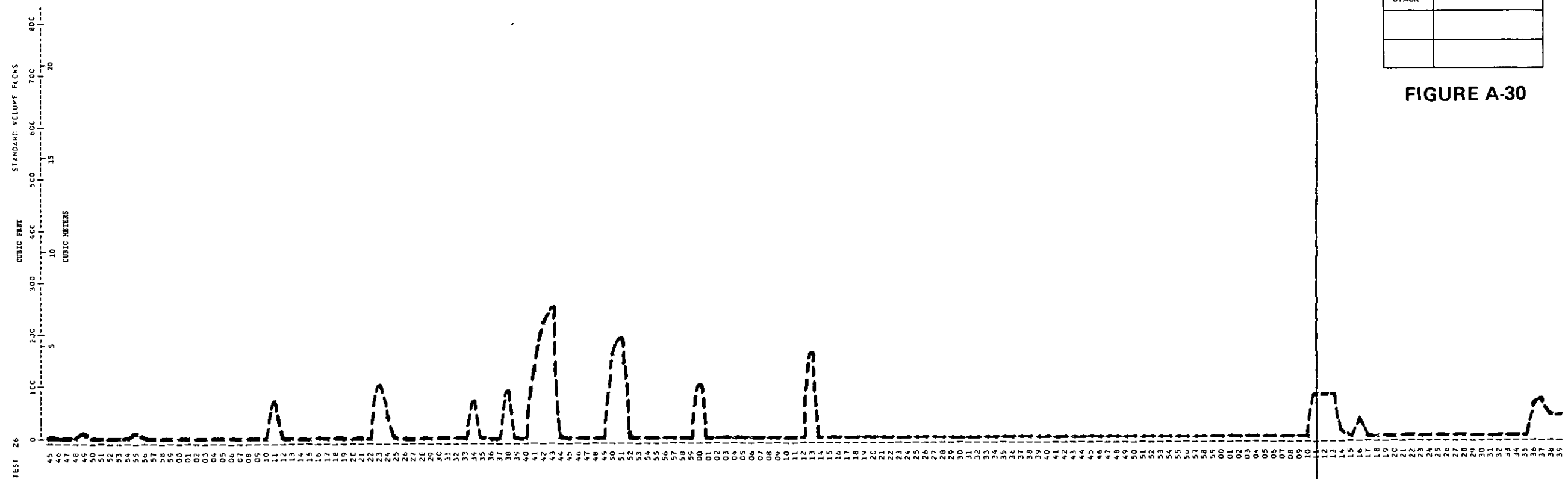
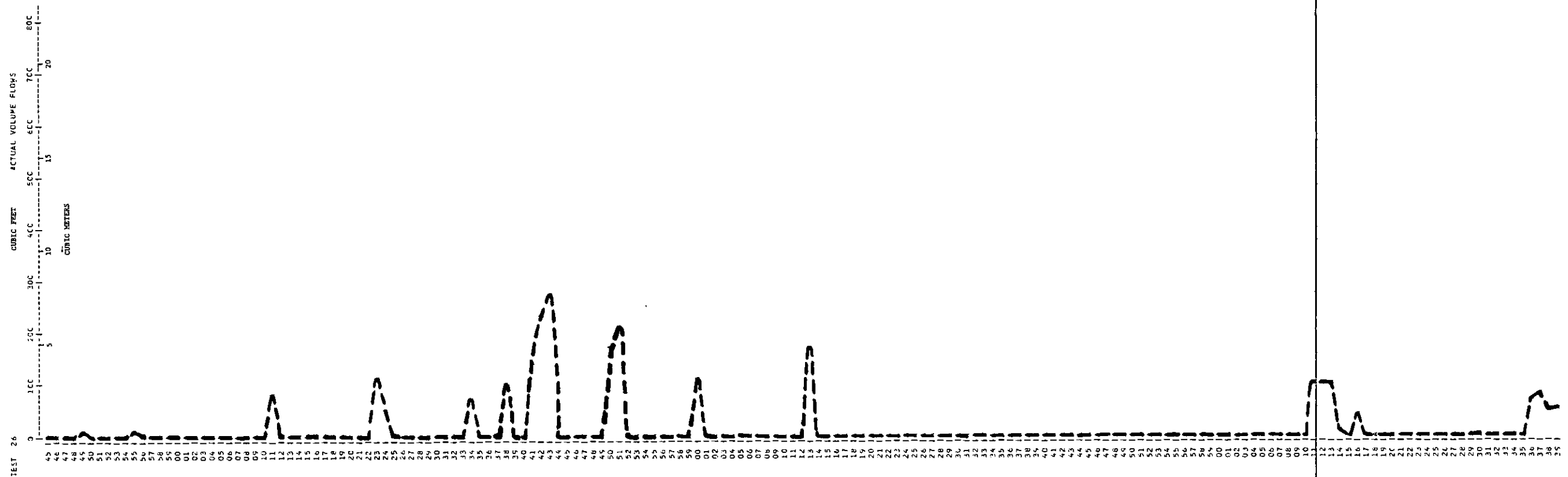
KEY, TEST 24	
LOCATION	SYMBOL
PUSHER GUIDE	————
CENTER GUIDE	- - - - -
COKE GUIDE	- . - . -

FIGURE A-28



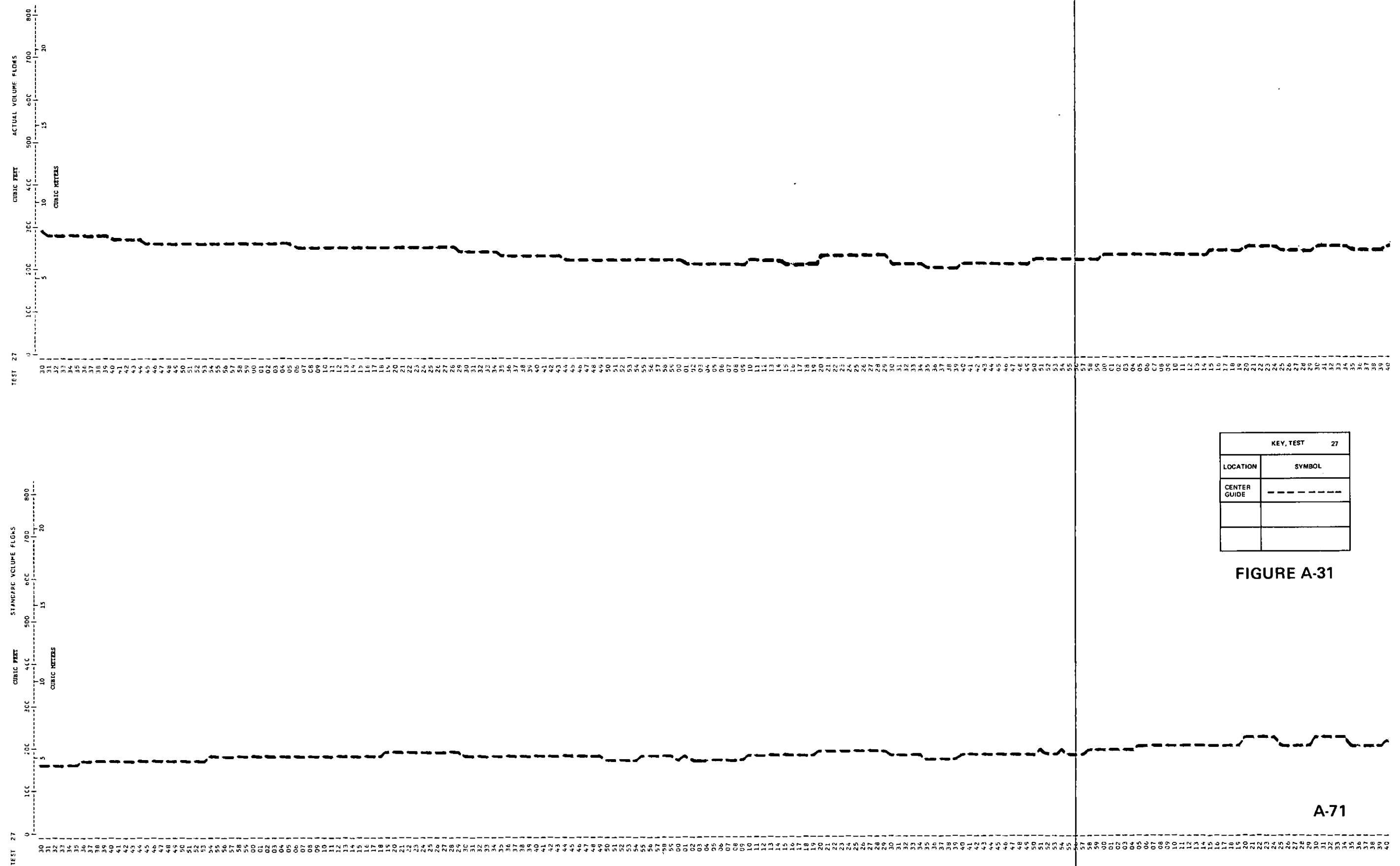
KEY, TEST 25	
LOCATION	SYMBOL
PUSHER GUIDE	————
CENTER GUIDE	-----
COKE GUIDE	- . - . - .

FIGURE A-29



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

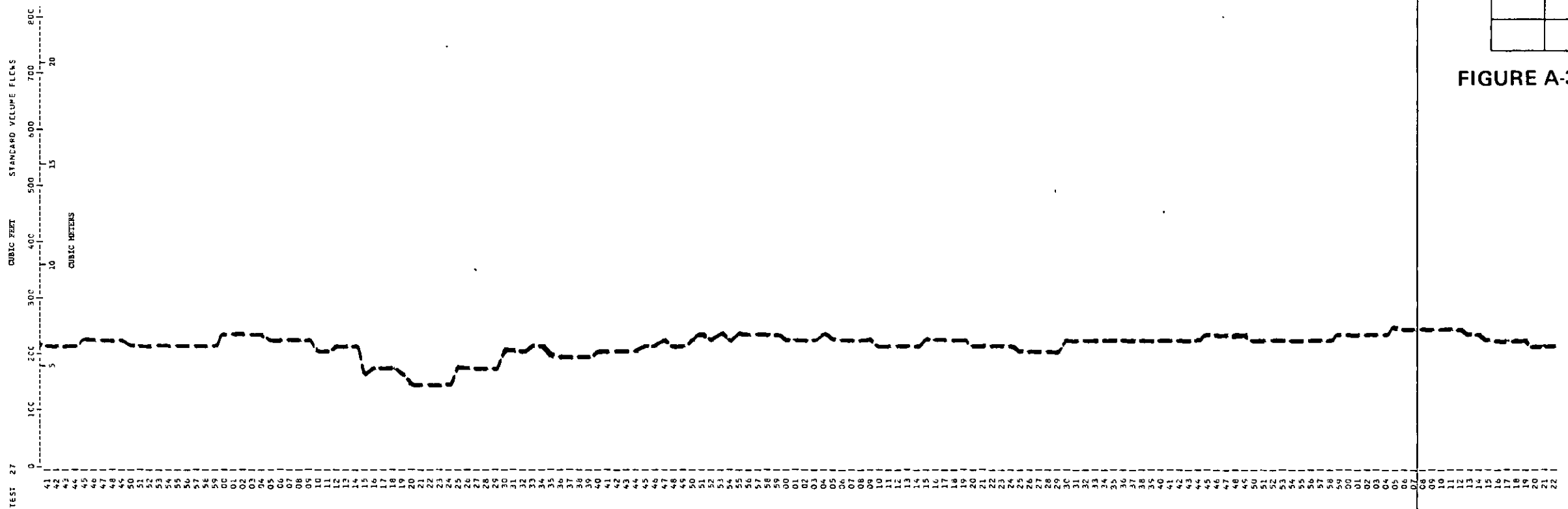
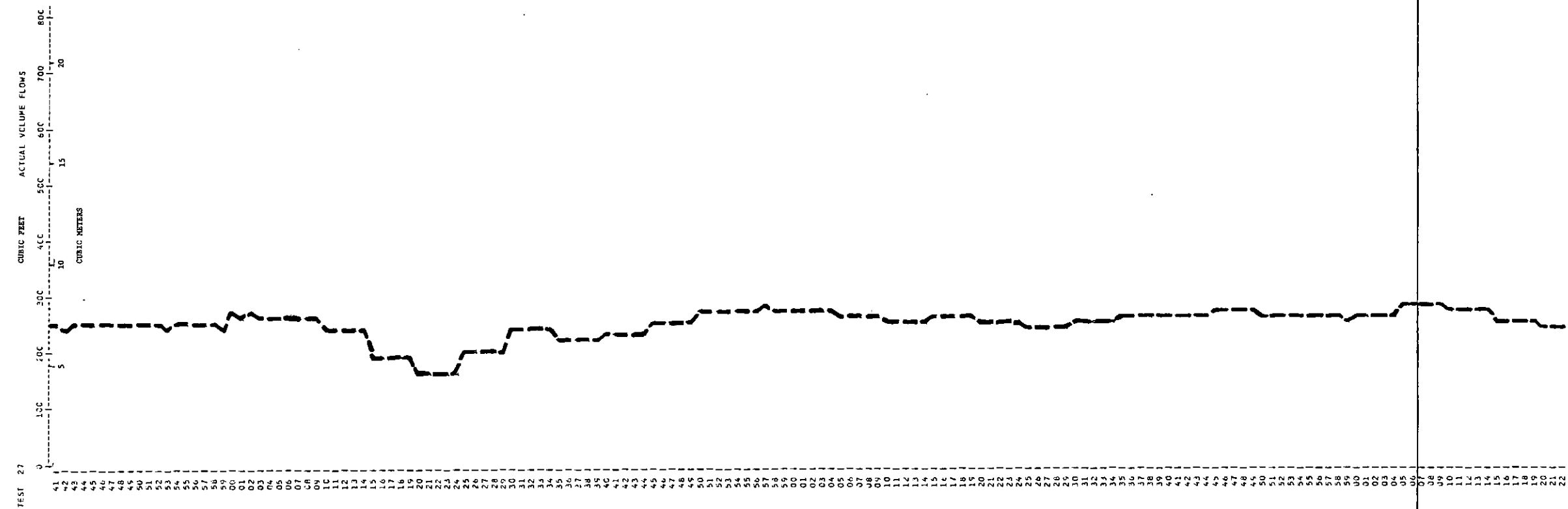
FIGURE A-30



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

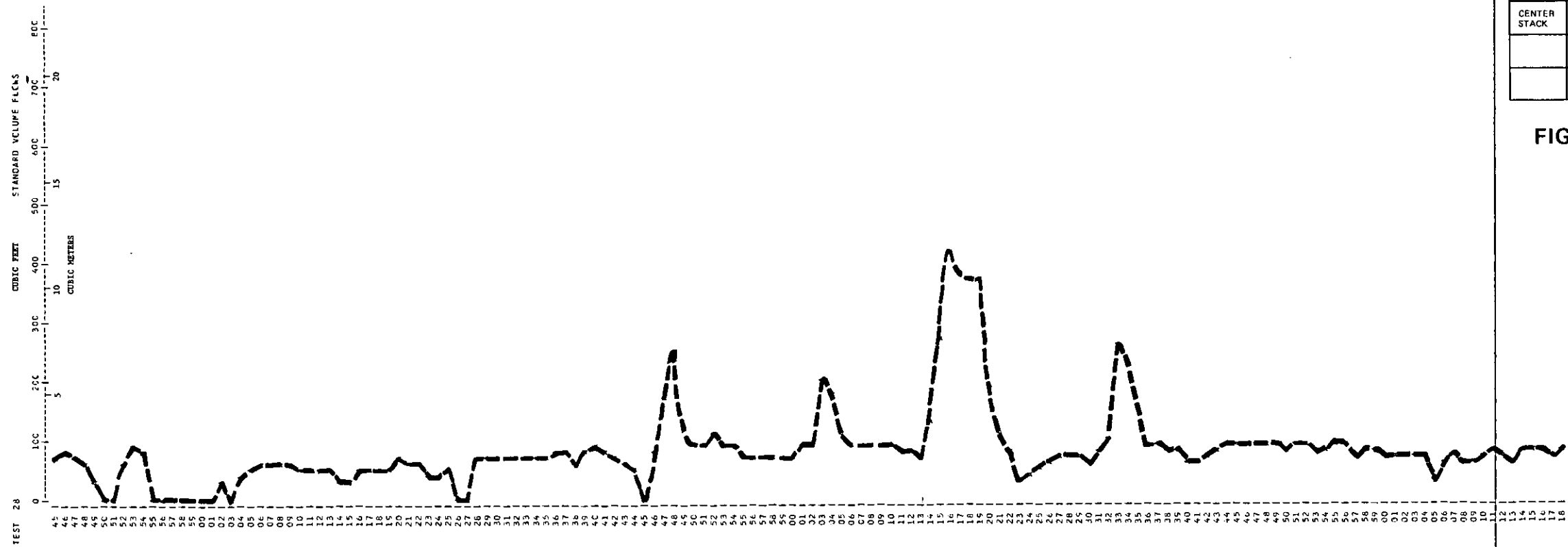
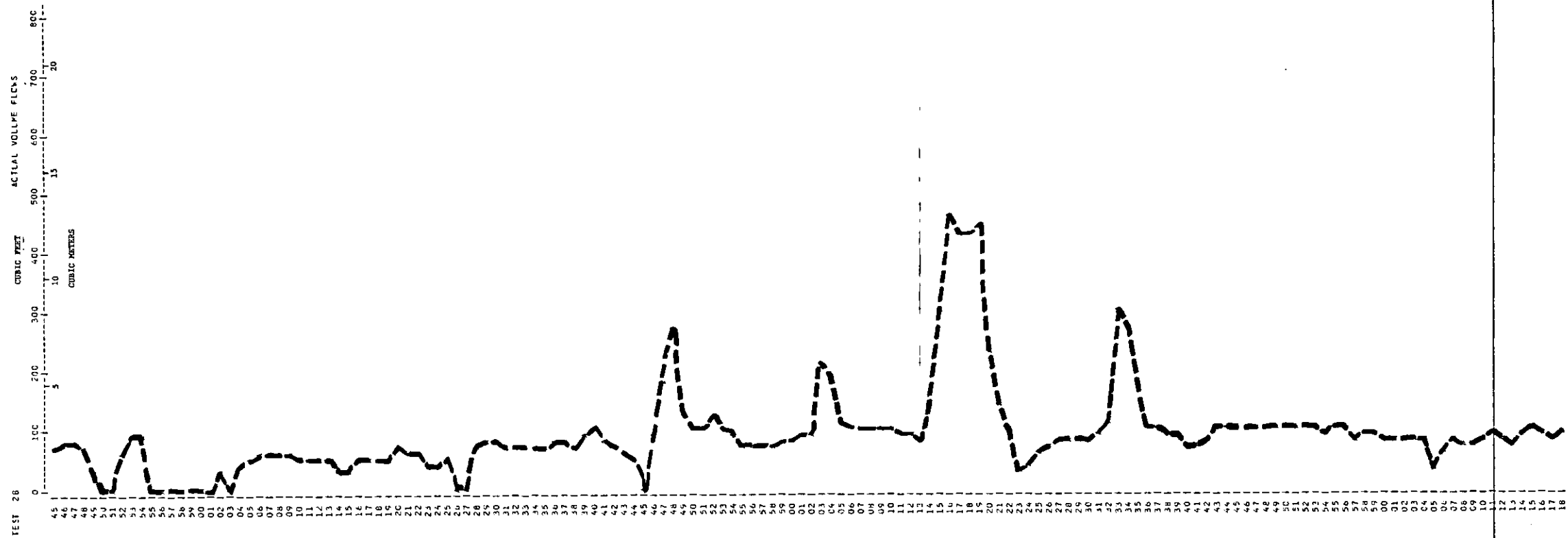
FIGURE A-31

A-71



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.

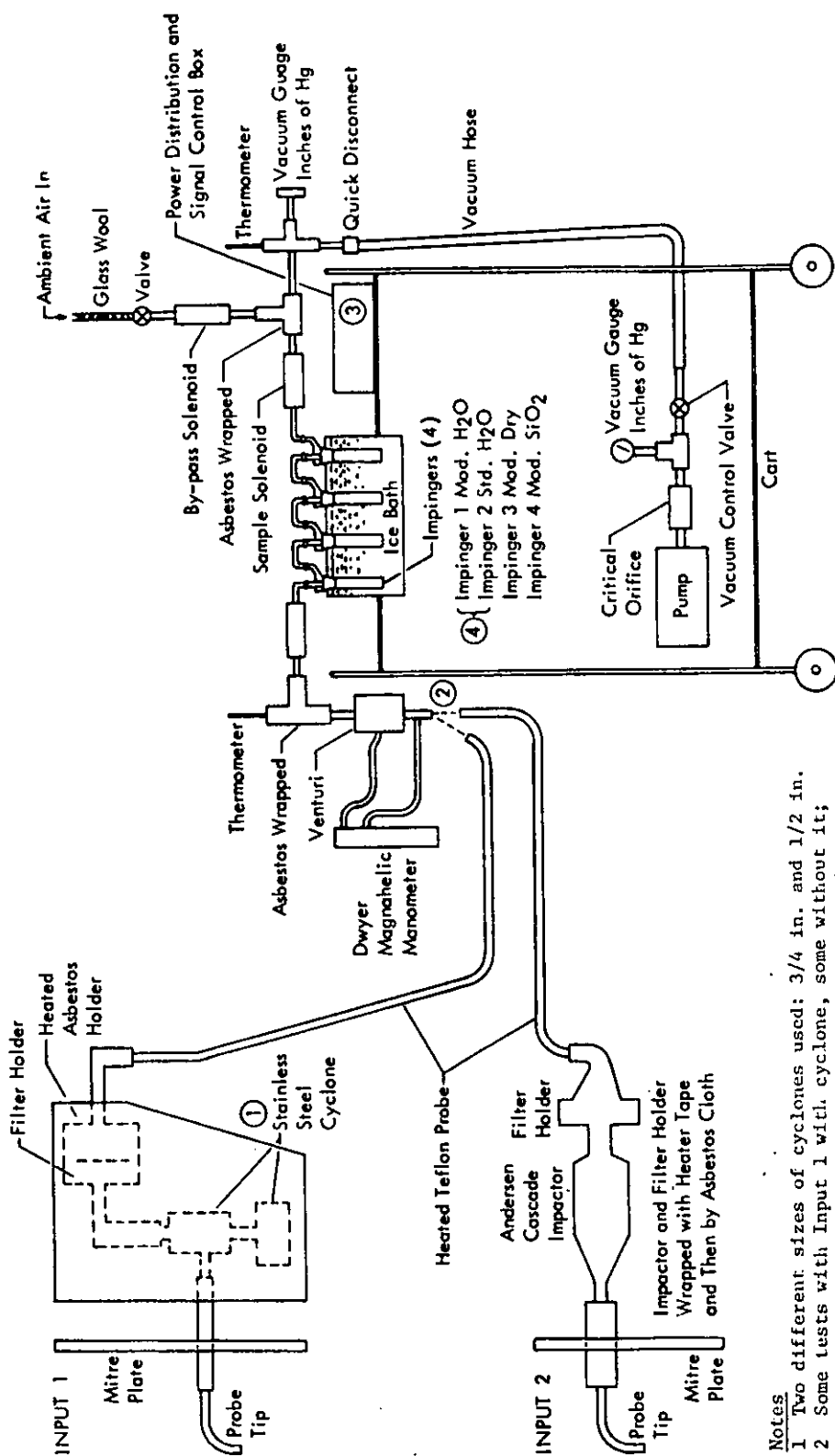
SAMPLING SYSTEMS

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

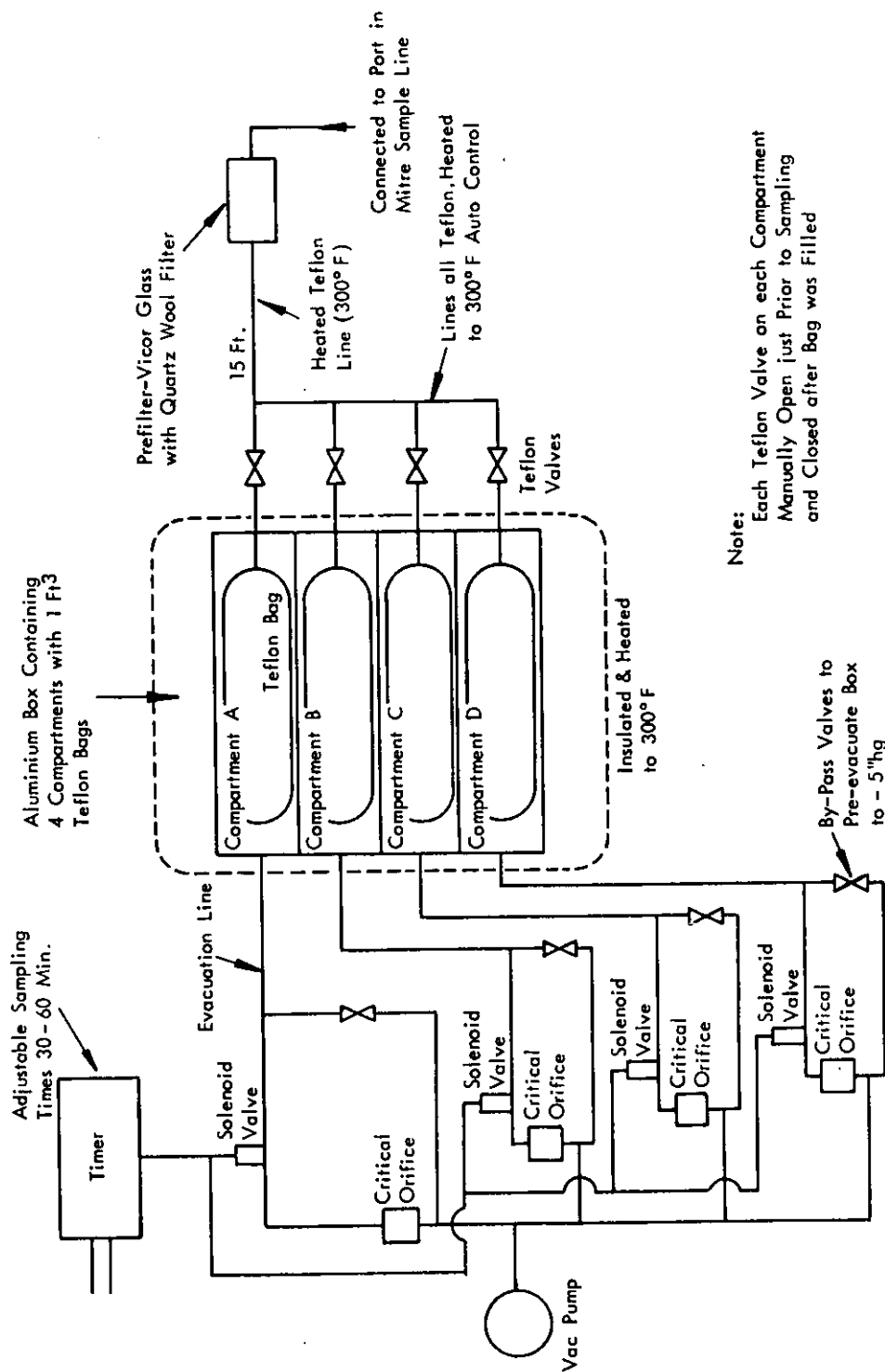
conditions, i.e., the sample solenoid valve open.) The ambient air flowed through the vacuum line, vacuum control valve, vacuum gauge, critical orifice and then to the pump. Adjustments were made with the vacuum control valve - near the pump - to achieve 10 in. Hg. The bypass solenoid valve was closed 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 valves 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

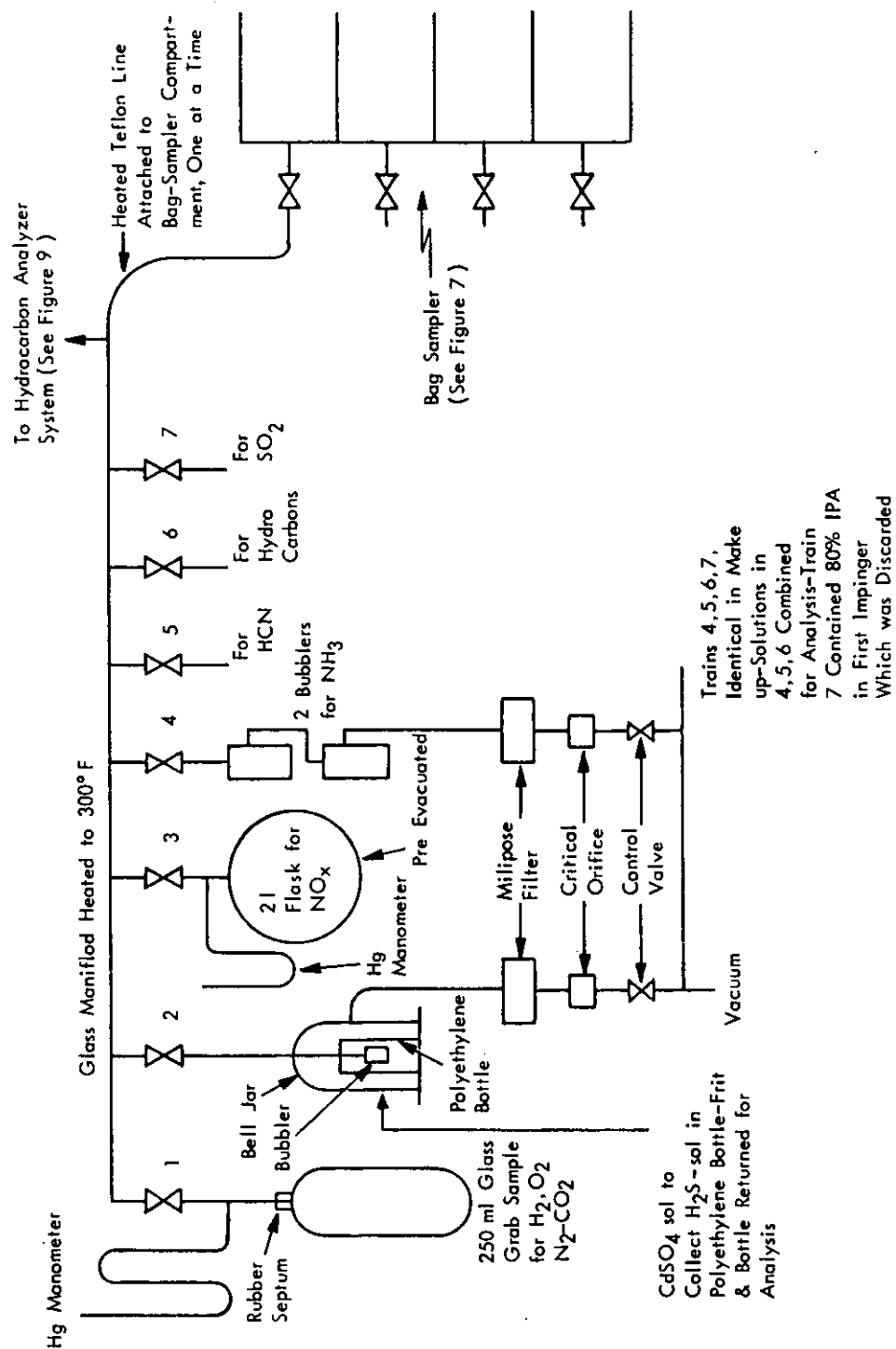


FIGURE B-3

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- Swagelok

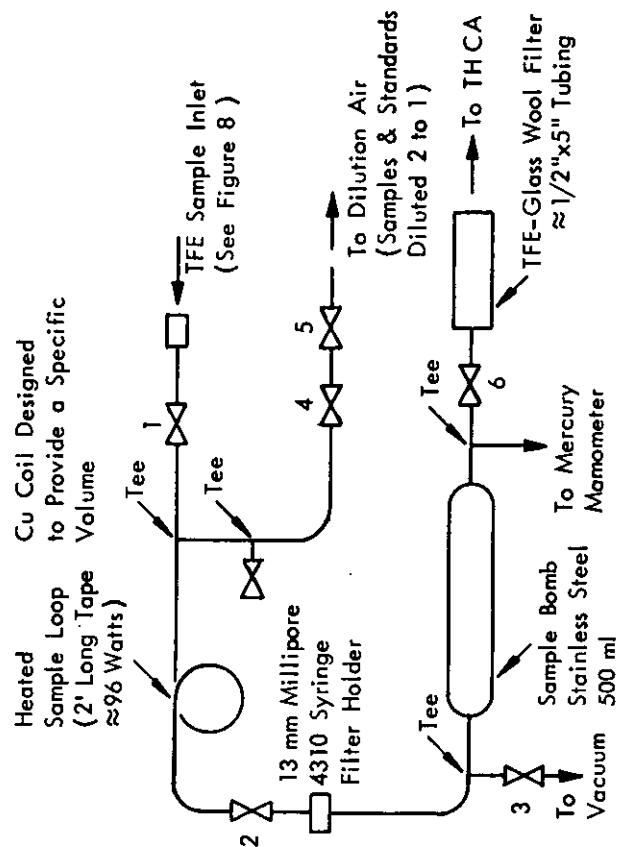


FIGURE B-4

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% CH₄ 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 CH₄. 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 CH₄.

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 valves 1 and 3 were open to acquire two grab samples; one was in a 250 ml glass bottle to be analyzed for H₂, O₂, N₂ and CO₂; 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 $\text{CdSO}_4 \cdot 8/3 \text{H}_2\text{O}$ 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

<u>Date</u>	<u>Run No.</u>	<u>Type of Car</u>	<u>Location</u>	<u>Type of Sample</u>	<u>Analysis</u>	<u>Remarks</u>
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 ₂ S, NH ₃ , CN, Phenol, SO ₂ , Pyridine, H ₂ , Mass loading	
22 Jun 73	W-3	Wilputte	1 Stack, 1 Guide	Gas Particulate	H ₂ S, 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 ₂ S, 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 ₂ S, 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 ₂ S, 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)

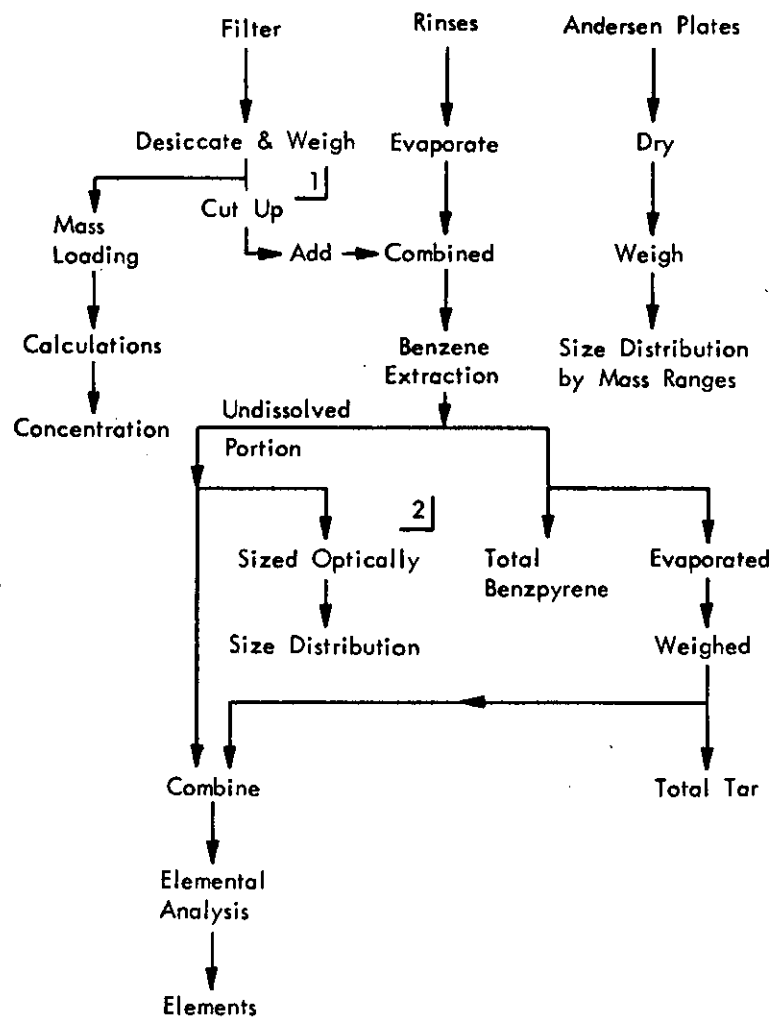
<u>Date</u>	<u>Run No.</u>	<u>Type of Car</u>	<u>Location</u>	<u>Type of Sample</u>	<u>Analysis</u>	<u>Remarks</u>
29 Jun 73	W-7	Wilputte	3 Stacks	Gas Particulate	H ₂ S, NO _x , NH ₃ , CN, phenol, SO ₂ , pyridine, O ₂ , N ₂ , CO ₂ , H.C., CH ₄ , CO, H ₂ , Tar, Benzo-alpha-pyridine, mass loading, elemental, particle sizing, particle size dis- tribution by mass ranges	
2 Jul 73	W-8	Wilputte	3 Stacks	Gas Particulate Coal	Tar, Benzo-alpha-pyridine, mass loading, elemental, Andersen, ultimate, proxi- mate 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 load- ing, 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)

<u>Date</u>	<u>Run No.</u>	<u>Type of Car</u>	<u>Location</u>	<u>Type of Sample</u>	<u>Analysis</u>	<u>Remarks</u>
5 Jul 73	W-11	Wilputte	3 Guides	Gas Particulate	H ₂ S, 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 ₂ S, 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 ₂ S, 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 ₂ S, 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)

<u>Date</u>	<u>Run No.</u>	<u>Type of Car</u>	<u>Location</u>	<u>Type of Sample</u>	<u>Analysis</u>	<u>Remarks</u>
16 Aug 73	LD-1	Leaking Door	Door	Gas	H ₂ S, 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 ₂ S, 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.

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

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 grains 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	Vacuum Gauge No.	Sample Tip No.	Sample Tip Area (ft ²)	Calibration			Orifice Rate at 10 in. Hg (defm)	Temp. (°F)	Orifice No.	Stack Temp. (°F)	Stack Pressure (in. Hg)	Sample Rate at Stack (defm)	Tip Velocity (ft/s)	Plugging Point	Estimation Point	Sample Time (min)
					Rate at 10 in. Hg (defm)	Temp. (°F)	Orifice No.										
W1-5	1	5	5	0.0008553	S	0.140	87	73-1	110	29.43	0.146	2.84	5	2.00			
-6	L	6	6	0.0008615	S	0.138	73	76-1	160	29.43	0.160	3.17	6	2.00			
W2-2	S	1	1	0.0008607	S	0.134	69	71-1	80	29.50	0.137	2.65	2	1.45			
-5	L	4	4	0.0008781	S	0.136	94	74-1	112	29.50	0.140	2.66	5	1.65			
W3-3	S	3	3	0.0008564	S	0.141	92	73-1	120	29.50	0.148	2.87	1	1.93			
-6	L	6	6	0.0008635	S	0.138	73	76-1	114	29.50	0.160	2.93	4	1.93			
W4-2	S	1	2	0.0008563	S	0.134	69	71-1	166	29.38	0.159	3.09	2	2.80			
-5	L	4	3	0.0008553	S	0.136	94	74-1	129	29.38	0.145	2.82	5	2.80			
W5-2	S	1	2	0.0008563	S	0.134	69	71-1	4065/	29.44	0.218	4.24	3	1.37			
-5	L	4	5	0.0008553	S	0.136	94	74-1	4065/	29.44	0.211	4.11	25 in.	6	1.37		
W6-2	S	3	3	0.0008564	M	0.338	95	73-2	650	29.15	0.682	13.27	3	1.83			
-3	And.	2	2	1	0.0008607	M	0.322	89	72-2	180	29.15	0.379	7.33	1	1.83		
-6	L	1	2	0.0008563	M	0.328	77	71-2	500	29.15	0.592	11.52	2	1.83			
W7-2	S	3	3	0.0008564	M	0.338	95	73-2	358	29.23	0.495	9.63	3	2.05			
-3	S	2	2	0.0008563	M	0.322	89	72-2	594	29.23	0.646	12.56	1	2.05			
-6	And.	1	1	0.0008607	M	0.328	77	71-2	163	29.23	0.371	7.18	2	2.05			
W8-2	And.	3	1	0.0008607	M	0.338	95	73-2	189	29.48	0.394	7.64	3	1.63			
-3	S	2	3	0.0008564	M	0.322	89	72-2	186	29.48	0.378	7.36	1	1.63			
-6	L	1	2	0.0008563	M	0.328	77	71-2	128	29.48	0.358	6.97	2	1.63			
W9-2	S	3	2	0.0008563	M	0.338	95	73-2	290	29.52	0.455	8.86	3	2.53			
-3	And.	2	3	0.0008564	M	0.322	89	72-2	120	29.52	0.339	6.60	1	2.53			
-6	L	1	1	0.0008607	M	0.328	77	71-2	130	29.52	0.359	6.95	2	2.53			
W10-2	And.	3	3	0.0008564	S	0.141	92	73-1	760	29.27	0.313	6.09	4	2.03			
-3	S	1	1	0.0008607	S	0.134	69	71-1	135	29.27	0.151	2.93	4	2.03			
-6	L	2	2	0.0008563	S	0.136	85	72-1	120	29.27	0.143	2.79	5	2.03			
W11-2	S	3	3	0.0008564	S	0.141	92	73-1	690	29.34	0.294	5.73	6	2.03			
-3	S	1	1	0.0008607	S	0.134	69	71-1	175	29.34	0.161	3.12	4	2.03			
-6	And.	2	2	0.0008563	S	0.136	85	72-1	190	29.34	0.160	3.12	5	2.03			
W12-2	And.	3	3	0.0008564	L	0.447	98	73-2/	181	29.42	0.513	9.99	2	2.33			
K1-3	-	2	2	0.0008563	L	0.434	94	72-3	128	29.40	0.461	8.97	2	2.33			
-6	-	1	1	0.0008607	L	0.397	84	71-3	132	29.40	0.432	8.37	1	4.20			
K2-2	-	3	2	0.0008563	L	0.447	98	73-3	85	29.25	0.439	8.54	3	2.67			
-3	And.	2	3	0.0008564	L	0.434	94	72-3	120	29.25	0.637	8.89	2	2.67			
K3-2	And.	3	3	0.0008564	L	0.447	98	73-3	450	29.25	0.733	14.26	3	4.90			
-3	-	2	2	0.0008563	L	0.434	94	72-3	130	29.25	0.441	8.56	2	4.90			
-6	-	1	1	0.0008607	L	0.397	84	71-3	165	29.25	0.459	8.83	1	4.90			
K4-2	S	3	3	0.0008564	L	0.447	98	73-3	249	29.32	0.566	11.01	3	2.47			
-3	S	2	2	0.0008563	L	0.397	84	71-3	114	29.32	0.417	8.12	2	2.47			
-6	And.	1	1	0.0008607	L	0.434	94	72-3	100	29.32	0.437	8.56	1	2.47			

Total: 16

a/ The last digit indicates size of orifice: 1 for small; 2 for medium; and 3 for large.

b/ MITEF 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	25.9	-	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 (g/g)	Conc. Condensate (g/g)	Conc. Combined Mass (g/g)	Sample Volume (cc)	Sample Volume (g)	Conc. Solids (g/g)	Conc. Condensate (g/g)	Combined Mass (g/g)	Solids Filter (g)	Solids Tip-Oye (g)	Solids And. Pl. (g)	Total Tip-Oye (g)	Total Filter (g)	Total Tip-Oye (g)	Total Filter (g)	Total And. Pl. (g)	Total (g)
U1-5	2.420	-	2.420	0.292	0.267	2.647	-	2.647	6.8	93.2	-	-	6.8	93.2	-	-	-
U2-2	2.295	-	2.295	0.320	0.269	2.730	-	2.730	5.5	94.5	-	-	5.5	94.5	-	-	-
U3-3	2.349	-	2.349	0.199	0.193	2.422	-	2.422	15.2	84.8	-	-	15.2	84.8	-	-	-
U4-2	3.860	-	3.860	0.203	0.185	4.345	-	4.345	39.3	60.7	-	-	39.3	60.7	-	-	-
U5-3	1.014	2.595	3.609	0.286	0.258	1.124	2.877	4.001	4.8	95.2	-	-	4.8	95.2	-	-	-
U6-2	1.155	2.190	3.345	0.286	0.261	1.266	2.400	3.665	14.0	86.0	-	-	14.0	86.0	-	-	-
U7-3	8.759	2.230	10.988	0.445	0.370	10.534	2.682	13.215	19.7	80.3	-	-	19.7	80.3	-	-	-
U8-2	2.888	4.265	7.153	0.406	0.359	1.535	3.266	4.801	84.1	35.9	-	-	84.1	35.9	-	-	-
U9-3	6.998	4.010	11.008	0.299	0.181	11.560	6.624	18.184	2.6	97.4	-	-	2.6	97.4	-	-	-
U10-2	1.735	4.544	6.279	0.289	0.175	2.853	7.504	10.359	56.2	33.8	-	-	56.2	33.8	-	-	-
U11-3	1.677	0.941	2.618	1.248	0.581	3.602	2.064	5.666	2.6	97.4	-	-	2.6	97.4	-	-	-
U12-2	4.516	4.467	8.983	0.180	0.164	5.597	5.784	11.377	4.6	15.4	73.7	6.3	2.3	7.6	30.5	14.4	5.9
U13-3	1.641	1.470	3.111	1.083	0.583	6.858	2.231	7.585	4.1	95.9	-	-	4.1	95.9	-	-	-
U14-2	3.960	8.087	12.047	1.015	0.642	6.525	6.261	12.786	9.6	90.4	-	-	9.6	90.4	-	-	-
U15-3	1.700	2.471	4.170	1.324	0.650	3.463	5.033	8.494	14.9	85.1	-	-	14.9	85.1	-	-	-
U16-2	2.471	4.170	6.641	0.761	0.653	2.864	1.120	4.066	4.7	16.9	20.4	8.0	3.4	11.2	37.0	22.2	-
U17-3	2.526	0.961	3.487	0.761	0.653	2.864	1.120	4.066	4.7	16.9	20.4	8.0	3.4	11.2	37.0	22.2	-
U18-2	3.639	2.781	6.420	0.642	0.517	2.932	4.519	7.451	2.0	28.3	67.4	2.1	1.7	2.8	31.2	38.6	4.5
U19-3	1.641	4.774	6.415	0.616	0.498	2.030	5.905	7.935	10.7	89.3	-	-	10.7	89.3	-	-	-
U20-2	2.802	1.823	4.625	1.515	0.802	6.892	2.329	9.219	7.2	92.8	-	-	7.2	92.8	-	-	-
U21-3	0.761	4.094	4.855	0.458	0.374	0.864	4.494	5.358	10.5	14.7	59.4	15.1	1.7	2.3	53.7	27.1	3.4
U22-2	5.060	5.272	10.332	0.508	0.405	5.583	6.255	11.838	16.5	83.5	-	-	16.5	83.5	-	-	-
U23-3	1.526	-	1.526	0.635	0.270	2.989	-	2.989	4.6	36.3	-	-	4.6	36.3	-	-	-
U24-2	2.603	-	2.603	0.307	0.268	2.989	-	2.989	4.6	36.3	-	-	4.6	36.3	-	-	-
U25-3	4.591	-	4.591	0.290	0.259	5.029	-	5.029	7.1	92.9	-	-	7.1	92.9	-	-	-
U26-2	1.564	0.240	1.804	0.597	0.270	3.458	0.511	3.969	40.7	59.3	-	-	40.7	59.3	-	-	-
U27-3	2.106	0.434	2.540	0.327	0.268	2.689	0.530	3.219	48.2	51.8	-	-	48.2	51.8	-	-	-
U28-2	3.349	0.216	3.565	0.325	0.260	2.505	0.908	3.413	9.5	50.5	-	-	9.5	50.5	-	-	-
U29-3	0.649	0.540	1.189	1.193	0.922	4.117	0.915	5.032	3.3	27.1	37.7	7.3	2.7	7.0	37.0	-	-
U30-2	0.809	0.809	1.618	1.936	1.715	0.981	0.610	1.599	2.8	26.5	38.3	12.4	1.8	16.4	0.7	37.6	-
U31-3	0.870	0.870	1.740	1.814	1.596	0.301	0.920	1.220	58.2	41.8	-	-	58.2	41.8	-	-	-
U32-2	1.842	0.870	2.712	1.172	1.114	1.938	0.915	2.853	74.3	25.7	44.3	11.6	3.8	40.3	3.1	20.6	8.4
U33-3	1.491	0.415	1.906	1.220	1.090	0.710	0.767	2.030	3.8	40.3	-	-	3.8	40.3	-	-	-
U34-2	0.551	0.455	0.995	2.161	1.898	0.513	0.517	1.030	88.9	11.1	-	-	88.9	11.1	-	-	-
U35-3	0.352	0.352	0.704	2.349	1.864	0.080	0.423	0.503	23.0	75.0	-	-	23.0	75.0	-	-	-
U36-2	0.080	0.080	0.160	1.031	1.123	0.119	0.119	0.238	43.2	56.8	-	-	43.2	56.8	-	-	-
U37-3	0.184	0.009	0.193	1.030	0.938	0.102	0.010	0.112	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U38-2	0.047	0.006	0.053	1.080	1.008	0.050	0.006	0.057	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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 EN (the total number of the particles sized at each size increment) and A (the total area in the field of view in mm²). 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

PLATES, T-P AND CONE-TIP					
Stage/Plate	Sample Weight (GM)	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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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		Jet Vel. (CM/S)	Partic. Diam. (MICR)
		Wt. %	Cum. %		
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 ₂ O)
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 ₂ O)
1227	K3-2	I
1239	K3-2	P (H ₂ O)
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 ₂ O)
1042	W6-3	I
1048	W6-3	P
1069	W8-2	I (H ₂ O)
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 ₂ O)
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 ($\langle N/A \rangle$) was estimated. The average density ($\langle N/A \rangle$) with the statistical error $\sqrt{\langle N/A \rangle}$ 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 ($\Sigma\%$) 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:

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

and the average diameter for that volume:

$$d_v = \frac{6V}{\pi} \quad (B-6)$$

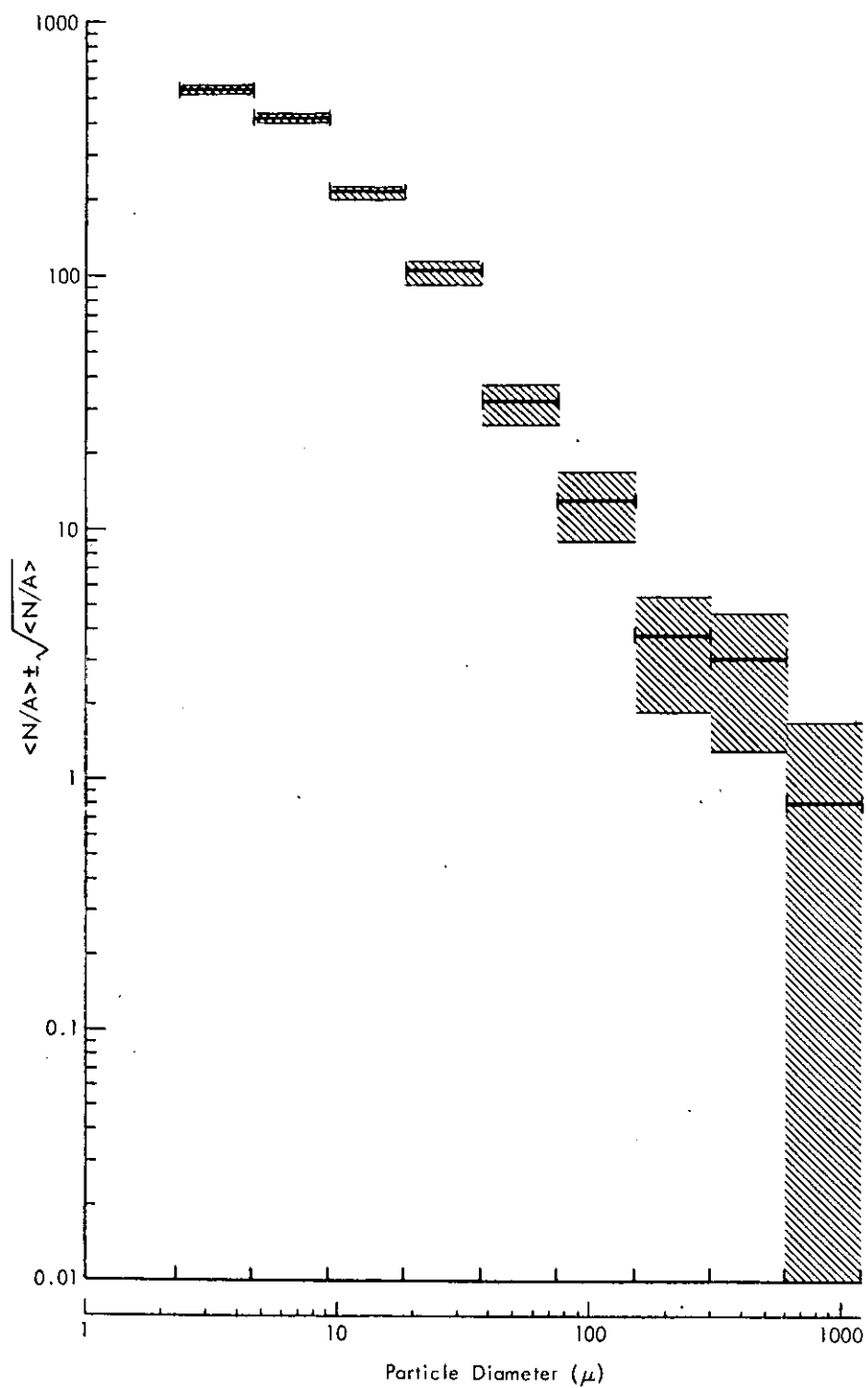


FIGURE B-6
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1051

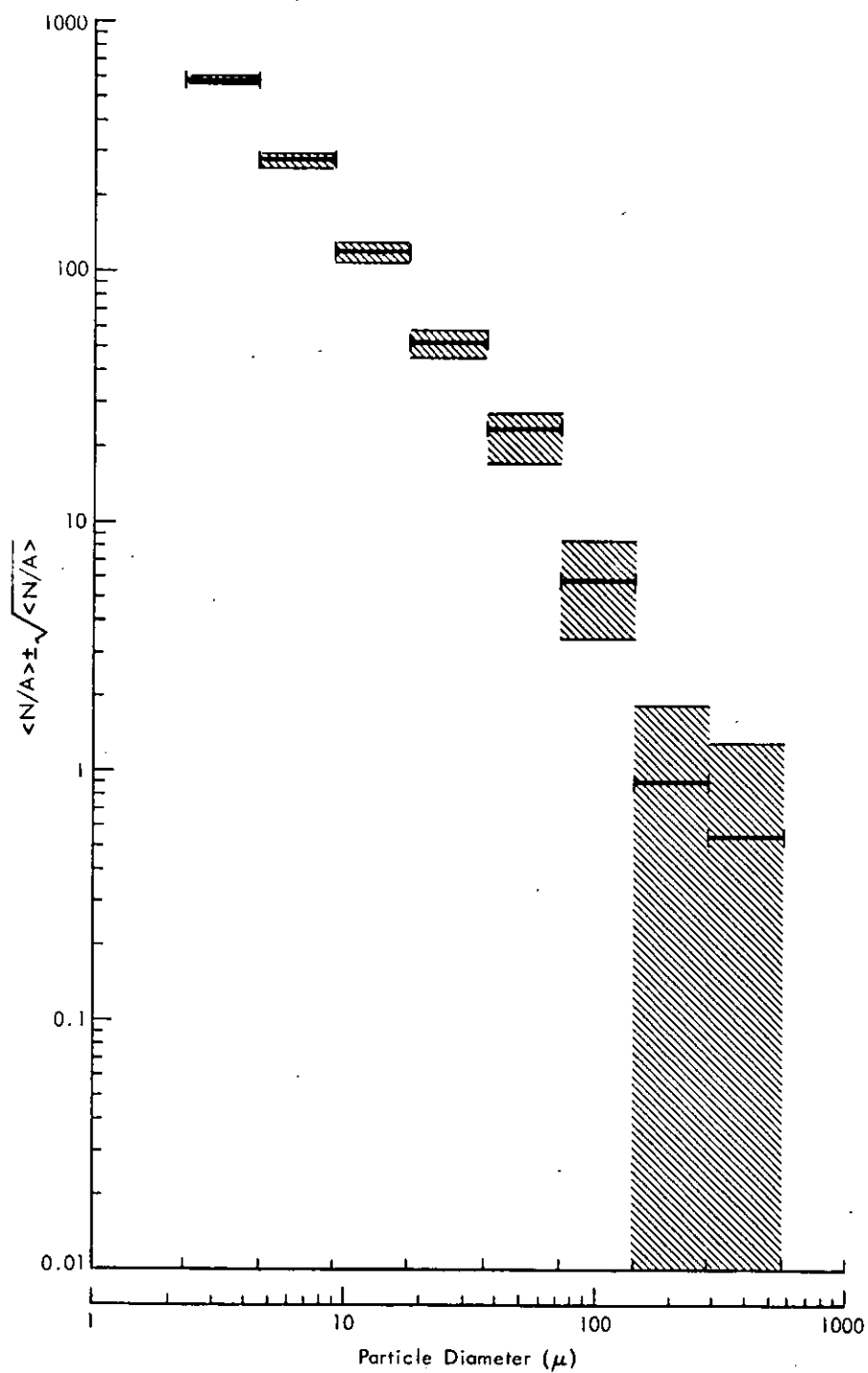


FIGURE B-7
 FIGURE (NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
 VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1072

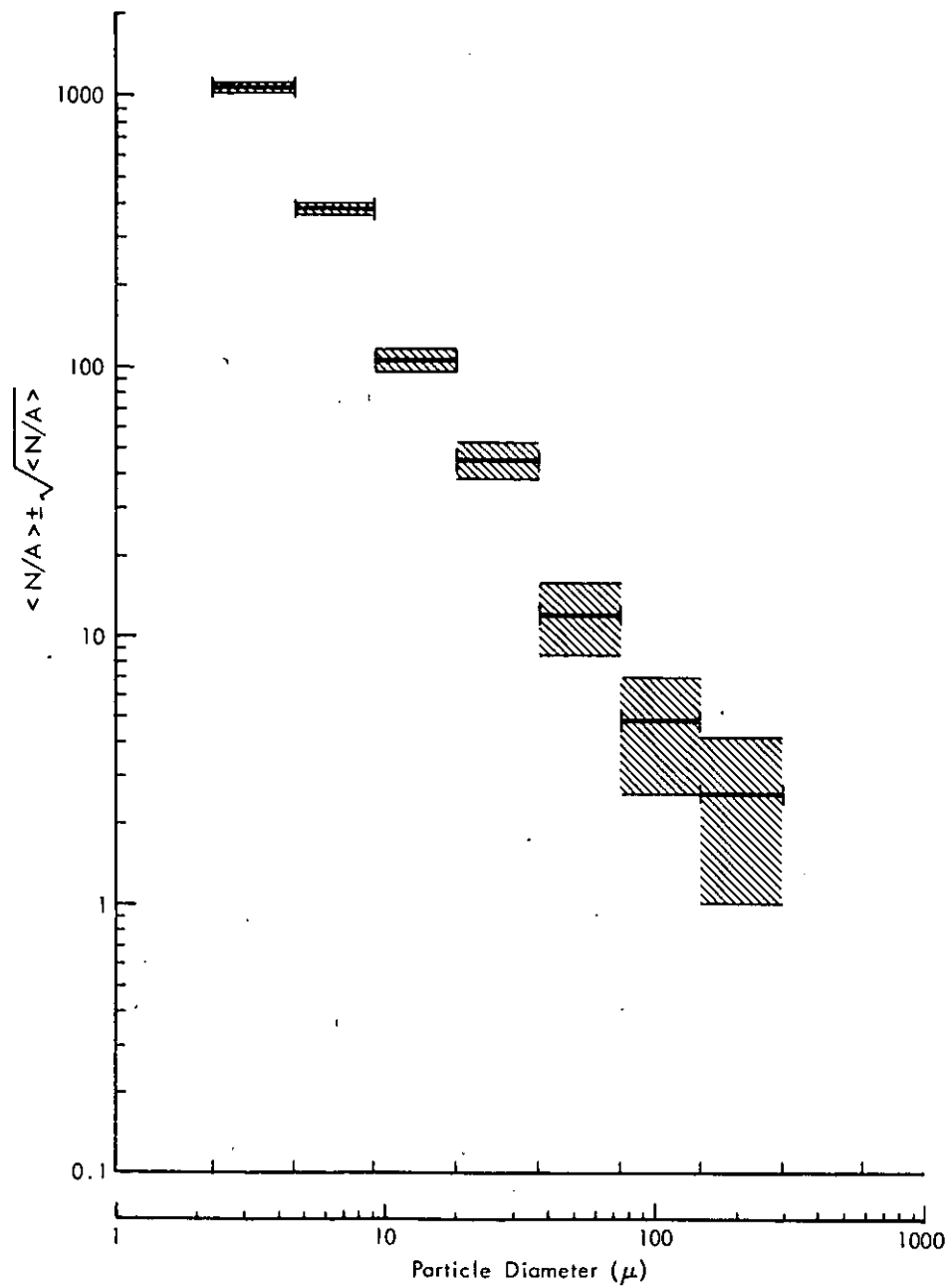


FIGURE B-8
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1076

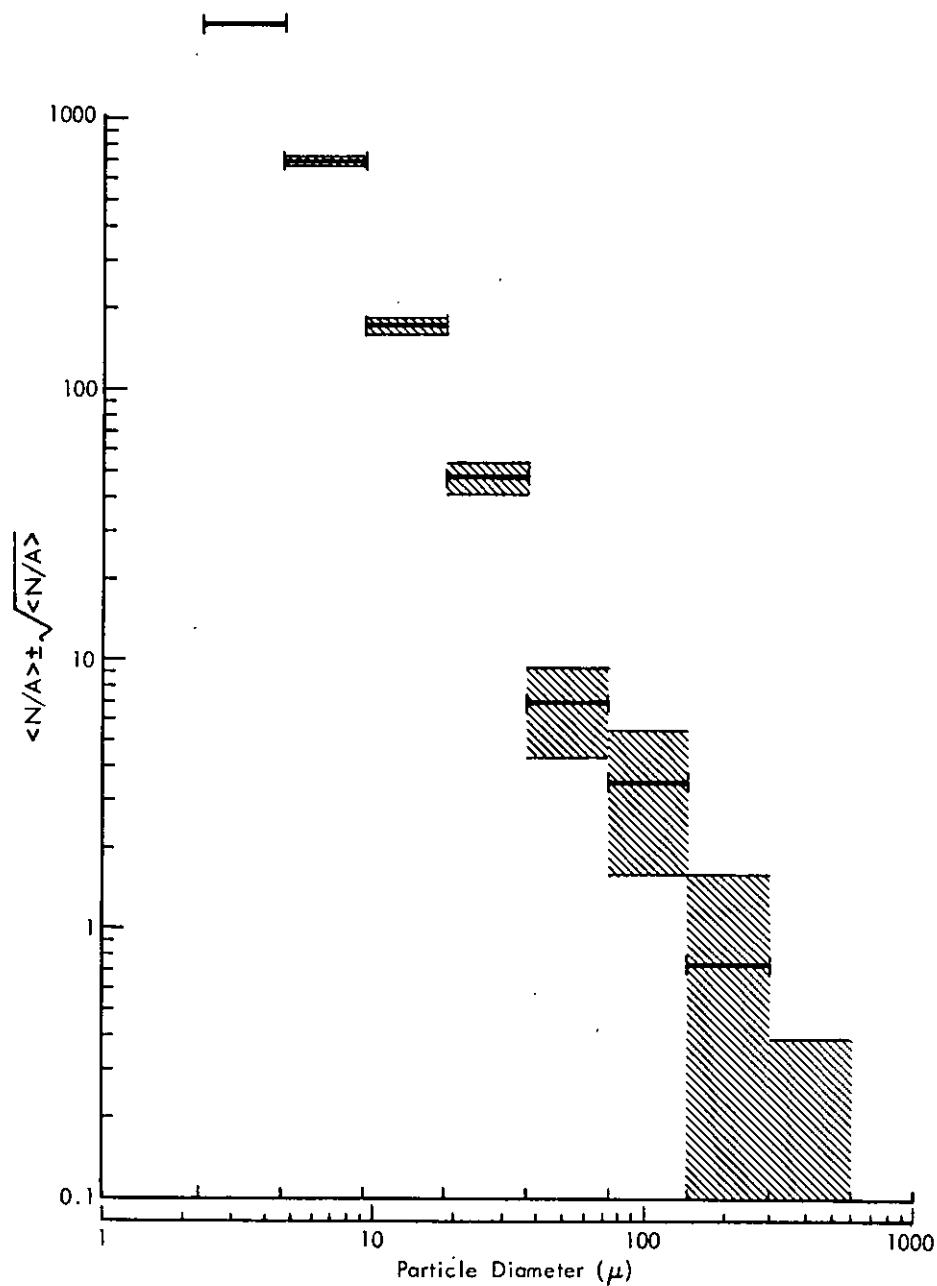


FIGURE B-9
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1109

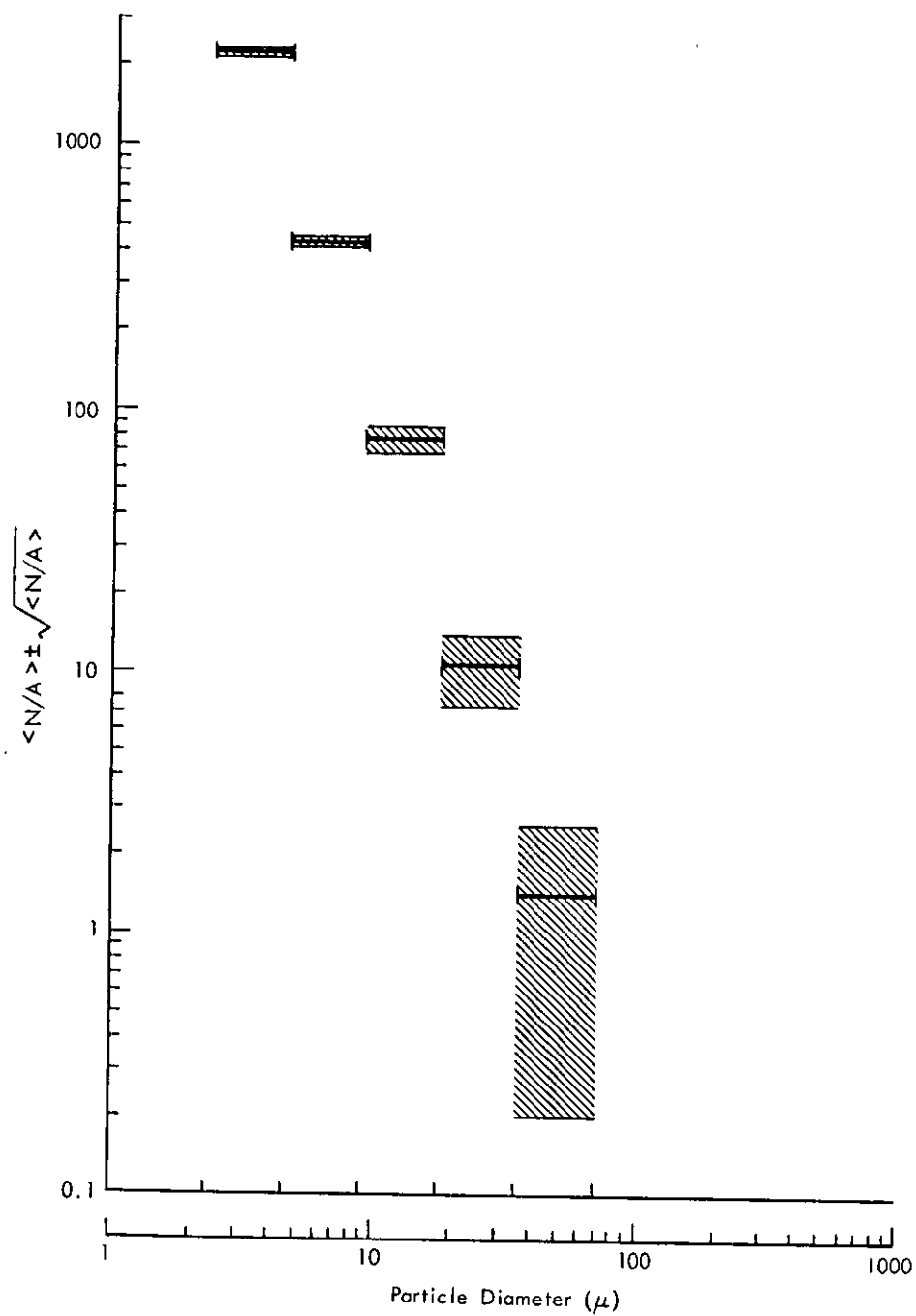


FIGURE B-10
NUMBER OF PARTICLES SIZED PER TOTAL AREA VIEWED
VERSUS PARTICLE DIAMETER FOR SAMPLE NO. 1222

TABLE B-17

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1051

<u>Mag.</u>	<u>Number</u>	<u>ΣN</u>	<u>$A(\text{mm}^2)$</u>	<u>Original</u> <u>$N/A \pm \sqrt{N/A}$</u>	<u>Estimated</u> <u>$\langle N/A \rangle \pm \sqrt{\langle N/A \rangle}$</u>	<u>Percent</u>
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

<u>Mag.</u>	<u>Number</u>	<u>ΣN</u>	<u>$A(\text{mm}^2)$</u>	<u>Original</u> <u>$N/A \pm \sqrt{N/A}$</u>	<u>Estimated</u> <u>$\langle N/A \rangle \pm \sqrt{\langle N/A \rangle}$</u>	<u>Percent</u>
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

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

TABLE B-20

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1009

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

TABLE B-21

OPTICAL SIZE-DISTRIBUTION DATA ON SAMPLE NO. 1222

<u>Mag.</u>	<u>Number</u>	<u>ΣN</u>	<u>$A(\mu m^2)$</u>	<u>Original</u> <u>$N/A \pm \sqrt{N/A}$</u>	<u>Estimated</u> <u>$\langle N/A \rangle \bullet \sqrt{\langle N/A \rangle}$</u>	<u>Percent</u>
800	0	483	0.2172	2223.8 ± 47.2	2223.8 ± 47.2	81.04
800	1	127	0.2172	584.7 ± 24.2	$430 \bullet 20.7$	15.67
360	1	452	1.4316	315.7 ± 17.8	--	--
800	2	17	0.2172	$78.3 \bullet 8.85$	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

<u>No.</u>	<u>Diameter</u> <u>Less Than</u>	<u>1051</u>	<u>1072</u>	<u>1076</u>	<u>1109</u>	<u>1222</u>
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

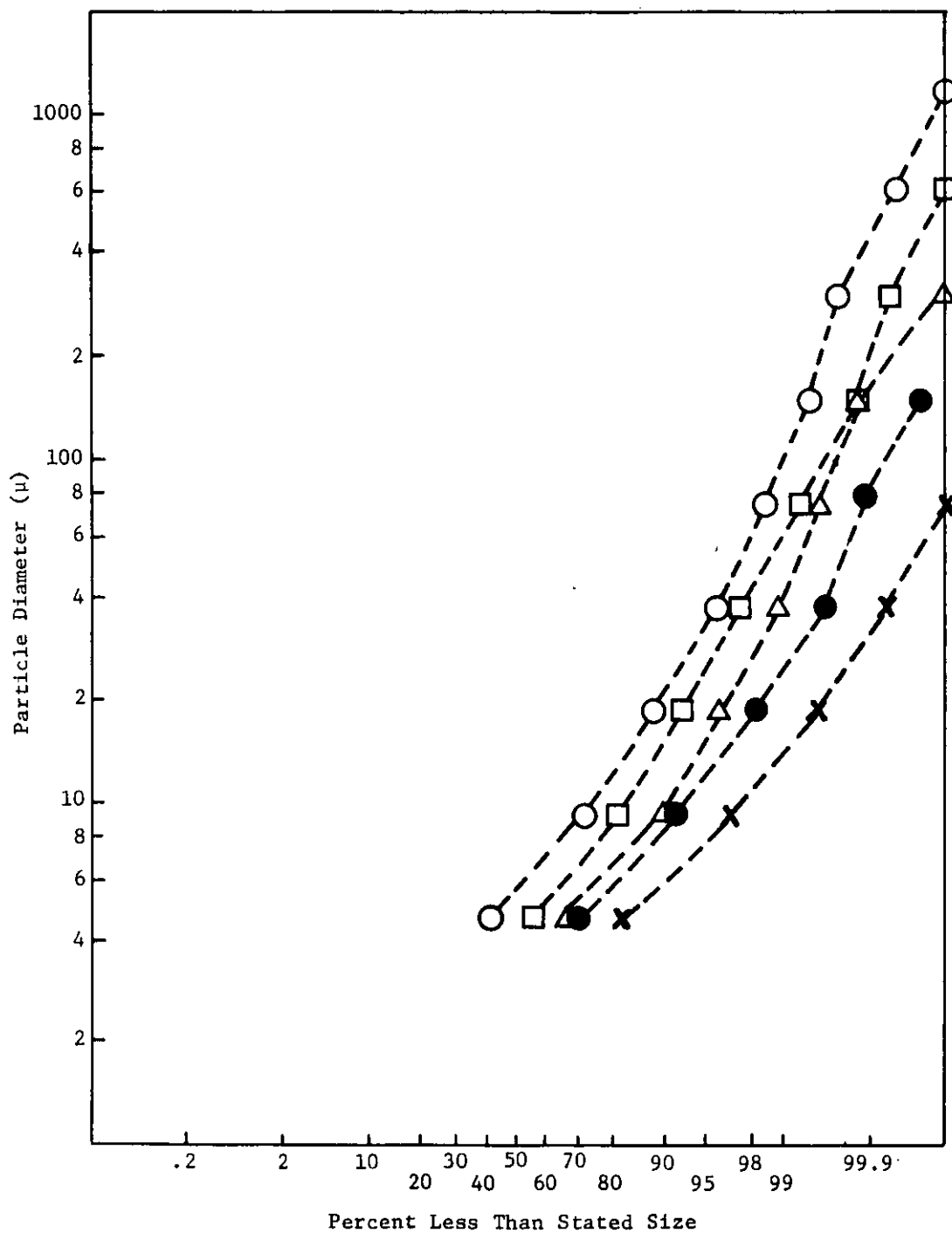


FIGURE 8-11
 SIZE DISTRIBUTION BY PARTICLE DIAMETER FOR SAMPLES
 1051 ○ 1072 □ 1076 △ 1109 ● 1222 X

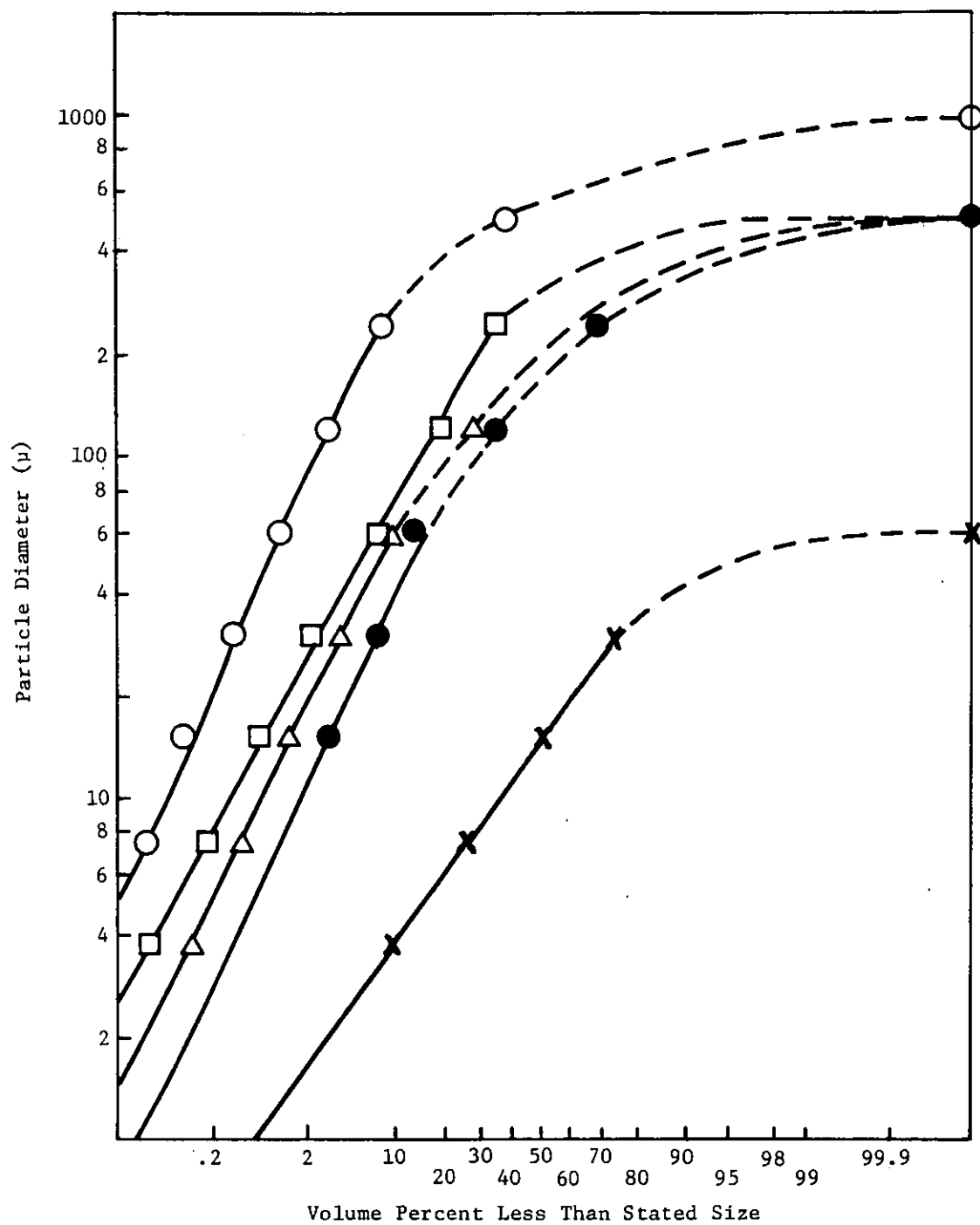


FIGURE B-12
VOLUME PERCENT VERSUS PARTICLE DIAMETER FOR SAMPLES
1051 ○ 1072 □ 1076 △ 1109 ● 1222 ×

The percent (by volume) in each size range:

$$\% = V <N/A> \frac{100}{\sum V <N/A>} . \quad (B-7)$$

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 phenanthrene, 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)

<u>Number</u>	<u>V(μ^3)</u>	<u>d_v(μ)</u>	<u>1051</u> <u>Σ</u>	<u>1072</u> <u>Σ</u>	<u>1076</u> <u>Σ</u>	<u>1109</u> <u>Σ</u>	<u>1222</u> <u>Σ</u>
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

<u>Sample No.</u> ^{a/}	<u>Total Weight (g)</u>	<u>Tar (%)</u>
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 polyethylene screw cap bottles.

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

TABLE B-25

BENZPYRENE ANALYSIS

<u>Sample No.</u>	<u>Total Benzpyrene(mg)</u>	<u>Total Tar (g)</u>	<u>Benzpyrene Conc.(ppm)^{a/}</u>
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

<u>Element</u>	<u>Analytical Line (A)</u>	<u>Flame Gases^{a/}</u>
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:

$$\text{Total } \mu\text{g} = \text{concentration}^{\text{a/}} (\mu\text{g/ml}) \times \text{dilution factor (ml)} \times \text{correction factor}$$

$$\text{Net } \mu\text{g} = \text{Total } \mu\text{g} - \mu\text{g in filter}$$

$$\text{Concentration (ppm)} = \frac{\text{Net } \mu\text{g}}{\text{Total Sample Weight (g)}}$$

$$\text{Concentration (\%)} = \text{ppm} \times 10^{-4}$$

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:

$$\text{Detection Limit (ppm)} = \frac{\text{Concentration}^{\text{b/}} (\mu\text{g/ml}) \times \text{dilution factor (50 ml)} - \text{sample weight used (g)}}{\text{correction factor}}$$

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
W8	25	0.46942	0.46942	1.0	1246, 1244, 1243
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 (ug)	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
Caesium	< 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 (ug)	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 (μ R)	Net (μ R)	$\bar{x}$
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-32
BARIUM

Sample No.	Total (μ R)	Net (μ R)	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%

TABLE B-31
ANTIMONY

Sample No.	Total (μ R)	Net (μ R)	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

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
R6	< 170	< 170	< 360

TABLE B-33
BERYLLIUM

Sample No.	Total (μg)	Net (μg)	DPM
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

TABLE B-34
CADMIUM

Sample No.	Total (μg)	Net (μg)	DPM
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			
1048	< 0.03	< 0.20	< 2.3
1069	< 0.04	< 0.19	150
1105	< 0.05	< 0.33	64
1111	< 0.04	< 1.4	45
1208	< 0.04	< 0.86	470
1209	< 0.03	< 0.96	< 11
1213	< 0.04	< 0.42	16
1222	< 0.04	< 0.83	110
1223	< 0.33	< 0.16	< 1.9
1224	0.26	0.42	260
1229	< 0.04	< 0.40	25
1230	< 0.10	< 2.4	400
1241	< 0.03	< 0.03	28
W8	0.27	0.27	16
W10	0.50	0.50	< 1.9
W12	< 0.075	< 0.075	< 1.7
K4	< 0.075	< 0.075	< 1.9
	0.25	0.25	< 1.9

TABLE B-37
CHROMIUM

Sample No.	Total (ug)	Net (ug)	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

TABLE B-35
CALCIUM

Sample No.	Total (ug)	Net (ug)	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	1.18%
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 (ug)	Net (ug)	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

1048	61	61	290
1069	< 1.9	< 1.9	< 13
1105	47	47	0.16%
1111	230	230	0.45%
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
W4	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

15

--

2.3

1048

1069

1105

1111

1208

1209

1213

1222

1223

1224

1229

1230

1261

W8

W10

W12

K4

22

9.2

21

20

5.1

24

36

< 14

49

310

10

41

120

4.3

< 3.1

3.8

< 3.1

22

9.2

21

18

2.8

24

36

< 14

49

310

7.7

41

120

4.3

< 3.1

3.8

< 3.1

100

61

730

390

90

250

750

< 6.9

80

0.312

180

0.372

380

9.2

< 5.8

6.0

< 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-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-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	0.8
1066	< 16	< 16	< 24

Filter No. 2

1048	43	43	55
1069	37	37	200
1105	14	14	240
1111	24	16	490
1208	16	7.7	340
1209	19	19	250
1213	190	190	200
1222	70	70	0.39%
1223	2,300	2,300	35
1224	33	33	0.37%
1229	260	250	330
1230	< 6.0	< 6.0	0.59%
1241	140	130	< 830
W8	< 15	< 15	410
W10	< 15	< 15	< 32
W12	21	21	< 28
K4	< 15	< 15	44
			< 32

TABLE B-43
MAGNESIUM

Sample No.	Total (μg)	Net (μg)	Ppm or %
Filter No. 1	260	--	0.19%
1045	400	140	690
1060	390	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 (ug)	Net (ug)	Ppm
Filter No. 1			
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			
1048	5.8	--	38
1069	36	36	170
1105	16	16	110
1111	8.5	8.5	300
1208	58	52	1,100
1209	10	4.2	160
1213	1.7	1.7	18
1222	20	20	410
1223	< 5.6	< 5.6	< 2.5
1224	16	16	26
1229	9.6	9.6	97
1230	13	7.2	170
1241	1.9	1.9	260
W8	20	14	44
W10	4.3	4.3	9.2
W12	3.5	3.5	6.6
K4	1.8	1.8	3.8
	5.8	5.8	12

a/ Less than filter blank.

TABLE B-45
MERCURY

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

TABLE B-46
MOLYBDENUMTABLE B-43
NICKEL

Filter No. 1	Total (ug)	Net (ug)	ppm or %
< 50	--	--	18
1045	< 73	< 73	0.12%
1060	< 57	< 57	0.10%
1067	< 56	< 56	880
1095	< 65	< 65	500
1102	< 62	< 62	0.10%
1114	< 62	< 62	0.21%
1066	< 200	< 200	61
W8	< 50	< 50	
W10	< 50	< 50	

ppm or %

Net (ug)

Total (ug)

Filter No. 1

ppm or %

Net (ug)

Total (ug)

Filter No. 1

ppm or %

Net (ug)

Total (ug)

TABLE B-47
POTASSIUM

Filter No. 1	Total (ug)	Net (ug)	%
< 50	--	--	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	0.8%
1066	400	400	0.06%
W8	120	120	0.12%
W10	130	130	0.09%

%

Net (ug)

Total (ug)

Filter No. 1

%

Net (ug)

Total (ug)

g/ Less than filter blank.

TABLE B-49
SELENIUM

Filter No. 1	Total (ug)	Net (ug)	PPM	Filter No. 1	Total (ug)	Net (ug)	PPM or %
1043	< 25	--	< 180	1045	10,000	--	7.1%
1060	< 36	< 36	< 180	1060	15,000	5,000	2.5%
1067	< 28	< 28	< 230	1067	11,000	1,000	0.8%
1095	< 28	< 28	< 88	1095	15,000	5,000	1.57%
1102	< 33	< 33	< 780	1102	14,000	4,000	9.5%
1114	< 31	< 31	< 490	1114	12,000	2,000	3.2%
1066	< 31	< 31	< 740	1066	12,000	2,000	4.8%
W8	< 100	< 100	< 150	W8	< 200	< 200	< 300
W10	< 25	< 25	< 250	W10	< 50	< 50	< 490
Filter No. 2	< 25	< 25	< 170		< 50	< 50	< 350
1048	< 21	--	< 140				
1069	< 26	< 26	< 120				
1105	< 34	< 34	< 220				
1111	< 28	< 28	< 970				
1208	< 26	< 26	< 560				
1209	< 21	< 21	< 680				
1213	< 25	< 25	< 260				
1222	< 25	< 25	< 520				
1223	< 430	< 430	< 210				
1224	< 100	< 100	< 160				
1229	< 26	< 26	< 260				
1230	< 140	< 140	< 3,300				
1241	< 21	< 21	< 2,900				
W8	< 110	< 110	< 350				
W10	< 98	< 98	< 210				
W12	< 98	< 98	< 180				
K4	< 98	< 98	< 210				

TABLE B-50
SODIUM

TABLE B-51
STRONTIUM

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

TABLE B54
TIN

Filter No. 1	Total (ug)	Met. (ug)	P25
1045	< 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	< 40	< 99
W10	< 10	< 10	< 69

TABLE B52
THALLIUM

Filter No. 1	Total (ug)	Met. (ug)	P25
1045	< 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	< 40	< 99
W10	< 10	< 10	< 69

TABLE B53
TITANIUM

Filter No. 1	Total (ug)	Met. (ug)	P25
1045	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

Filter No. 2	Total (ug)	Met. (ug)	P25 or 2
1045	< 22	--	< 150
1045	< 28	< 28	< 133
1069	56	56	370
1105	< 30	< 30	< 0.10%
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

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

TABLE B-56
ZINC

Filter No. 1	Total (µg)	Net (µg)	ppm or %
1045	4,200	--	3.0%
1060	6,400	2,200	1.1%
1067	5,000	800	0.64%
1095	4,500	300	940
1102	5,600	1,400	3.3%
1114	5,000	800	1.3%
1066	5,000	800	1.9%
	20	20	30

Filter No. 2	Total (µg)	Net (µg)	ppm
1048	< 15	--	< 99
1069	< 19	< 19	< 91
1105	< 24	< 24	< 160
1111	< 20	< 20	< 700
1208	< 18	< 18	< 390
1209	< 15	< 15	< 480
1213	< 17	< 17	< 180
1222	< 18	< 18	< 370
1223	< 73	< 73	< 36
1224	< 17	< 17	< 28
1229	< 19	< 19	< 190
1230	< 23	< 23	< 540
1241	< 15	< 15	< 2,100
W8	< 18	< 18	< 57
W10	< 17	< 17	< 36
W12	< 17	< 17	< 32
K4	< 17	< 17	< 36
	< 17	< 17	< 36

Filter No. 2	Total (µg)	Net (µg)	ppm or %
1048	8,000	--	5.3%
1069	29,000	29,000	14.0%
1105	24,000	24,000	16.0%
1111	420	420	1.5%
1208	8,400	400	0.86%
1209	8,000	0	0.2%
1213	220	220	0.23%
1222	1,600	1,600	3.3%
1223	38	38	19
1224	670	670	0.11%
1229	220	220	0.22%
1230	5,100	0	0.2%
1241	14	14	0.19%
W8	4,300	0	0.2%
W10	5.0	5.0	11
W12	4.5	4.5	8.4
K4	7.8	7.8	16
	4.0	4.0	8.6

g/ 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, CH₄, 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

SAMPLE MARKED: W-8 PORT 3

Sieve Sizes	Percent Retained	Percent Passing	Sieve Size	Percent Retained	Percent Passing
Round 1"	0.0	100.0	Round 1"	0.0	100.0
" 3/4"	0.63	99.17	" 3/4"	1.93	98.07
" 1/2"	3.14	96.03	" 1/2"	2.01	96.06
" 3/8"	4.37	91.66	" 3/8"	3.12	92.94
Square No. 4	11.49	80.17	Square No. 4	9.23	83.71
" No. 8	19.14	61.03	" No. 8	15.89	67.82
" No. 16	20.49	40.54	" No. 16	17.64	50.18
" No. 30	14.57	25.97	" No. 30	16.30	33.88
" No. 50	10.06	15.91	" No. 50	12.91	20.97
" No. 100	9.49	6.42	" No. 100	10.19	10.78
" No. 200	3.89	2.53	" No. 200	5.37	5.41

SAMPLE MARKED: K #4

SAMPLE MARKED: W-10

Sieve Sizes	Percent Retained	Percent Passing	Sieve Size	Percent Retained	Percent Passing
Round 1"	0.0	100.0	Round 1"	0.0	100.0
" 3/4"	0.0	100.0	" 3/4"	1.39	98.61
" 1/2"	2.07	97.93	" 1/2"	4.15	94.46
" 3/8"	3.94	93.99	" 3/8"	2.80	91.66
Square No. 4	10.05	83.94	Square No. 4	9.56	82.10
" No. 8	16.21	67.73	" No. 8	15.68	66.42
" No. 16	18.96	48.77	" No. 16	18.10	48.32
" No. 30	16.78	31.99	" No. 30	16.65	31.67
" No. 50	13.52	18.47	" No. 50	14.40	17.27
" No. 100	9.27	9.20	" No. 100	10.41	6.86
" No. 200	4.80	4.40	" No. 200	3.55	3.31

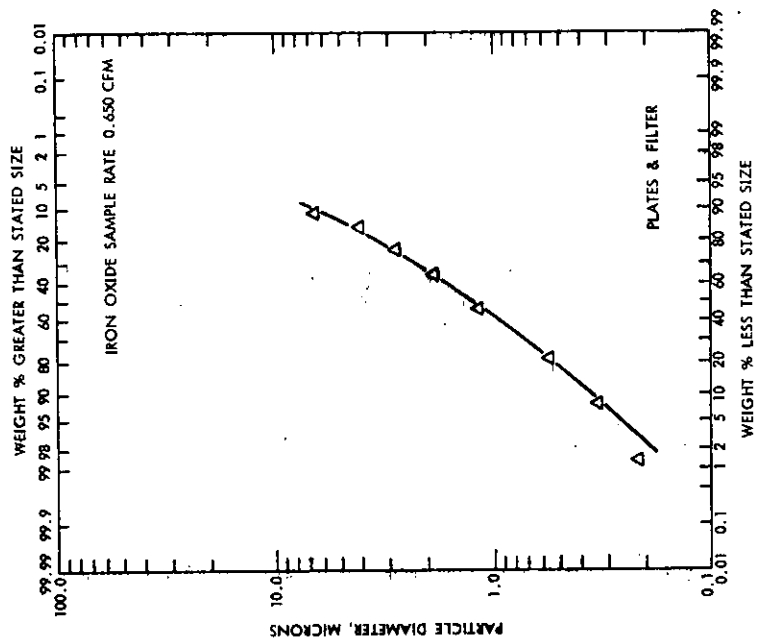


FIGURE B-15
BACKGROUND CURVES FOR ANDERSON CASCADE
IMPACTOR-IRON OXIDE AT 0.247 CFM

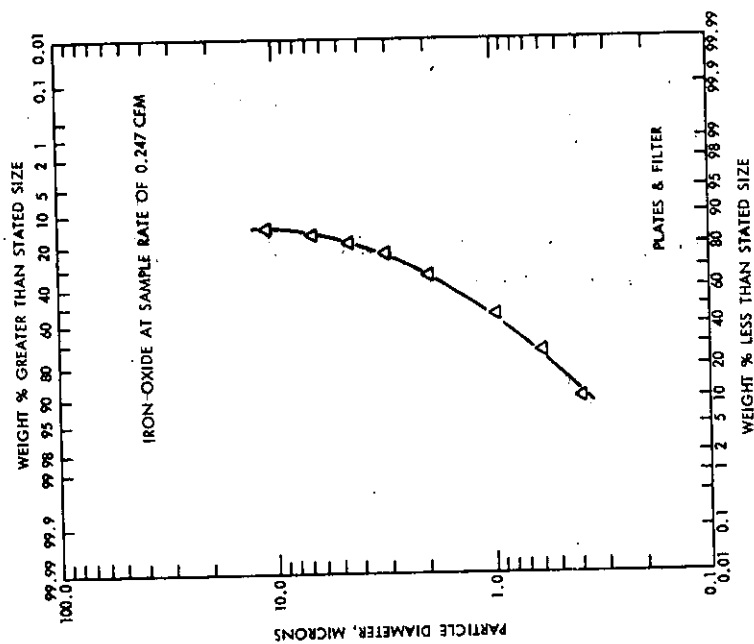


FIGURE B-16
BACKGROUND CURVES FOR ANDERSON CASCADE
IMPACTOR-IRON OXIDE AT 0.65 CFM

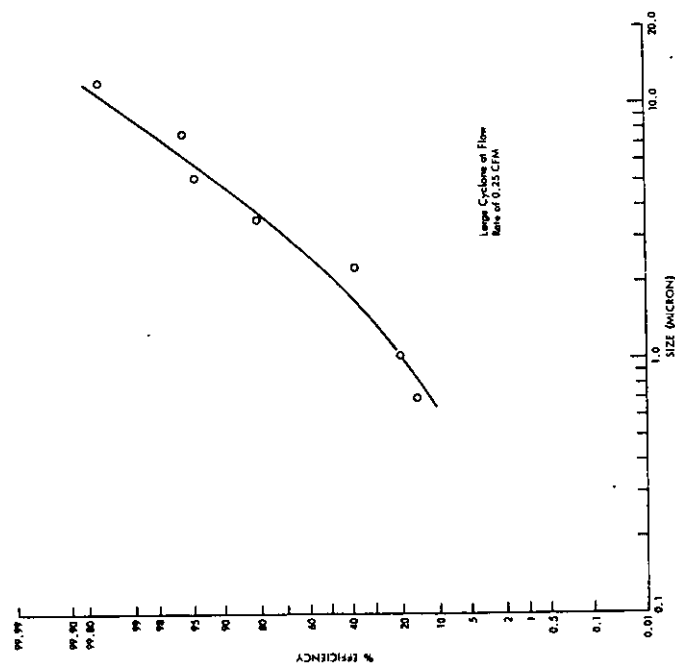


FIGURE B-17
CALIBRATION CURVE FOR LARGE CYCLONE USING LIMESTONE

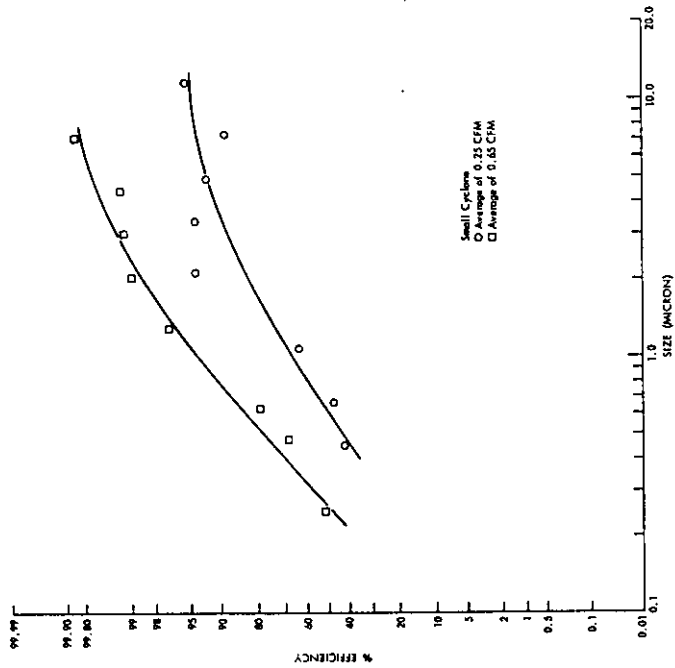


FIGURE B-18
CALIBRATION CURVE FOR SMALL CYCLONE

The methods used to quantify the gases are summarized below:

H₂S ASTM D 2725-70 "Methylene Blue Method;" exceptions to method -
 Neutral CdSO₄ 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"

NH₄ : 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

SO₂: 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 - N₂
 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 O₂, N₂, CO₂, H₂, THC, CH₄, 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

SAMPLE NUMBR	AMBIENT TEMP(F)	H2S ANALYTICAL RESULTS				SAMPLE VOLUME (LITERS)	TOTAL MICRO- GRAMS	PPM OF H2S
		BAROMETRIC PRESSURE (IN. HG)	FLASK PRESSURE (IN. HG)	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)			
		INIT.	FINAL	INIT.	FINAL			
K1A	79.00	29.40		.34	6.77	2.20	0.L.	1.10
K1B	79.00	29.40		.34	5.65	1.84	0.L.	1.10
K1C	79.00	29.40		.34	5.43	1.90	0.L.	1.10
K1D	79.00	29.40		.34	6.12	1.99	0.L.	1.10
K3A	80.00	29.25		.34	5.47	1.77	0.L.	1.10
K3B	80.00	29.25		.34	13.00	4.20	0.L.	1.10
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
K4H	84.00	29.52		.34	12.48	4.21	0.L.	1.10
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	0.L.	1.10
W3C	70.00	29.49		.34	2.92	.97	0.L.	1.10
W3D	70.00	29.49		.34	2.48	.82	0.L.	1.10
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	0.L.	1.10
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	0.L.	1.10
W7B	74.00	29.22		.34	.70	.23	0.L.	1.10
LD1C	88.00	29.42		.34	3.37	1.08	0.L.	1.10
LD1D	88.00	29.42		.34	2.52	.81	0.L.	1.10
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	0.L.	1.10
W11D	78.00	29.34		.34	3.05	.99	15.00	9.93
W12A	88.00	29.42		.34	2.38	.76	0.L.	1.10
W12B	88.00	29.42		.34	13.00	4.17	0.L.	1.10

TABLE B-60

SAMPLE NUMBER	AMBIENT TEMP (F)	ANALYTICAL RESULTS				SAMPLE VOLUME (LITERS)	TOTAL MICRO- GRAMS	PPM OF NOX (NO2)
		BAROMETRIC PRESSURE (IN. HG)	FLASK PRESSURE (IN. HG)	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)			
		INIT.	FINAL	INIT.	FINAL			
K1A	79.00	29.40	29.25	26.27	.49	1.74	0.L.	7.00
K1H	79.00	29.40	29.25	26.38	.49	1.73	0.L.	7.00
K1C	79.00	29.40	29.25	26.46	.49	1.75	0.L.	7.00
K1D	79.00	29.40	29.25	26.35	.49	1.74	0.L.	7.00
K3A	80.00	29.25	29.42	26.36	.49	1.74	0.L.	7.00
K3H	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
K4R	84.00	29.52	29.52	26.76	.49	1.75	0.L.	7.00
K4D	84.00	29.52	29.52	26.76	.49	1.76	0.L.	7.00
W2A	72.00	29.35	29.50	23.43	.49	1.58	30.00	9.26
W2H	72.00	29.35	29.50	23.67	.49	1.58	0.L.	7.00
W3A	70.00	29.49	29.38	23.90	.49	1.59	0.L.	7.00
W3C	70.00	29.49	29.38	23.83	.49	1.60	0.L.	7.00
W3D	70.00	29.49	29.38	23.86	.49	1.60	0.L.	7.00
W4A	75.00	29.35	29.44	23.67	.49	1.57	0.L.	7.00
W4H	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	0.L.	7.00
W5A	79.00	29.42	29.32	23.81	.49	1.56	40.00	12.48
W5H	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	0.L.	7.00
W6H	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	0.L.	7.00
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	0.L.	7.00
W7H	74.00	29.22	29.48	23.57	.49	1.56	0.L.	7.00
W7C	74.00	29.22	29.48	23.34	.49	1.55	960.00	301.28
W7D	74.00	29.22	29.48	23.34	.49	1.55	10.00	301.28
LD1C	88.00	29.42	29.52	26.79	.49	1.74	0.L.	7.00
LD1D	88.00	29.42	29.52	26.75	.49	1.74	0.L.	7.00
W10A	79.00	29.27	29.34	23.80	.49	1.57	0.L.	7.00
W10P	79.00	29.27	29.34	23.76	.49	1.56	0.L.	7.00
W10C	79.00	29.27	29.34	23.65	.49	1.56	0.L.	7.00
W11A	78.00	29.34	29.34	23.97	.49	1.58	0.L.	7.00
W11H	74.00	29.34	29.34	23.86	.49	1.58	0.L.	7.00
W11C	74.00	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	26.43	.49	1.74	10.00	2.79
W12H	88.00	29.42	29.52	26.67	.49	1.73	0.L.	7.00

TABLE B-61

NH4 ANALYTICAL RESULTS										
SAMPLE NUMBER	AMBIENT TEMP(F)	MANOMETRIC PRESSURE (IN. HG)		FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)	TOTAL MICRO- GRAMS	PPM OF NH3		
		INIT.	FINAL							
										INIT.
K1A	79.00	29.40		.34	7.27	2.39	D.L.	7.00	D.L.	3.86
K1R	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	2.66	.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
W5H	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	4.26	1.00	15.00			4.61
W6D	73.00	29.15		.34	3.03	.36	13.00			17.11
W7A	74.00	29.22		.34	1.10	.36	36.00			130.62
W7R	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
W12H	88.00	29.42		.34	13.00	4.20	D.L.	7.00	D.L.	2.19

TABLE B-62

SAMPLE NUMBER	AMBIENT TEMP(F)	CN ANALYTICAL RESULTS					TOTAL MICRO- GRAMS	PPM OF CN
		BAROMETRIC PRESSURE (IN. HG) INIT. FINAL	FLASK PRESSURE (IN. HG) INIT. FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)	SAMPLE VOLUME (LITERS)		
K1A	79.00	29.40		.36	7.77	2.68	D.L.	D.L.
K1B	79.00	29.40		.36	6.65	2.29	D.L.	D.L.
K1C	79.00	29.40		.36	6.83	2.36	D.L.	D.L.
K1D	79.00	29.40		.36	7.12	2.45	D.L.	D.L.
K3A	80.00	29.25		.36	6.47	2.22	D.L.	D.L.
K3B	80.00	29.25		.36	13.00	4.45	D.L.	D.L.
K3C	80.00	29.25		.36	3.18	1.09	D.L.	D.L.
K3D	80.00	29.25		.36	5.50	1.88	D.L.	D.L.
K4H	84.00	29.52		.36	13.00	4.46	D.L.	D.L.
K40	84.00	29.52		.36	1.00	.34	D.L.	D.L.
W2A	72.00	29.35		.36	9.37	3.27	D.L.	D.L.
W2R	72.00	29.35		.36	13.00	4.54	D.L.	D.L.
W3A	70.00	29.49		.36	4.80	1.69	D.L.	D.L.
W3C	70.00	29.49		.36	3.92	1.38	D.L.	D.L.
W3D	70.00	29.49		.36	3.48	1.23	D.L.	D.L.
W4A	75.00	29.35		.36	13.00	4.51	D.L.	D.L.
W4B	75.00	29.35		.36	11.07	3.84	D.L.	D.L.
W4C	75.00	29.35		.36	12.55	4.35	D.L.	D.L.
W5A	79.00	29.42		.36	13.00	4.49	D.L.	D.L.
W5B	79.00	29.42		.36	7.23	2.50	86.00	16.50
W5C	79.00	29.42		.36	13.00	4.49	30.00	10.34
W6A	73.00	29.15		.36	13.00	4.50	5.00	.96
W6R	73.00	29.15		.36	4.22	1.46	D.L.	D.L.
W6C	73.00	29.15		.36	13.00	4.50	D.L.	D.L.
W6D	73.00	29.15		.36	3.53	1.22	D.L.	D.L.
W7A	74.00	29.22		.36	1.60	.55	D.L.	D.L.
W7B	74.00	29.22		.36	1.70	.59	D.L.	D.L.
W7C	74.00	29.22		.36	1.25	.43	D.L.	D.L.
LD1C	88.00	29.42		.36	4.70	1.60	D.L.	D.L.
LD1D	88.00	29.42		.36	1.52	.51	D.L.	D.L.
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
W11R	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.	D.L.
W12A	88.00	29.42		.36	3.38	1.15	D.L.	D.L.
W12H	88.00	29.42		.36	13.00	4.41	D.L.	D.L.

TABLE B-63

SAMPLE NUMBER	AMBIENT TEMP(F)	PHENOL ANALYTICAL RESULTS			SAMPLE VOLUME (LITERS)	TOTAL MICRO- GRAMS	PPM OF PHENOL
		BAROMETRIC PRESSURE (IN. HG) INIT. FINAL	FLASK PRESSURE (IN. HG) INIT. FINAL	FLOW RATE (L./MIN)			
				SAMPLING TIME (MINUTES)			
K1A	79.00	29.40		.36	8.27	2.91	0.L. 50.00
K1B	79.00	29.40		.36	7.15	2.51	0.L. 50.00
K1C	79.00	29.40		.36	7.33	2.58	0.L. 50.00
K1D	79.00	29.40		.36	7.62	2.68	0.L. 50.00
K3A	80.00	29.25		.36	6.97	2.43	0.L. 50.00
K3B	80.00	29.25		.36	13.00	4.54	0.L. 50.00
K3C	80.00	29.25		.36	3.68	1.29	0.L. 50.00
K3D	80.00	29.25		.36	6.00	2.10	0.L. 50.00
K4H	84.00	29.52		.36	6.50	2.27	0.L. 50.00
K4D	84.00	29.52		.36	1.50	.52	0.L. 50.00
W2A	72.00	29.35		.36	9.87	3.51	0.L. 50.00
W2R	72.00	29.35		.36	13.00	4.62	0.L. 50.00
W3A	70.00	29.49		.36	5.30	1.90	0.L. 50.00
W3C	70.00	29.49		.36	4.42	1.58	0.L. 50.00
W3D	70.00	29.49		.36	3.98	1.43	0.L. 50.00
W4A	75.00	29.35		.36	13.00	4.60	0.L. 50.00
W4B	75.00	29.35		.36	11.57	4.09	0.L. 50.00
W4C	75.00	29.35		.36	13.00	4.60	0.L. 50.00
W5A	79.00	29.42		.36	13.00	4.58	0.L. 50.00
W5R	79.00	29.42		.36	7.73	2.72	0.L. 50.00
W5C	79.00	29.42		.36	13.00	4.58	0.L. 50.00
W6A	73.00	29.15		.36	13.00	4.58	0.L. 50.00
W6B	73.00	29.15		.36	4.72	1.66	0.L. 50.00
W6C	73.00	29.15		.36	13.00	4.58	0.L. 50.00
W6D	73.00	29.15		.36	4.03	1.42	0.L. 50.00
W7A	74.00	29.22		.36	2.10	.74	0.L. 50.00
W7R	74.00	29.22		.36	2.20	.78	0.L. 50.00
W7C	74.00	29.22		.36	1.75	.62	0.L. 50.00
LD1C	88.00	29.42		.36	5.20	1.80	0.L. 50.00
LD1D	88.00	29.42		.36	2.02	.70	0.L. 50.00
W10A	79.00	29.27		.36	9.78	3.43	0.L. 50.00
W11A	78.00	29.34		.36	13.00	4.57	0.L. 50.00
W11R	78.00	29.34		.36	13.00	4.57	0.L. 50.00
W11C	78.00	29.34		.36	13.00	4.57	0.L. 50.00
W11D	78.00	29.34		.36	4.55	1.60	0.L. 50.00
W12A	88.00	29.42		.36	3.88	1.34	0.L. 50.00
W12R	88.00	29.42		.36	13.00	4.50	0.L. 50.00

TABLE B-64

SAMPLE NUMBER	AMBIENT TEMP(F)	SO2 ANALYTICAL RESULTS					SAMPLE VOLUME (LITERS)	TOTAL MICRO- GRAMS	PPM OF SO2
		BAROMETRIC PRESSURE (IN. HG)		FLASK PRESSURE (IN. HG)	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)			
		INIT.	FINAL	INIT.	FINAL				
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.
K4H	84.00	29.52		.33	16.00	5.00	D.L.	90.00	D.L.
K4D	84.00	29.52		.33	2.00	.62	D.L.	90.00	D.L.
W2A	72.00	29.35		.33	10.37	3.29	D.L.	90.00	D.L.
W2B	72.00	29.35		.33	22.00	6.99	D.L.	90.00	D.L.
W3A	70.00	29.49		.33	2.30	.74	D.L.	90.00	D.L.
W3C	70.00	29.49		.33	4.92	1.57	D.L.	90.00	D.L.
W3D	70.00	29.49		.33	4.48	1.44	D.L.	90.00	D.L.
W4A	75.00	29.35		.33	22.00	6.95	D.L.	90.00	D.L.
W4B	75.00	29.35		.33	12.07	3.81	D.L.	100.00	D.L.
W4C	75.00	29.35		.33	13.55	4.28	D.L.	90.00	D.L.
W5A	79.00	29.42		.33	22.00	6.91	D.L.	1730.00	87.51
W5B	79.00	29.42		.33	8.23	2.59	D.L.	1720.00	232.47
W5C	79.00	29.42		.33	22.00	6.91	D.L.	1400.00	70.81
W6A	73.00	29.15		.33	22.00	6.93	D.L.	90.00	D.L.
W6B	73.00	29.15		.33	5.22	1.64	D.L.	90.00	D.L.
W6C	73.00	29.15		.33	22.00	6.93	D.L.	1370.00	69.16
W6D	73.00	29.15		.33	4.53	1.43	D.L.	90.00	D.L.
W7A	74.00	29.22		.33	2.60	.82	D.L.	90.00	D.L.
W7B	74.00	29.22		.33	2.70	.85	D.L.	90.00	D.L.
W7C	74.00	29.22		.33	2.25	.71	D.L.	90.00	D.L.
L01C	88.00	29.42		.33	5.70	1.76	D.L.	90.00	D.L.
L01D	88.00	29.42		.33	2.52	.78	D.L.	90.00	D.L.
W10A	79.00	29.27		.33	10.28	3.21	D.L.	90.00	D.L.
W11A	78.00	29.34		.33	13.63	4.28	D.L.	90.00	D.L.
W11B	78.00	29.34		.33	15.05	4.73	D.L.	90.00	D.L.
W11C	78.00	29.34		.33	22.00	6.91	D.L.	90.00	D.L.
W11D	78.00	29.34		.33	5.05	1.59	D.L.	90.00	D.L.
W12A	88.00	29.42		.33	4.38	1.35	D.L.	90.00	D.L.
W12B	88.00	29.42		.33	15.50	4.79	D.L.	90.00	D.L.

TABLE B-65

SAMPLE NUMBER	AMBIENT TEMP (F)	PYRIDINE ANALYTICAL RESULTS				SAMPLE VOLUME (LITERS)	TOTAL MICRO- GRAMS	PPM OF PYRIDINE
		HAROMETRIC PRESSURE (IN. HG) INIT. FINAL	FLASK PRESSURE (IN. HG) INIT. FINAL	FLOW RATE (L./MIN)	SAMPLING TIME (MINUTES)			
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
W5C	79.00	29.42		.36	7.73	2.72	D.L.500.00	D.L. 52.02
W6A	73.00	29.15		.36	13.00	4.58	D.L.500.00	D.L. 30.89
W6C	73.00	29.15		.36	4.72	1.66	D.L.500.00	D.L. 85.13
W6D	73.00	29.15		.36	13.00	4.58	D.L.500.00	D.L. 30.89
W7A	74.00	29.22		.36	4.03	1.42	D.L.500.00	D.L. 99.55
W7B	74.00	29.22		.36	2.10	.74	D.L.500.00	D.L.191.10
W7C	74.00	29.22		.36	2.20	.78	D.L.500.00	D.L.182.42
LD1C	88.00	29.42		.36	1.75	.62	D.L.500.00	D.L.229.32
LD1D	88.00	29.42		.36	5.20	1.80	D.L.500.00	D.L. 78.66
W10A	79.00	29.27		.36	2.02	.70	D.L.500.00	D.L.202.83
W11A	78.00	29.34		.36	9.78	3.43	D.L.500.00	D.L. 41.33
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	13.00	4.57	D.L.500.00	D.L. 30.97
W12A	88.00	29.42		.36	4.55	1.60	D.L.500.00	D.L. 88.50
W12B	88.00	29.42		.36	3.88	1.34	D.L.500.00	D.L.105.33
W12C	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, CH₄, 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 =

$$V_{sa} = (5)(P_s/P_a) (s), \text{ where}$$

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 =

$$R = V_{sa}/IRU_s, \text{ where}$$

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 =

$$V_{ua} = (R)(IRU_u), \text{ where}$$

V_{ua} = Volume of unknown gas at atmospheric pressure

IRU_u = Instrument response units for unknown gas

- (4) Total sample volume at atmospheric pressure =

$$V_{ts} = (5)(P_v/P_a), \text{ where}$$

V_{ts} = Total sample volume

P_u = Pressure of sample, mmHg

- (5) Concentration of unknown gas, volume percent =

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

TABLE B-68
O₂, N₂, CO₂, THC, CH₄, CO AND H₂ 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

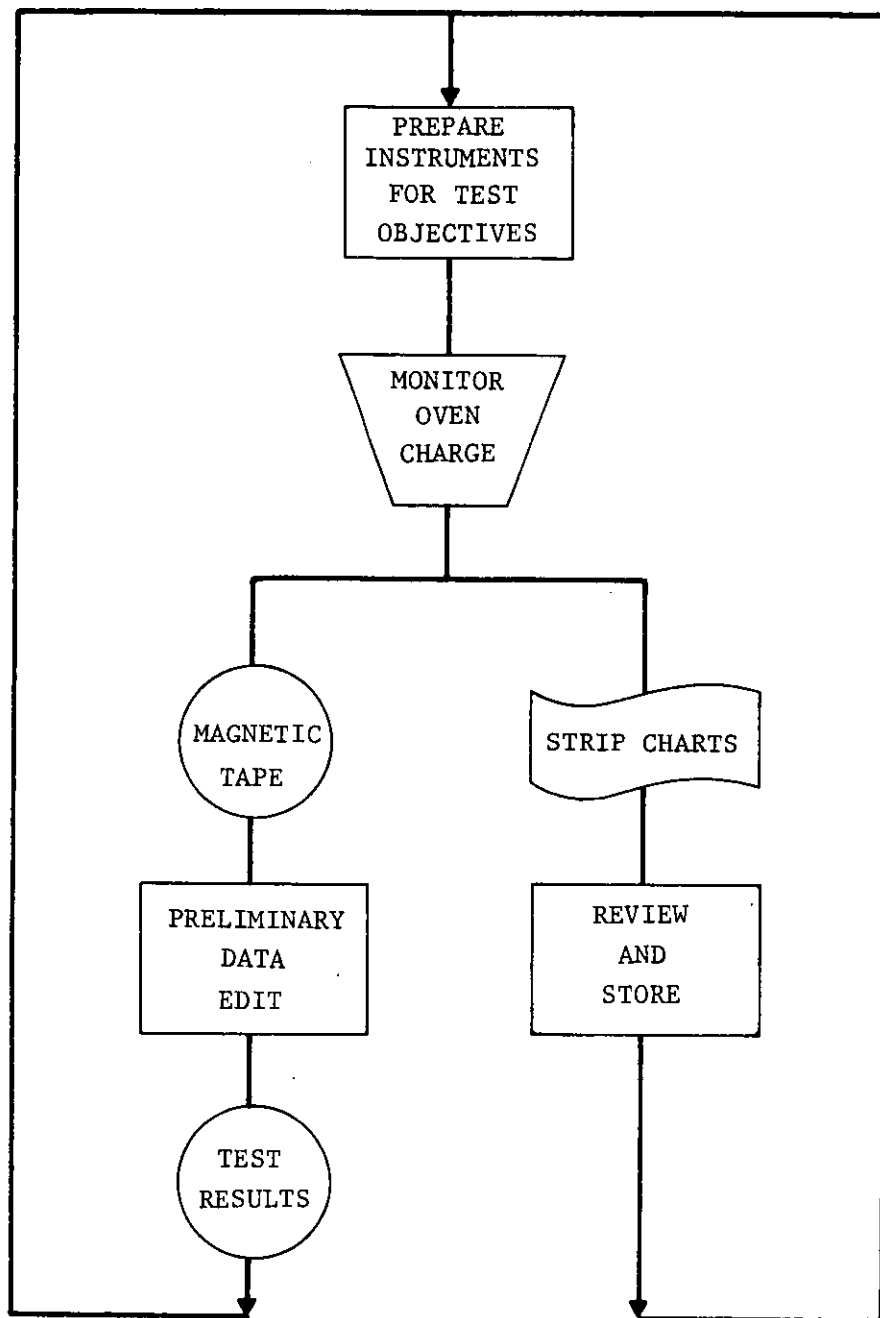


FIGURE C-1
COKE OVEN CHARGE DATA RECORDING OVERVIEW

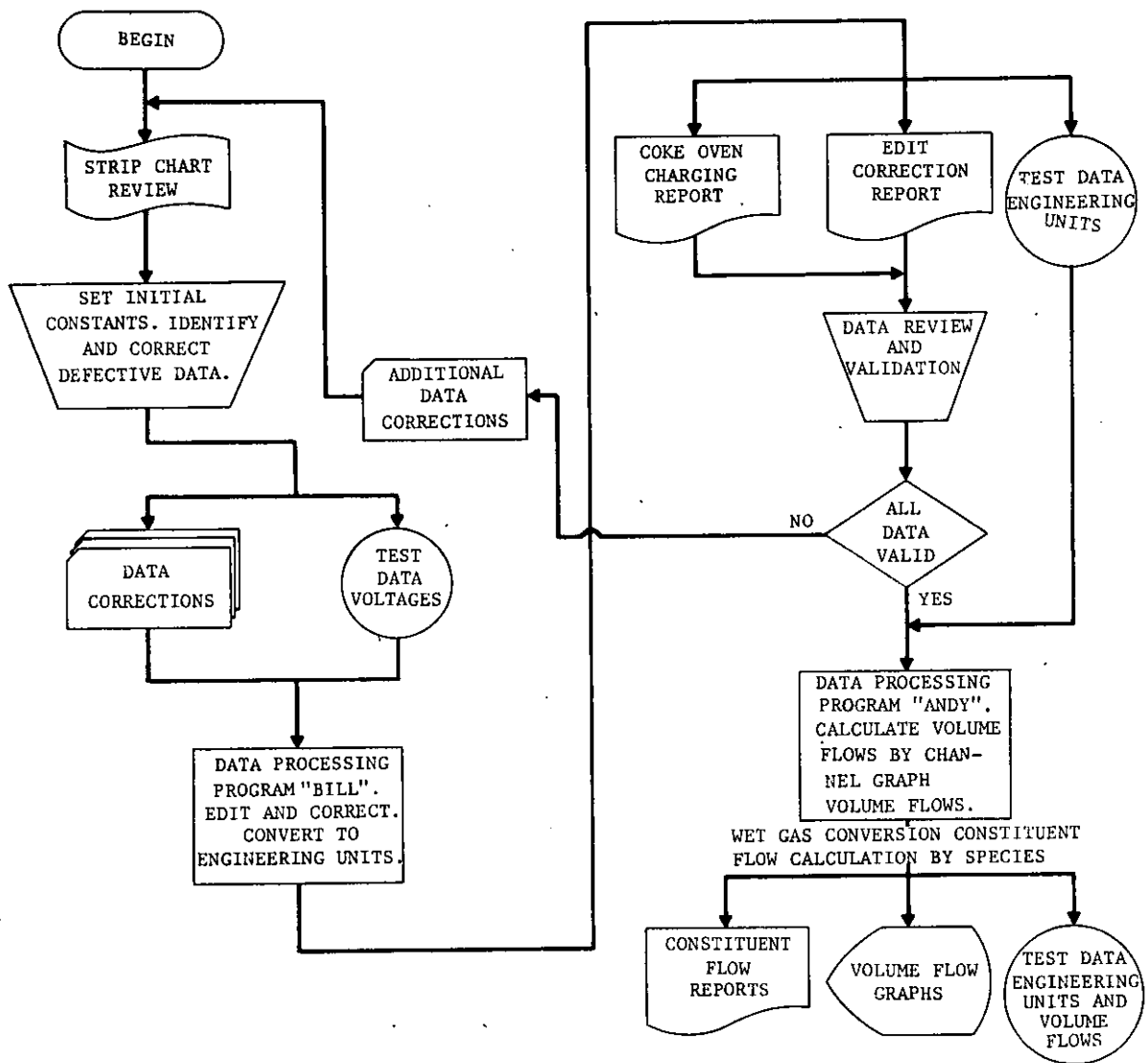


FIGURE C-2
COKE OVEN DATA PROCESSING OVERVIEW

final data tape provided EPA represent the output of the programs labeled "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
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

Header

Chan	2	Channel Identifier 00 - 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.

Data*

* Repeats to provide a total of seventy data items

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

<u>Level</u>	<u>Field Name</u>	<u>Field Type and Length in Bytes</u>	<u>Field Description</u>
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., 00, 01, etc. A blank denotes no observation for that second.
2	CH00	4 FIXED DECIMAL	Channel 00, Picture 999999.9
2	CH01	4 FIXED DECIMAL	Channel 01, Picture 999999.9
2	CH02	4 FIXED DECIMAL	Channel 02, Picture 999999.9
2	CH03	4 FIXED DECIMAL	Channel 03, Picture 9999.999
2	CH04	4 FIXED DECIMAL	Channel 04, Picture 99999.99
2	CH05	4 FIXED DECIMAL	Channel 05, Picture 999999.9
2	CH06	4 FIXED DECIMAL	Channel 06, Picture 9999.999
2	CH07	4 FIXED DECIMAL	Channel 07, Picture 99999.99
2	CH08	4 FIXED DECIMAL	Channel 08, Picture 999.9999
2	CH09	4 FIXED DECIMAL	Channel 09, Picture 999999.9
2	CH10	4 FIXED DECIMAL	Channel 10, 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	CH30	4 FIXED DECIMAL	Channel 30, 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	CH40	4 FIXED DECIMAL	Channel 40, 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., '00', '01', '02', ... denotes a second 0, no observations for second 1, second 2, etc.

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

<u>Level</u>	<u>Field Name</u>	<u>Field Type and Length in Bytes</u>	<u>Field Description</u>
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	CH20	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

** 0 - 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 (00, 01, 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

<u>Field Name</u>	<u>Field Type and Length in Bytes</u>	<u>Field Description</u>
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.
MRI CH	3 CHAR	Corresponding MRI test, if applicable
REMC	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, 0, 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 00 to 09 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						
CHØ1 (PPM SO ₂)			CHØ2 (PPM H ₂ S)		CHØ5 (THC)	
TEST	VALUE	# IN EXCESS	VALUE	# IN EXCESS	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	006768
DENSITY	1600 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	3608
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) =

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

Standard Flow - SF (I,J) =

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

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 "G1" 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 (CH00 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, 06 through 09, monitored H_2 , O_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".

<u>Level</u>	<u>Field Name</u>	<u>Field Type and Length in Bytes</u>	<u>Field Description</u>
1	KEY	8 CHAR	Input Record Key
2	CH00	4 FLOAT DECIMAL	Channel 00 Observation
2	CH01	4 FLOAT DECIMAL	Channel 01 Observation
2	CH02	4 FLOAT DECIMAL	Channel 02 Observation
2	CH03	4 FLOAT DECIMAL	Channel 03 Observation
2	CH04	4 FLOAT DECIMAL	Channel 04 Observation
2	CH05	4 FLOAT DECIMAL	Channel 05 Observation
2	CH06	4 FLOAT DECIMAL	Channel 06 Observation
2	CH07	4 FLOAT DECIMAL	Channel 07 Observation
2	CH08	4 FLOAT DECIMAL	Channel 08 Observation
2	CH09	4 FLOAT DECIMAL	Channel 09 Observation
2	CH10	4 FLOAT DECIMAL	Channel 10 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	CH30	4 FLOAT DECIMAL	Channel 30 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	CH40	4 FLOAT DECIMAL	Channel 40 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"

<u>Level</u>	<u>Field Name</u>	<u>Field Type and Length in Bytes</u>	<u>Field Description</u>
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*	CH20	1 CHAR	Channel 20 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.

<u>Flow Position</u>	<u>Contents</u>
1	Flow channel one
2	Flow channel two
3	Flow channel three
4	Sum of all flows monitored
5	Constituent flow measured in Channel 00
6	Constituent flow measured in Channel 01
7	Constituent flow measured in Channel 02
8	Constituent flow measured in Channel 03
9	Constituent flow measured in Channel 04
10	Constituent flow measured in Channel 05
11	Constituent flow measured in Channel 06
12	Constituent flow measured in Channel 07
13	Constituent flow measured in Channel 08
14	Constituent flow measured in Channel 09

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

CS/SEC PL/1 COMPILER (P)

VERSION 5.30

PL/1 P COMPILER OPTIONS SPECIFIED ARE AS FOLLOWS--

1040,NOLECK

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

```

ECCIC
CHARGO
NMPACRC
SOURCE2
NMPACCK
COMP
SOURCE
ATR
XREF
NEXTRF
NLIST
LOAD
ACDECK
FLAG
STMT
SIZE=C168192
LINECNT=056
CPT=C1
SURGIN=(C02,C72,C01)
NEXTDIC
NEST
CPLIST
SYNCHKS

ECCIC,CHARGO,NMPACRC,SOURCE2,NMPACCK,COMP,SOURCE,ATR,XREF,NEXTRF,NLIST,LOAD,
NLECK,FLAG,STPT,SIZE=0168192,LINECNT=056,OPT=C1,SURGIN=(C02,C72,C01),NEXTDIC,
NEST,CPLIST,SYNCHKS

```

C-22

3-50874

C00C0500

C00C0500
00000600

MYSTIC: PROCELUPE (CTIONS(MAIN) :

STMT LEVEL NEST

```

1  MYSTIC: PROCELUPE (CTIONS(MAIN) :
2  ENCLARE FOLS ENTRY (FIXED BINARY (31)) :
3  CCL MAX1 FILE PRINT :
4  CCL CIL (4) CHAR (1) INIT ('1','2','3','4') :
5  CCL FC FIXED DECIMAL (15,6) :
6  CCL (MAX1,MAX2) FIXED DECIMAL (7,1) :
7  CCL ECT CHAR (1) INIT (' ') :
8  CCL REPTR FILE PRINT :
9  CCL TRKEY CHAR (8) BASEC (C1) :
10  ELC2 CHAR (2) INIT (' ') :
11  CCL TRAN FILE RECD INFL SEQUENTIAL BUFFERED ENV (F16CC,80) :
12  CCL TRC4 FIXED DECIMAL (7,2) :
13  TR05 FIXED DECIMAL (7,1) :
14  TR07 FIXED DECIMAL (7,2) :
15  TR05 FIXED DECIMAL (7,1) :
16  TR31 FIXED DECIMAL (7,1) :
17  TR33 FIXED DECIMAL (7,3) :
18  TR34 FIXED DECIMAL (7,1) :
19  TR45 FIXED DECIMAL (7,5) :
20  (QSEC,TRSEC) FIXED BIN (15) :
21  ALLOC CHAR (80) BASEC (Q1) :
22  K04 CHAR (4) INIT (' ') :
23  K05 CHAR (4) INIT (' ') :
24  K07 CHAR (4) INIT (' ') :
25  K09 CHAR (4) INIT (' ') :
26  K20 CHAR (4) INIT (' ') :
27  K21 CHAR (4) INIT (' ') :
28  K22 CHAR (4) INIT (' ') :
29  K34 CHAR (4) INIT (' ') :
30  K45 CHAR (4) INIT (' ') :
31  SC4 CHAR (2) INIT (' ') :
32  SC5 CHAR (2) INIT (' ') :
33  SC7 CHAR (2) INIT (' ') :
34  SC9 CHAR (2) INIT (' ') :
35  S20 CHAR (2) INIT (' ') :
36  S21 CHAR (2) INIT (' ') :
37  S23 CHAR (2) INIT (' ') :
38  S24 CHAR (2) INIT (' ') :
39  S45 CHAR (2) INIT (' ') :
40  BLANK4 CHAR (4) INIT (' ') :
41  BLANK2 CHAR (2) INIT (' ') :
42  CCL CPERNEY CHAR (5) BASEC (C1) :
43  1 TRANACT BASEC (Q1) :
44  5 TRANKEY CHAR (7) :
45  5 EEL CHAR (1) :
46  5 SECT CHAR (2) :
47  5 EEC2 CHAR (3) :
48  5 TRC1 CHAR (2) :
49  5 EEC3 CHAR (2) :
50  5 TRV1 CHAR (1) :
51  5 EEC4 CHAR (2) :

```

350875

000C05C0

MYSTIC: PRG2[LINE OPTIENS(MAIN) :

SYMT LEVEL NEST

```

13 1      5 TRC2 CHAR (2) ,
      5 EE5 CHAR (2) ,
      5 TRV2 CHAR (8) ,
      5 EE6 CHAR (3) ,
      5 TRC2 CHAR (2) ,
      5 TRV3 CHAR (2) ,
      5 TRV3 CHAR (1) ,
      5 TRC4 CHAR (2) ,
      5 EE9 CHAR (2) ,
      5 TRV4 CHAR (8) ,
      5 EE91 CHAR (2) ,
      5 TRANEC CHAR (4) ,
      5 EE92 CHAR (1) ,
      5 SECE CHAR (2) ,
      5 EE93 CHAR (3) ,
      5 STARKY CHAR (5) INIT ( ' ' ) ,
      5 STCPREY CHAR (9) ;
      CCL 1 LEADER ,
      5 KEYIZ CHAR (3) INIT ('KEY') ,
      5 MCNT1 CHAR (12) ,
      5 CAVA CHAR (2) ,
      5 LABCH (35) CHAR (7) ,
      5 CYRC CHAR (4) ,
      5 MRICH CHAR (3) ,
      5 RENC1 CHAR (34) ,
      5 MKKREC CHAR (7) ,
      5 ANN FIXED EIN (15) ,
      5 JUNK CHAR (1588) INIT ('JUNK') ;
      DCL CF CHAR (7) INIT ('CEG F ' ) ,
      INNC CHAR (7) INIT ('-01' MC') ,
      CNFLAG CHAR (8) INIT ('***GN***') ,
      ELANK7 CHAR (7) INIT (' ERR ') ,
      CCL TAB(12) FIXED BIN(15) INITIAL(31,59,50,120,151,181,212,243,273,304,334,365 ) ;
      CCL LEAP FIXED BIN(15) ;
      CCL (IDE,M) FIXED BIN(15) ;
      DCL ACN_TAB(12) INIT('JANUARY ','FEBRUARY ','MARCH ','
      , APRIL ','MAY ','JUNE ','
      , JULY ','AUGUST ','SEPT ','
      ,OCTOBER ','NOVEMBER ','DECEMBER ')
      CHAR(9) ;
      DCL (CI,SC,LS16,LC16,LS19,LC19,LS20,LC20,LC30) FIXED BIN (31)
      INIT (0) ;
      DCL (JSEC,CATASEC,CATAPIN,CATAMP,INSEC ) FIXED BIN(31) INIT (0) ;
      DCL (I,J,P,ALWIN,NUMREC,CUPREC,NUMSTON,JCTR) FIXED BIN(31) INIT (0) ;
      DCL KEEPREC FIXED BIN (31) INIT (0) ;
      DCL (ERRCODE,TRREC,TRCT,SC )FIXED BIN(15) INIT (0) ;
      DCL (IC1SEC,TUTIN,TO1STCH,DEPREC )FIXED BIN(31) INIT (0) ;
      DCL (JSEC FIXED EIN (31) DEFINED SE ;
14 1      00000700
      00000860
      00000840
      00000880
      00000900
      00001000
      00001100
      00001200
      00001300
      00001400
      00001500
      00001600
      00001700
      00001800
      00001900
      00002000
      00002100
      00002200
      00002300
      00024000
      00002500
      00002600
15 1      INITIAL(31,59,50,120,151,181,212,243,273,304,334,365 ) ;
16 1      CCL LEAP FIXED BIN(15) ;
17 1      CCL (IDE,M) FIXED BIN(15) ;
18 1      DCL ACN_TAB(12) INIT('JANUARY ','FEBRUARY ','MARCH ','
      , APRIL ','MAY ','JUNE ','
      , JULY ','AUGUST ','SEPT ','
      ,OCTOBER ','NOVEMBER ','DECEMBER ')
      CHAR(9) ;
      DCL (CI,SC,LS16,LC16,LS19,LC19,LS20,LC20,LC30) FIXED BIN (31)
      INIT (0) ;
      DCL (JSEC,CATASEC,CATAPIN,CATAMP,INSEC ) FIXED BIN(31) INIT (0) ;
      DCL (I,J,P,ALWIN,NUMREC,CUPREC,NUMSTON,JCTR) FIXED BIN(31) INIT (0) ;
      DCL KEEPREC FIXED BIN (31) INIT (0) ;
      DCL (ERRCODE,TRREC,TRCT,SC )FIXED BIN(15) INIT (0) ;
      DCL (IC1SEC,TUTIN,TO1STCH,DEPREC )FIXED BIN(31) INIT (0) ;
      DCL (JSEC FIXED EIN (31) DEFINED SE ;
19 1
20 1
21 1
22 1
23 1
24 1
25 1

```


00000500

MYSTIC: PRECELUPE (PTIENS(MAIN) :

STMT LEVEL NEST

```

2 C00 PIC 'SSSVSSSS' *
2 E1 CHAR ( 2 ) *
2 C01 PIC 'SSSVSSSS' *
2 E2 CHAR ( 2 ) *
2 C02 PIC 'SSSVSSSS' *
2 E3 CHAR ( 2 ) *
2 C03 PIC 'SSSVSSSS' *
2 E4 CHAR ( 2 ) *
2 C04 PIC 'SSSVSSSS' *
2 E5 CHAR ( 2 ) *
2 C05 PIC 'SSSVSSSS' *
2 E6 CHAR ( 2 ) *
2 C06 PIC 'SSSVSSSS' *
2 E7 CHAR ( 2 ) *
2 C07 PIC 'SSSVSSSS' *
2 E8 CHAR ( 2 ) *
2 C08 PIC 'SSSVSSSS' *
2 E9 CHAR ( 2 ) *
2 C09 PIC 'SSSVSSSS' *
2 E10 CHAR ( 2 ) *
2 C10 PIC 'SSSVSSSS' *
2 E11 CHAR ( 2 ) *
2 C11 PIC 'SSSVSSSS' *
2 E12 CHAR ( 2 ) *
2 C12 PIC 'SSSVSSSS' *
2 E13 CHAR ( 2 ) *
2 C13 PIC 'SSSVSSSS' *
2 E14 CHAR ( 2 ) *
2 C14 PIC 'SSSVSSSS' *
2 E15 CHAR ( 2 ) *
2 C15 PIC 'SSSVSSSS' *
2 E16 CHAR ( 2 ) *
2 C16 PIC 'SSSVSSSS' *
2 E17 CHAR ( 2 ) *
2 C17 CHAR ( 1 ) *
2 E18 CHAR ( 7 ) *
2 C18 CHAR ( 1 ) *
2 E19 CHAR ( 7 ) *
2 C19 CHAR ( 1 ) *
2 E20 CHAR ( 7 ) *
2 C20 CHAR ( 1 ) *
2 E21 CHAR ( 7 ) *
2 C21 CHAR ( 1 ) *
2 E22 CHAR ( 7 ) *
2 C22 CHAR ( 1 ) *
2 E23 CHAR ( 7 ) *
2 C23 CHAR ( 1 ) *
2 E24 CHAR ( 7 ) *
2 C24 CHAR ( 1 ) *
2 E25 CHAR ( 7 ) *
2 C25 CHAR ( 1 ) *
2 E26 CHAR ( 6 ) *
2 C26 PIC 'SSSVSSSS' *
2 E27 CHAR ( 2 ) *
2 C28 CHAR ( 1 ) *
2 E29 CHAR ( 2 ) *
2 C30 PIC 'SSSVSSSS' *

```

NEVER USED * /
SIGN * /
SKIPPEC

NEVER USED * /

```

000069CC
00007000
00007100
00007200
00007300
00007400
00007500
00007600
00007700
00007800
00007900
00008000
00008100
00008200
00008300
00008400
00008500
00008600
00008700
00008800
00008900
00009000
00009100
00009200
00009300
00009400
00009500
00009600
00009700
00009800
00009900
00010000
00010100
00010200
00010300
00010400
00010500
00010600
00010700
00010800
00010900
00011000
00011100
00011200
00011300
00011400
00011500
00011600
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CCCCC0500

MYSTIC: PROCEDURE (TICKS(MAIN) :

STMT LEVEL NEST

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38      '3 WILPUTTE GUIDES
39      '2 WILPUTTE GUIDE & STACK'
40      '1 WILPUTTE GUIDE & STACK'
41      '2 WILPUTTE GUIDE & STACK'
42      '3 WILPUTTE STACKS
43      '2 WILPUTTE STACK & GUIDE'
44      '1 WILPUTTE STACK & GUIDE'
45      '3 KCPFFERS GUIDES
46      '2 WILPUTTE STACK
47      '1 KCPFFERS GUIDE
48      '1 & #2 KCPFFERS GUIDE
49      '1 (17) CHAR (3) INIT ('1','2','3','4','5','6','7',
50      '8','9','10','11','12','13','14','15','16','17',
51      '18','19','20','21','22','23','24','25','26','27',
52      '28','29','30','31','32','33','34','35','36','37',
53      '38','39','40','41','42','43','44','45','46','47',
54      '48','49','50','51','52','53','54','55','56','57',
55      '58','59','60','61','62','63','64','65','66','67',
56      '68','69','70','71','72','73','74','75','76','77',
57      '78','79','80','81','82','83','84','85','86','87',
58      '88','89','90','91','92','93','94','95','96','97',
59      '98','99','00')
60      RCM (12) CHAR (34) INIT (
61      'R1 ACTIVATED MANUALLY - BENT BOOM'
62      'CLIFF. PRES. FITOT PLUGGED'
63      'GAS LEAKS'
64      'GUIDE GAS PROBE FLUGGED'
65      '2 PROBE & THERMOCUPLE DATA DEF'
66      'EARLY PART OF TEST NOT RECORDED'
67      '3 SENSCE BLEND CUT'
68      'FLOW STOPPED ON #3'
69      'LOW FLOW - FANS BURNED OUT'
70      'HAC FIRE ON #3'
71      'PCOR GAS DATA'
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MYSTIC: PRECELUPE CPTIENS(MAIN) ;

STMT LEVEL NEST

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57      JCTR,JSEC,CE,SE,LS16,LC16,LS15,LC15,LS20,LO20,LS30,LC30,
59      (PAGE,A,71SKIP,F(12),F(12))) ;
60      ECF = 'Y' ; GC TC NUTEST ;
61      END ;
62      CA TRANSMT (INPUT) BEGIN ;
64      DEFREC = DEFREC + 1 ;
65      CC TC READER ;
66      END ;
67      CA CONVERSION BEGIN ;
68      FLT ECIT ('CONVERSION EREFC *** ERRCODE= 'ONCODE,ONSOURCE,
70      CNCHARONLCC) (PAGE,A,F(6),SKIP,A,SKIP,A) ;
71      ECF = 'Y' ; SIGNAL ERRCR ; END ;
72      CN ENCFAGE (REFC) BEGIN ;
73      PAGE = PAGE + 1 ;
74      PUT FILE (REFC) ECIT('MITRE - EPA CORE CVEN TESTS', 'PAGE',
75      'DATE',MONTH,DAY,' ',19,YR,'OVEN',CVEN(CVNUM)),
76      'MITRE TEST NUMBER',TEST,PCINTS MONITORED,PCINT(PCNUM),
77      'MRI TEST NUMBER',MRI(MRITEST),REMARKS,REMARKNUM),
78      'TIME',SUBSTR(CTREC,REC_ID(JCTR),4,2),':',SUBSTR(QTRREC,
79      REC_ID(JCTR),6,2)) ;
80      (PAGE,COL(50),A,COL(120),A,F(6),SKIP(2),COL(08),3*(X(2),A),A,
81      A,CCL(70),A,X(2),A),
82      COL(10),A,F(6),COL(70),A,X(15),A,
83      COL(10),A,F(6),COL(70),A,X(2),A,COL(10),A,X(2),5(A)) ;
84      END ;
85      CP ENCFILE (TRAN) BEGIN ;
86      ECF = 'Y' ;
87      END ;
88      CFEN FILE (REFTR) LINESIZE (132) PAGESIZE (66) ;
89      READER: RECF FILE (TRAN) SET (Q1) ;
90      IF SECT < '15' THEN BBI = '1' ; ELSE IF SECT < '30' THEN BBI = '2' ;
91      ELSE IF SECT < '45' THEN BBI = '3' ; ELSE BBI = '4' ;
92      READER: RECF FILE (INPUT) SET (Q) ; /* A1 */
93      ALMIN = NUMIN + 1 ;
94      IF STARKEY > CKEY THEN GC TC READER ; /* READ START CHECK */
95      PUT ECIT ('READER',ALLKEY,TALLKEY,JL,TJC,KEY,TKEY) (SKIP,7*(X(2),A)) ;
96      /*
97      IF TALLKEY = ALLKEY THEN
98      CC ;
99      TALLKEY = ALLKEY ;
100      KEEPSEC = INREC-SEC ;
101      ICTR = (KEEPSEC / 15) ;
102      ISEC = KEEPSEC - (ICTR * 15) + 1 ;
103      ICTR = PCL(ICTR,4) + 1 ;
104      IF THEY = KEY THEN
105      CC ;
106      /* DEQUE ONLY
107      IF (NUMSTON > 6C
108      ***** */

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0000500

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MYSTIC: PSCCEUFE CPTICNS(MAIN) :
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STMT	LEVEL	NEST	CODE
99	1	2	DATASEC = KEEPSEC + INDESEC ; /* CUM TIME TC MIN*/00030700
100	1	2	END ;
101	1	1	ELSE
101	1	1	IF 1JC ~ JD THEN GC TC NUTEST ;
101	1	1	ELSE
103	1	1	DC ;
103	1	1	KEY = KEY ;
104	1	1	IF THR ~ FR THEN
105	1	2	IF THR ~ FR THEN
106	1	2	DC ;
107	1	2	TPR = HR ;
108	1	2	CATAHR = HR ;
109	1	2	CATAHR = MIN ;
110	1	2	INDESEC = (DATAHR * 3600) + (DATAMIN * 60) ;
111	1	2	CATASEC = KEEPSEC + INDESEC ;
111	1	2	END ;
112	1	2	ELSE
113	1	2	DC ;
113	1	2	DATAMIN = MIN ;
114	1	2	INDESEC = (CATAHR * 3600) + (DATAMIN * 60) ;
115	1	2	DATASEC = KEEPSEC + INDESEC ;
116	1	2	END ;
117	1	2	END ;
118	1	2	END ;
119	1	2	END ;
120	1	2	END ;
120	1	2	CC ;
121	1	2	DUPREC = DUPREC + 1 ;
122	1	2	GC TC READER ;
123	1	2	END ;
124	1	2	IF DATASEC - JSEC > 7200 THEN GC TC NUTEST ; /* 60 MIN*/00033500
			/* CEREU ONLY
			IF (NUMSTON > 60
			***** */
			QCHECK =
			/*
			PUT EDIT ('CHECK',DATASEC,JSEC,ISEC,JQTR,IQTR) (SKIP,A,5(F(12))) ;
			*/
			IF DATASEC - JSEC > 59 THEN
			DC ;
			CALL RCUS (JQTR) ;
			GC TC CCHECK ;
			END ;
			ELSE
			DC ;
			IF STOPKEY < CHECKKEY THEN GC TO LAGGER ; /* LAG CHECK TEST */
			IF CTRREC(IQTR).REC_IC = , THEN
			DC ;
			CTRREC.REC_IC (IQTR) = KEY ;
			QTR (IQTR) = QIC (IQTR) ;
			NUMREC = NUMREC + 1 ;
			END ;
			ELSE IF QTRREC(IQTR).REC_IC ~ KEY THEN GO TOERRR ;
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			00036400
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00000500

MUSTIC: PROCEDURE CFTICN(MAIN);

STMT LEVEL NEST

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142 1 1      END ;
143 1 1      STICRE: /* REPLACES KEEPER */
144 1 1      ALPSTIC = NUMSTIC + 1 ;
/* CALCULATE LAGGED INDEXES FOR 16,19,20,30 SEC LAG
AS LC16 AND LS16, ETC. */
145 1 1      LAGGER:
146 1 1      IF DATASEC - JSEC > 29 THEN GC TC LAG_30 ;
147 1 1      ELSE IF DATASEC - JSEC > 19 THEN GC TC LAG_20 ;
148 1 1      ELSE IF DATASEC - JSEC > 18 THEN GC TC LAG_19 ;
149 1 1      ELSE IF DATASEC - JSEC > 15 THEN GC TC LAG_16 ;
150 1 1      ELSE GC TC AC_LAG ;
151 1 1      LAG_30:
152 1 1      /* INDEX FOR LAG CF IS RELATED TO CURRENT INDEX */
153 1 1      LC30 = M(CIC10 + 1,4) + 1 ;
154 1 1      /*
155 1 1      (SELECT (STRANGE)) /* CF03 (LC30,LS30) = AC3 * C02 + B03 ;
156 1 1      CH04 (LC30,LS30) = C04 * A04 + B04 ;
157 1 1      IF TEST < 4 THEN CASE (LC30,LS30) = C53 ;
158 1 1      LAG_20:
159 1 1      LS20 = DATASEC - 20 ;
160 1 1      LC20 = LS20 / 15 ;
161 1 1      LS20 = LS20 - (LC20 * 15) * 1 ;
162 1 1      LC20 = M(CIC20,4) + 1 ;
163 1 1      CF06 (LC20,LS20) = A06 * C06 + B06 ;
164 1 1      CH07 (LC20,LS20) = C07 * A07 + B07 ;
165 1 1      CF08 (LC20,LS20) = C08 ;
166 1 1      CF09 (LC20,LS20) = C09 ;
167 1 1      CH09 (LC20,LS20) = C05 ;
168 1 1      LAG_15:
169 1 1      LS15 = DATASEC - 15 ;
170 1 1      LC15 = LS15 / 15 ;
171 1 1      LS15 = LS15 - (LC15 * 15) + 1 ;
172 1 1      LC15 = M(CIC15,4) + 1 ;
173 1 1      IF LABEL16 = 1 * THEN CH05(LC15,LS15)=C05 *
174 1 1      A05 + B05 ;
175 1 1      LAG_16:
176 1 1      LS16 = DATASEC - 16 ;
177 1 1      LC16 = LS16 / 15 ;
178 1 1      LS16 = LS16 - (LC16 * 15) + 1 ;
179 1 1      LC16 = M(CIC16,4) + 1 ;
180 1 1      IF LABEL11 = 1 * THEN CF00 (LC16,LS16) = C00
181 1 1      * AC0 ;
182 1 1      IF LABEL12 = 1 * THEN CF01 (LC16,LS16) = C01 * AC1
183 1 1      + C003500 ;
184 1 1      IF LABEL13 = 1 * THEN CF02 (LC16,LS16) = C02 * AC2
185 1 1      + C003950 ;
186 1 1      IF LABEL14 = 1 * THEN CF03 (LC16,LS16) = C03 * AC3
187 1 1      + C004000 ;
188 1 1      IF LABEL15 = 1 * THEN CF04 (LC16,LS16) = C04 * AC4
189 1 1      + C004010 ;
190 1 1      IF LABEL16 = 1 * THEN CF05 (LC16,LS16) = C05 * AC5
191 1 1      + C004020 ;
192 1 1      IF LABEL17 = 1 * THEN CF06 (LC16,LS16) = C06 * AC6
193 1 1      + C004030 ;
194 1 1      IF LABEL18 = 1 * THEN CF07 (LC16,LS16) = C07 * AC7
195 1 1      + C004040 ;
196 1 1      IF LABEL19 = 1 * THEN CF08 (LC16,LS16) = C08 * AC8
197 1 1      + C004050 ;
198 1 1      IF LABEL20 = 1 * THEN CF09 (LC16,LS16) = C09 * AC9
199 1 1      + C004060 ;
200 1 1      IF LABEL21 = 1 * THEN CF10 (LC16,LS16) = C10 * AC10
201 1 1      + C004070 ;
202 1 1      IF LABEL22 = 1 * THEN CF11 (LC16,LS16) = C11 * AC11
203 1 1      + C004080 ;
204 1 1      IF LABEL23 = 1 * THEN CF12 (LC16,LS16) = C12 * AC12
205 1 1      + C004090 ;
206 1 1      IF LABEL24 = 1 * THEN CF13 (LC16,LS16) = C13 * AC13
207 1 1      + C004100 ;
208 1 1      IF LABEL25 = 1 * THEN CF14 (LC16,LS16) = C14 * AC14
209 1 1      + C004110 ;
210 1 1      IF LABEL26 = 1 * THEN CF15 (LC16,LS16) = C15 * AC15
211 1 1      + C004120 ;
212 1 1      IF LABEL27 = 1 * THEN CF16 (LC16,LS16) = C16 * AC16
213 1 1      + C004130 ;
214 1 1      IF LABEL28 = 1 * THEN CF17 (LC16,LS16) = C17 * AC17
215 1 1      + C004140 ;
216 1 1      IF LABEL29 = 1 * THEN CF18 (LC16,LS16) = C18 * AC18
217 1 1      + C004150 ;
218 1 1      IF LABEL30 = 1 * THEN CF19 (LC16,LS16) = C19 * AC19
219 1 1      + C004160 ;
220 1 1      IF LABEL31 = 1 * THEN CF20 (LC16,LS16) = C20 * AC20
221 1 1      + C004170 ;
222 1 1      IF LABEL32 = 1 * THEN CF21 (LC16,LS16) = C21 * AC21
223 1 1      + C004180 ;
224 1 1      IF LABEL33 = 1 * THEN CF22 (LC16,LS16) = C22 * AC22
225 1 1      + C004190 ;
226 1 1      IF LABEL34 = 1 * THEN CF23 (LC16,LS16) = C23 * AC23
227 1 1      + C004200 ;
228 1 1      IF LABEL35 = 1 * THEN CF24 (LC16,LS16) = C24 * AC24
229 1 1      + C004210 ;
230 1 1      IF LABEL36 = 1 * THEN CF25 (LC16,LS16) = C25 * AC25
231 1 1      + C004220 ;
232 1 1      IF LABEL37 = 1 * THEN CF26 (LC16,LS16) = C26 * AC26
233 1 1      + C004230 ;
234 1 1      IF LABEL38 = 1 * THEN CF27 (LC16,LS16) = C27 * AC27
235 1 1      + C004240 ;
236 1 1      IF LABEL39 = 1 * THEN CF28 (LC16,LS16) = C28 * AC28
237 1 1      + C004250 ;
238 1 1      IF LABEL40 = 1 * THEN CF29 (LC16,LS16) = C29 * AC29
239 1 1      + C004260 ;
240 1 1      IF LABEL41 = 1 * THEN CF30 (LC16,LS16) = C30 * AC30
241 1 1      + C004270 ;
242 1 1      IF LABEL42 = 1 * THEN CF31 (LC16,LS16) = C31 * AC31
243 1 1      + C004280 ;
244 1 1      IF LABEL43 = 1 * THEN CF32 (LC16,LS16) = C32 * AC32
245 1 1      + C004290 ;
246 1 1      IF LABEL44 = 1 * THEN CF33 (LC16,LS16) = C33 * AC33
247 1 1      + C004300 ;
248 1 1      IF LABEL45 = 1 * THEN CF34 (LC16,LS16) = C34 * AC34
249 1 1      + C004310 ;
250 1 1      IF LABEL46 = 1 * THEN CF35 (LC16,LS16) = C35 * AC35
251 1 1      + C004320 ;
252 1 1      IF LABEL47 = 1 * THEN CF36 (LC16,LS16) = C36 * AC36
253 1 1      + C004330 ;
254 1 1      IF LABEL48 = 1 * THEN CF37 (LC16,LS16) = C37 * AC37
255 1 1      + C004340 ;
256 1 1      IF LABEL49 = 1 * THEN CF38 (LC16,LS16) = C38 * AC38
257 1 1      + C004350 ;
258 1 1      IF LABEL50 = 1 * THEN CF39 (LC16,LS16) = C39 * AC39
259 1 1      + C004360 ;
260 1 1      IF LABEL51 = 1 * THEN CF40 (LC16,LS16) = C40 * AC40
261 1 1      + C004370 ;
262 1 1      IF LABEL52 = 1 * THEN CF41 (LC16,LS16) = C41 * AC41
263 1 1      + C004380 ;
264 1 1      IF LABEL53 = 1 * THEN CF42 (LC16,LS16) = C42 * AC42
265 1 1      + C004390 ;
266 1 1      IF LABEL54 = 1 * THEN CF43 (LC16,LS16) = C43 * AC43
267 1 1      + C004400 ;
268 1 1      IF LABEL55 = 1 * THEN CF44 (LC16,LS16) = C44 * AC44
269 1 1      + C004410 ;
270 1 1      IF LABEL56 = 1 * THEN CF45 (LC16,LS16) = C45 * AC45
271 1 1      + C004420 ;
272 1 1      IF LABEL57 = 1 * THEN CF46 (LC16,LS16) = C46 * AC46
273 1 1      + C004430 ;
274 1 1      IF LABEL58 = 1 * THEN CF47 (LC16,LS16) = C47 * AC47
275 1 1      + C004440 ;
276 1 1      IF LABEL59 = 1 * THEN CF48 (LC16,LS16) = C48 * AC48
277 1 1      + C004450 ;
278 1 1      IF LABEL60 = 1 * THEN CF49 (LC16,LS16) = C49 * AC49
279 1 1      + C004460 ;
280 1 1      IF LABEL61 = 1 * THEN CF50 (LC16,LS16) = C50 * AC50
281 1 1      + C004470 ;
282 1 1      IF LABEL62 = 1 * THEN CF51 (LC16,LS16) = C51 * AC51
283 1 1      + C004480 ;
284 1 1      IF LABEL63 = 1 * THEN CF52 (LC16,LS16) = C52 * AC52
285 1 1      + C004490 ;
286 1 1      IF LABEL64 = 1 * THEN CF53 (LC16,LS16) = C53 * AC53
287 1 1      + C004500 ;
288 1 1      IF LABEL65 = 1 * THEN CF54 (LC16,LS16) = C54 * AC54
289 1 1      + C004510 ;
290 1 1      IF LABEL66 = 1 * THEN CF55 (LC16,LS16) = C55 * AC55
291 1 1      + C004520 ;
292 1 1      IF LABEL67 = 1 * THEN CF56 (LC16,LS16) = C56 * AC56
293 1 1      + C004530 ;
294 1 1      IF LABEL68 = 1 * THEN CF57 (LC16,LS16) = C57 * AC57
295 1 1      + C004540 ;
296 1 1      IF LABEL69 = 1 * THEN CF58 (LC16,LS16) = C58 * AC58
297 1 1      + C004550 ;
298 1 1      IF LABEL70 = 1 * THEN CF59 (LC16,LS16) = C59 * AC59
299 1 1      + C004560 ;
300 1 1      IF LABEL71 = 1 * THEN CF60 (LC16,LS16) = C60 * AC60
301 1 1      + C004570 ;
302 1 1      IF LABEL72 = 1 * THEN CF61 (LC16,LS16) = C61 * AC61
303 1 1      + C004580 ;
304 1 1      IF LABEL73 = 1 * THEN CF62 (LC16,LS16) = C62 * AC62
305 1 1      + C004590 ;
306 1 1      IF LABEL74 = 1 * THEN CF63 (LC16,LS16) = C63 * AC63
307 1 1      + C004600 ;
308 1 1      IF LABEL75 = 1 * THEN CF64 (LC16,LS16) = C64 * AC64
309 1 1      + C004610 ;
310 1 1      IF LABEL76 = 1 * THEN CF65 (LC16,LS16) = C65 * AC65
311 1 1      + C004620 ;
312 1 1      IF LABEL77 = 1 * THEN CF66 (LC16,LS16) = C66 * AC66
313 1 1      + C004630 ;
314 1 1      IF LABEL78 = 1 * THEN CF67 (LC16,LS16) = C67 * AC67
315 1 1      + C004640 ;
316 1 1      IF LABEL79 = 1 * THEN CF68 (LC16,LS16) = C68 * AC68
317 1 1      + C004650 ;
318 1 1      IF LABEL80 = 1 * THEN CF69 (LC16,LS16) = C69 * AC69
319 1 1      + C004660 ;
320 1 1      IF LABEL81 = 1 * THEN CF70 (LC16,LS16) = C70 * AC70
321 1 1      + C004670 ;
322 1 1      IF LABEL82 = 1 * THEN CF71 (LC16,LS16) = C71 * AC71
323 1 1      + C004680 ;
324 1 1      IF LABEL83 = 1 * THEN CF72 (LC16,LS16) = C72 * AC72
325 1 1      + C004690 ;
326 1 1      IF LABEL84 = 1 * THEN CF73 (LC16,LS16) = C73 * AC73
327 1 1      + C004700 ;
328 1 1      IF LABEL85 = 1 * THEN CF74 (LC16,LS16) = C74 * AC74
329 1 1      + C004710 ;
330 1 1      IF LABEL86 = 1 * THEN CF75 (LC16,LS16) = C75 * AC75
331 1 1      + C004720 ;
332 1 1      IF LABEL87 = 1 * THEN CF76 (LC16,LS16) = C76 * AC76
333 1 1      + C004730 ;
334 1 1      IF LABEL88 = 1 * THEN CF77 (LC16,LS16) = C77 * AC77
335 1 1      + C004740 ;
336 1 1      IF LABEL89 = 1 * THEN CF78 (LC16,LS16) = C78 * AC78
337 1 1      + C004750 ;
338 1 1      IF LABEL90 = 1 * THEN CF79 (LC16,LS16) = C79 * AC79
339 1 1      + C004760 ;
340 1 1      IF LABEL91 = 1 * THEN CF80 (LC16,LS16) = C80 * AC80
341 1 1      + C004770 ;
342 1 1      IF LABEL92 = 1 * THEN CF81 (LC16,LS16) = C81 * AC81
343 1 1      + C004780 ;
344 1 1      IF LABEL93 = 1 * THEN CF82 (LC16,LS16) = C82 * AC82
345 1 1      + C004790 ;
346 1 1      IF LABEL94 = 1 * THEN CF83 (LC16,LS16) = C83 * AC83
347 1 1      + C004800 ;
348 1 1      IF LABEL95 = 1 * THEN CF84 (LC16,LS16) = C84 * AC84
349 1 1      + C004810 ;
350 1 1      IF LABEL96 = 1 * THEN CF85 (LC16,LS16) = C85 * AC85
351 1 1      + C004820 ;
352 1 1      IF LABEL97 = 1 * THEN CF86 (LC16,LS16) = C86 * AC86
353 1 1      + C004830 ;
354 1 1      IF LABEL98 = 1 * THEN CF87 (LC16,LS16) = C87 * AC87
355 1 1      + C004840 ;
356 1 1      IF LABEL99 = 1 * THEN CF88 (LC16,LS16) = C88 * AC88
357 1 1      + C004850 ;
358 1 1      IF LABEL100 = 1 * THEN CF89 (LC16,LS16) = C89 * AC89
359 1 1      + C004860 ;
360 1 1      IF LABEL101 = 1 * THEN CF90 (LC16,LS16) = C90 * AC90
361 1 1      + C004870 ;
362 1 1      IF LABEL102 = 1 * THEN CF91 (LC16,LS16) = C91 * AC91
363 1 1      + C004880 ;
364 1 1      IF LABEL103 = 1 * THEN CF92 (LC16,LS16) = C92 * AC92
365 1 1      + C004890 ;
366 1 1      IF LABEL104 = 1 * THEN CF93 (LC16,LS16) = C93 * AC93
367 1 1      + C004900 ;
368 1 1      IF LABEL105 = 1 * THEN CF94 (LC16,LS16) = C94 * AC94
369 1 1      + C004910 ;
370 1 1      IF LABEL106 = 1 * THEN CF95 (LC16,LS16) = C95 * AC95
371 1 1      + C004920 ;
372 1 1      IF LABEL107 = 1 * THEN CF96 (LC16,LS16) = C96 * AC96
373 1 1      + C004930 ;
374 1 1      IF LABEL108 = 1 * THEN CF97 (LC16,LS16) = C97 * AC97
375 1 1      + C004940 ;
376 1 1      IF LABEL109 = 1 * THEN CF98 (LC16,LS16) = C98 * AC98
377 1 1      + C004950 ;
378 1 1      IF LABEL110 = 1 * THEN CF99 (LC16,LS16) = C99 * AC99
379 1 1      + C004960 ;
380 1 1      IF LABEL111 = 1 * THEN CF100 (LC16,LS16) = C100 * AC100
381 1 1      + C004970 ;
382 1 1      IF LABEL112 = 1 * THEN CF101 (LC16,LS16) = C101 * AC101
383 1 1      + C004980 ;
384 1 1      IF LABEL113 = 1 * THEN CF102 (LC16,LS16) = C102 * AC102
385 1 1      + C004990 ;
386 1 1      IF LABEL114 = 1 * THEN CF103 (LC16,LS16) = C103 * AC103
387 1 1      + C005000 ;
388 1 1      IF LABEL115 = 1 * THEN CF104 (LC16,LS16) = C104 * AC104
389 1 1      + C005010 ;
390 1 1      IF LABEL116 = 1 * THEN CF105 (LC16,LS16) = C105 * AC105
391 1 1      + C005020 ;
392 1 1      IF LABEL117 = 1 * THEN CF106 (LC16,LS16) = C106 * AC106
393 1 1      + C005030 ;
394 1 1      IF LABEL118 = 1 * THEN CF107 (LC16,LS16) = C107 * AC107
395 1 1      + C005040 ;
396 1 1      IF LABEL119 = 1 * THEN CF108 (LC16,LS16) = C108 * AC108
397 1 1      + C005050 ;
398 1 1      IF LABEL120 = 1 * THEN CF109 (LC16,LS16) = C109 * AC109
399 1 1      + C005060 ;
400 1 1      IF LABEL121 = 1 * THEN CF110 (LC16,LS16) = C110 * AC110
401 1 1      + C005070 ;
402 1 1      IF LABEL122 = 1 * THEN CF111 (LC16,LS16) = C111 * AC111
403 1 1      + C005080 ;
404 1 1      IF LABEL123 = 1 * THEN CF112 (LC16,LS16) = C112 * AC112
405 1 1      + C005090 ;
406 1 1      IF LABEL124 = 1 * THEN CF113 (LC16,LS16) = C113 * AC113
407 1 1      + C005100 ;
408 1 1      IF LABEL125 = 1 * THEN CF114 (LC16,LS16) = C114 * AC114
409 1 1      + C005110 ;
410 1 1      IF LABEL126 = 1 * THEN CF115 (LC16,LS16) = C115 * AC115
411 1 1      + C005120 ;
412 1 1      IF LABEL127 = 1 * THEN CF116 (LC16,LS16) = C116 * AC116
413 1 1      + C005130 ;
414 1 1      IF LABEL128 = 1 * THEN CF117 (LC16,LS16) = C117 * AC117
415 1 1      + C005140 ;
416 1 1      IF LABEL129 = 1 * THEN CF118 (LC16,LS16) = C118 * AC118
417 1 1      + C005150 ;
418 1 1      IF LABEL130 = 1 * THEN CF119 (LC16,LS16) = C119 * AC119
419 1 1      + C005160 ;
420 1 1      IF LABEL131 = 1 * THEN CF120 (LC16,LS16) = C120 * AC120
421 1 1      + C005170 ;
422 1 1      IF LABEL132 = 1 * THEN CF121 (LC16,LS16) = C121 * AC121
423 1 1      + C005180 ;
424 1 1      IF LABEL133 = 1 * THEN CF122 (LC16,LS16) = C122 * AC122
425 1 1      + C005190 ;
426 1 1      IF LABEL134 = 1 * THEN CF123 (LC16,LS16) = C123 * AC123
427 1 1      + C005200 ;
428 1 1      IF LABEL135 = 1 * THEN CF124 (LC16,LS16) = C124 * AC124
429 1 1      + C005210 ;
430 1 1      IF LABEL136 = 1 * THEN CF125 (LC16,LS16) = C125 * AC125
431 1 1      + C005220 ;
432 1 1      IF LABEL137 = 1 * THEN CF126 (LC16,LS16) = C126 * AC126
433 1 1      + C005230 ;
434 1 1      IF LABEL138 = 1 * THEN CF127 (LC16,LS16) = C127 * AC127
435 1 1      + C005240 ;
436 1 1      IF LABEL139 = 1 * THEN CF128 (LC16,LS16) = C128 * AC128
437 1 1      + C005250 ;
438 1 1      IF LABEL140 = 1 * THEN CF129 (LC16,LS16) = C129 * AC129
439 1 1      + C005260 ;
440 1 1      IF LABEL141 = 1 * THEN CF130 (LC16,LS16) = C130 * AC130
441 1 1      + C005270 ;
442 1 1      IF LABEL142 = 1 * THEN CF131 (LC16,LS16) = C131 * AC131
443 1 1      + C005280 ;
444 1 1      IF LABEL143 = 1 * THEN CF132 (LC16,LS16) = C132 * AC132
445 1 1      + C005290 ;
446 1 1      IF LABEL144 = 1 * THEN CF133 (LC16,LS16) = C133 * AC133
447 1 1      + C005300 ;
448 1 1      IF LABEL145 = 1 * THEN CF134 (LC16,LS16) = C134 * AC134
449 1 1      + C005310 ;
450 1 1      IF LABEL146 = 1 * THEN CF135 (LC16,LS16) = C135 * AC135
451 1 1      + C005320 ;
452 1 1      IF LABEL147 = 1 * THEN CF136 (LC16,LS16) = C136 * AC136
453 1 1      + C005330 ;
454 1 1      IF LABEL148 = 1 * THEN CF137 (LC16,LS16) = C137 * AC137
455 1 1      + C005340 ;
456 1 1      IF LABEL149 = 1 * THEN CF138 (LC16,LS16) = C138 * AC138
457 1 1      + C005350 ;
458 1 1      IF LABEL150 = 1 * THEN CF139 (LC16,LS16) = C139 * AC139
459 1 1      + C005360 ;
460 1 1      IF LABEL151 = 1 * THEN CF140 (LC16,LS16) = C140 * AC140
461 1 1      + C005370 ;
462 1 1      IF LABEL152 = 1 * THEN CF141 (LC16,LS16) = C141 * AC141
463 1 1      + C005380 ;
464 1 1      IF LABEL153 = 1 * THEN CF142 (LC16,LS16) = C142 * AC142
465 1 1      + C005390 ;
466 1 1      IF LABEL154 = 1 * THEN CF143 (LC16,LS16) = C143 * AC143
467 1 1      + C005400 ;
468 1 1      IF LABEL155 = 1 * THEN CF144 (LC16,LS16) = C144 * AC144
469 1 1      + C005410 ;
470 1 1      IF LABEL156 = 1 * THEN CF145 (LC16,LS16) = C145 * AC145
471 1 1      + C005420 ;
472 1 1      IF LABEL157 = 1 * THEN CF146 (LC16,LS16) = C146 * AC146
473 1 1      + C005430 ;
474 1 1      IF LABEL158 = 1 * THEN CF147 (LC16,LS16) = C147 * AC147
475 1 1      + C005440 ;
476 1 1      IF LABEL159 = 1 * THEN CF148 (LC16,LS16) = C148 * AC148
477 1 1      + C005450 ;
478 1 1      IF LABEL160 = 1 * THEN CF149 (LC16,LS16) = C149 * AC149
479 1 1      + C005460 ;
480 1 1      IF LABEL161 = 1 * THEN CF150 (LC16,LS16) = C150 * AC150
481 1 1      + C005470 ;
482 1 1      IF LABEL162 = 1 * THEN CF151 (LC16,LS16) = C151 * AC151
483 1 1      + C005480 ;
484 1 1      IF LABEL163 = 1 * THEN CF152 (LC16,LS16) = C152 * AC152
485 1 1      + C005490 ;
486 1 1      IF LABEL164 = 1 * THEN CF153 (LC16,LS16) = C153 * AC153
487 1 1      + C005500 ;
488 1 1      IF LABEL165 = 1 * THEN CF154 (LC16,LS16) = C154 * AC154
489 1 1      + C005510 ;
490 1 1      IF LABEL166 = 1 * THEN CF155 (LC16,LS16) = C155 * AC155
491 1 1      + C005520 ;
492 1 1      IF LABEL167 = 1 * THEN CF156 (LC16,LS16) = C156 * AC156
493 1 1      + C005530 ;
494 1 1      IF LABEL168 = 1 * THEN CF157 (LC16,LS16) = C157 * AC157
495 1 1      + C005540 ;
496 1 1      IF LABEL169 = 1 * THEN CF158 (LC16,LS16) = C158 * AC158
497 1 1      + C005550 ;
498 1 1      IF LABEL170 = 1 * THEN CF159 (LC16,LS16) = C159 * AC159
499 1 1      + C005560 ;
500 1 1      IF LABEL171 = 1 * THEN CF160 (LC16,LS16) = C160 * AC160
501 1 1      + C005570 ;
502 1 1      IF LABEL172 = 1 * THEN CF161 (LC16,LS16) = C161 * AC161
503 1 1      + C005580 ;
504 1 1      IF LABEL173 = 1 * THEN CF162 (LC16,LS16) = C162 * AC162
505 1 1      + C005590 ;
506 1 1      IF LABEL174 = 1 * THEN CF163 (LC16,LS16) = C163 * AC163
507 1 1      + C005600 ;
508 1 1      IF LABEL175 = 1 * THEN CF164 (LC16,LS16) = C164 * AC164
509 1 1      + C005610 ;
510 1 1      IF LABEL176 = 1 * THEN CF165 (LC16,LS16) = C165 * AC165
511 1 1      + C005620 ;
512 1 1      IF LABEL177 = 1 * THEN CF166 (LC16,LS16) = C166 * AC166
513 1 1      + C005630 ;
514 1 1      IF LABEL178 = 1 * THEN CF167 (LC16,LS16) = C167 * AC167
515 1 1      + C005640 ;
516 1 1      IF LABEL179 = 1 * THEN CF168 (LC16,LS16) = C168 * AC168
517 1 1      + C005650 ;
518 1 1      IF LABEL180 = 1 * THEN CF169 (LC16,LS16) = C169 * AC169
519 1 1      + C005660 ;
520 1 1      IF LABEL181 = 1 * THEN CF170 (LC16,LS16) = C170 * AC170
521 1 1      + C005670 ;
522 1 1      IF LABEL182 = 1 * THEN CF171 (LC16,LS16) = C171 * AC171
523 1 1      + C005680 ;
524 1 1      IF LABEL183 = 1 * THEN CF172 (LC16,LS16) = C172 * AC172
525 1 1      + C005690 ;
526 1 1      IF LABEL184 = 1 * THEN CF173 (LC16,LS16) = C173 * AC173
527 1 1      + C005700 ;
528 1 1      IF LABEL185 = 1 * THEN CF174 (LC16,LS16) = C174 * AC174
529 1 1      + C005710 ;
530 1 1      IF LABEL186 = 1 * THEN CF175 (LC16,LS16) = C175 * AC175
531 1 1      + C005720 ;
532 1 1      IF LABEL187 = 1 * THEN CF176 (LC16,LS16) = C176 * AC176
533 1 1      + C005730 ;
534 1 1      IF LABEL188 = 1 * THEN CF177 (LC16,LS16) = C177 * AC177
535 1 1      + C005740 ;
536 1 1      IF LABEL189 = 1 * THEN CF178 (LC16,LS16) = C178 * AC178
537 1 1      + C005750 ;
538 1 1      IF LABEL190 = 1 * THEN CF179 (LC16,LS16) = C179 * AC179
539 1 1      + C005760 ;
540 1 1      IF LABEL191 = 1 * THEN CF180 (LC16,LS16) = C180 * AC180
541 1 1      + C005770 ;
542 1 1      IF LABEL192 = 1 * THEN CF181 (LC16,LS16) = C181 * AC181
543 1 1      + C005780 ;
544 1 1      IF LABEL193 = 1 * THEN CF182 (LC16,LS16) = C182 * AC182
545 1 1      + C005790 ;
546 1 1      IF LABEL194 = 1 * THEN CF183 (LC16,LS16) = C183 * AC183
547 1 1      + C005800 ;
548 1 1      IF LABEL195 = 1 * THEN CF184 (LC16,LS16) = C184 * AC184
549 1 1      + C005810 ;
550 1 1      IF LABEL196 = 1 * THEN CF185 (LC16,LS16) = C185 * AC185
551 1 1      + C005820 ;
552 1 1      IF LABEL197 = 1 * THEN CF186 (LC16,LS16) = C186 * AC186
553 1 1      + C005830 ;
554 1 1      IF LABEL198 = 1 * THEN CF187 (LC16,LS16) = C187 * AC187
555 1 1      + C005840 ;
556 1 1      IF LABEL199 = 1 * THEN CF188 (LC16,LS16) = C188 * AC188
557 1 1      + C005850 ;
558 1 1      IF LABEL200 = 1 * THEN CF189 (LC16,LS16) = C189 * AC189
559 1 1      + C005860 ;
560 1 1      IF LABEL201 = 1 * THEN CF190 (LC16,LS16) = C190 * AC190
561 1 1      + C005870 ;
562 1 1      IF LABEL202 = 1 * THEN CF191 (LC16,LS16) = C191 * AC191
563 1 1      + C005880 ;
564 1 1      IF LABEL203 = 1 * THEN CF192 (LC16,LS16) = C192 * AC192
565 1 1      + C005890 ;
566 1 1      IF LABEL204 = 1 * THEN CF193 (LC16,LS16) = C193 * AC193
567 1 1      + C005900 ;
568 1 1      IF
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MYSTIC: PROCEDURE OPTICS(MAIN) ;

SYMT LEVEL NEST

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188 1 C13 (C1,SD) = C13 ;
189 1 C13 (C1,SD) = (C13 (C1,SD) * 155.5) - 37 * B13 ;
190 1 C14 (C1,SD) = C14 ;
191 1 C14 (C1,SD) = (C14 (C1,SD) * 20) * 22 ;
192 1 C17 (C1,SD) = NS (C17) ;
193 1 C18 (C1,SD) = NS (C18) ;
194 1 C19 (C1,SD) = NS (C19) ;
195 1 C20 (C1,SD) = NS (C20) ;
196 1 C21 (C1,SD) = NS (C21) ;
197 1 C22 (C1,SD) = NS (C22) ;
198 1 C23 (C1,SD) = NS (C23) ;
199 1 C24 (C1,SD) = NS (C24) ;
200 1 C25 (C1,SD) = NS (C25) ;
201 1 IF LABEL (25) = 1 THEN C36 (C1,SD) = C36 * A36 + B36 ;
202 1 IF LABEL (26) = 1 THEN C30 (C1,SD) = C30 * A30 + B30 ;
203 1 IF LABEL (27) = 1 THEN C31 (C1,SD) = C31 * A31 + B31 ;
204 1 IF LABEL (28) = 1 THEN C32 (C1,SD) = C32 * A32 + B32 ;
205 1 IF LABEL (29) = 1 THEN C33 (C1,SD) = C33 * A33 + B33 ;
206 1 IF LABEL (30) = 1 THEN C34 (C1,SD) = C34 * A34 + B34 ;
207 1 IF LABEL (31) = 1 THEN C40 (C1,SD) = C40 * A40 + B40 ;
208 1 IF LABEL (32) = 1 THEN C41 (C1,SD) = C41 * A41 + B41 ;
209 1 IF LABEL (33) = 1 THEN C42 (C1,SD) = C42 * A42 + B42 ;
210 1 IF LABEL (34) = 1 THEN C43 (C1,SD) = C43 * A43 + B43 ;
211 1 IF LABEL (35) = 1 THEN C44 (C1,SD) = C44 * A44 + B44 ;
212 1 IF LABEL (36) = 1 THEN C45 (C1,SD) = C45 * A45 + B45 ;
213 1 IF LABEL (37) = 1 THEN C37 (C1,SD) = C37 * A37 + B37 ;
214 1 IF LABEL (38) = 1 THEN C39 (C1,SD) = C39 * A39 + B39 ;
215 1 C48 (C1,SD) = NS (C48) ;
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CCCCC500

MYSTIC: FRCCEDIFE (PTIONS(MAIN)) :

STMT LEVEL NEST

```

286 1      JSECC = 0 ;
      /
      *
      IN11: GC TC PRC (TEST) ;
      FRC(11): LABEL (25), LABEL (26), LABEL (27), LABEL (28), LABEL (29),
      FRC(12): LABEL (30) = BLANK7 ;
      LABEL (30) = BLANK7 ;
      CYNLP, MPITEST, FCNLP, FENNUM = 1 ;
      STARKY = '170163700' ; STCFKEY = '170164250' ; /* TEST 2 */
      EC1 = -50 ; /* TEST 2 */ B45 = +0.08 ;
      EC7 = -2 ; /* TEST 2 */ B02 = -130 ; B42 = 10 ;
      EC3 = -100 ; /* TEST 2 */
      GC TC KEEPER ;
      FRC(13): LABEL (27) = ' DEG F ' ;
      STARKY = '172114830' ; STCFKEY = '172115344' ; /* TEST 3 */
      EC1 = -200 ; /* TEST 3 */ B21 = +5 ;
      EC2 = -160 ; /* TEST 3 */ B34 = +30 ;
      EC3 = +C.1 ; /* TEST 3 */
      EC7 = +6.4 ; /* TEST 3 */
      EC2 = -110 ; /* TEST 3 */
      EC2 = 0 ; /* TEST 2 */
      LABEL(126), LABEL (28) = INAC ;
      LABEL (29) = DF ;
      LABEL (32), LABEL (31), LABEL (33), LABEL (34), LABEL (35),
      LABEL (36), LABEL (37) = BLANK7 ;
      CYNLP, MPITEST, FCNLP, FENNUM = 2 ;
      GC TC KEEPER ;
      FRC(14): LABEL (35) = BLANK7 ;
      MPITEST, FENNUM = 3 ;
      CYNLP = 1 ;
      REMNUM = 2 ;
      STARKY = '173101600' ; STCFKEY = '173102129' ; /* TEST 4 */
      EC1 = -50 ; /* TEST 4 */ B31 = 0 ;
      EC2 = -150 ; /* TEST 4 */ B34 = +5 ;
      EC3 = +1.0 ; /* TEST 4 */
      EC5 = +.3 ; /* TEST 4 */
      EC7 = -1.7 ; /* TEST 4 */
      EC2 = -100 ; /* TEST 4 */
      LABEL(5) = 'PPM NOX' ; /* CHANGE */
      GC TC KEEPER ;
      FRC(15):
      MPITEST = 4 ;
      CYNLP = 3 ;
      FCNLP = 2 ;
      REMNUM = 12 ;
      STARKY = '176160800' ; STCFKEY = '176161229' ; /* TEST 5 */
      EC1 = +50 ; /* TEST 5 */ B3C = 0.115 ;
      EC2 = -225 ; /* TEST 5 */ B31 = 10 ;
      EC3 = +.1 ; /* TEST 5 */ B32 = 0.065 ;
      EC4 = +.1 ; /* TEST 5 */

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000508CC
000509CC
000510CC
00051100
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00051300

000514CC
000516CC

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0005265C
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3-50887

00000500

MYSTIC: POCCELE CPTILAS(MAIN) ;

STMT LEVEL NEST

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344 1 EC5 = C ; /* TEST 5 */
345 1 EC7 = C ; /* TEST 5 */
346 1 E15 = -51 ; /* TEST 5 */
347 1 GO TC KEEPER ;
348 1 PRC(6):
349 1 PRITEST = 5 ;
350 1 CVALUP = 4 ;
351 1 FCALUP = 4 ;
352 1 REMNUM = 12;
353 1 STARKEY = '177110745' ; STCFKEY = '177111500' ; /* TEST 6 */
354 1 E11 = -475 ; /* TEST 6 */
355 1 EC2 = -50 ; /* TEST 6 */
356 1 EC3 = -15 ; /* TEST 6 */
357 1 EC4 = -80 ; /* TEST 6 */
358 1 B14 = -2.5 ; /* TEST 6 */
359 1 E12 = -2.5 ; /* TEST 6 */
360 1 E13 = -2.7 ; /* TEST 6 */
361 1 GO TC KEEPER ;
362 1 PRC(7):
363 1 LABEL(18) = 'EG-F' ; /* CHANGE */
364 1 LABEL(19) = 'EG-M' ; /* CHANGE */
365 1 LABEL(20) = 'EG-C' ; /* CHANGE */
366 1 LABEL(21) = 'ST-F' ; /* CHANGE */
367 1 LABEL(22) = 'ST-M' ; /* CHANGE */
368 1 LABEL(23) = 'ST-C' ; /* CHANGE */
369 1 A20 = 1.12 ;
370 1 A33 = 1.12 ;
371 1 A45 = 1.12 ;
372 1 LABEL(36) = 'MRI' ; /* CHANGE */
373 1 LABEL(1) = BLANK7 ;
374 1 LABEL(32) = DF ;
375 1 LABEL(35) = INNC ;
376 1 PRITEST = 6 ;
377 1 CVALUP = 2 ;
378 1 FCALUP = 5 ;
379 1 REMNUM = 12;
380 1 STARKEY = '179152245' ; STCFKEY = '179152644' ; /* TEST 7 */
381 1 E11 = C ; /* TEST 7 */
382 1 EC2 = -50 ; /* TEST 7 */
383 1 EC3 = -10 ; /* TEST 7 */
384 1 EC4 = C ; /* TEST 7 */
385 1 E12 = C ; /* TEST 7 */
386 1 E13 = C ; /* TEST 7 */
387 1 GO TC KEEPER ;
388 1 PRC(8):
389 1 LABEL(1) = 'H2C' ;
390 1 LABEL(21),LABEL(3) ,LABEL(6) = BLANK7 ;
391 1 PRITEST = 7 ;
392 1 CVALUP = 2 ;
393 1 FCALUP = 5 ;
394 1 REMNUM = 12;
395 1 STARKEY = '180112425' ; STCFKEY = '180113755' ; /* TEST 8 */
396 1 EC2 = C ; /* TEST 8 */
397 1 EC3 = 0 ; /* TEST 8 */

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00000500

MYSTIC: FRCECLIFE (PTICAS(MAIN) :

STMT LEVEL NEST

```

407 1      E44 = +.1 ; /* TEST 8 */      E45 = -0.01 ;
408 1      E45 = +.1 ; /* TEST 8 */
409 1      CC TC KEEPER ;
410 1      FRC(5): A03 = 250 ;
411 1      LABEL(35) = OF ;
412 1      LABEL(1) = *X H2O * ;
413 1      LABEL(6) = *X THC * ;
414 1      PHTEST = 9 ;
415 1      CVALP = 4 ;
416 1      PCNUM = 5 ;
417 1      REMNUM = 12 ;
418 1      STARKEY = '184114345' ; STCFKEY = '184114644' ; /* TEST 9 */
419 1      EC4 = 0 ; /* TEST 9 */      B30 = 0.045 ; B31 = 5 ; B33 = 0.001 ;
420 1      EC5 = C ; /* TEST 5 */      B34 = 0 ; B42 = 5 ; B45 = C ;
421 1      CC TC KEEPER ;
422 1      FRC(10): A3C = .312 ;
423 1      A33 = .312 ;
424 1      A45 = .312 ;
425 1      LABEL(6) = BLANK7 ;
426 1      LABEL(1) = *X H2O * ;
427 1      LABEL(2) = *PF* SC2 * ;
428 1      LABEL(3) = *PPM H2S * ;
429 1      LABEL(6) = *X THC * ;
430 1      PRTEST = 1C ;
431 1      CVALP = 5 ;
432 1      PCNUM = 5 ;
433 1      REMNUM = 12 ;
434 1      STARKEY = '185152605' ; STCFKEY = '185152859' ; /* TEST 10 */
435 1      EC2 = +15 ; /* TEST 10 */      B3C = 0.06 ;
436 1      EC3 = -100 ; /* TEST 10 */      B31 = 0 ; B33 = 0.06 ;
437 1      B12 = +5.2 ; /* TEST 10 */      B42 = 0 ;
438 1      EC TC KEEPER ;
439 1      FRC(11): LABEL(6) = *X THC * ;
440 1      PRTEST = 11 ;
441 1      CVALP = 2 ;
442 1      PCNUM = 1 ;
443 1      REMNUM = 3 ;
444 1      STARKEY = '186151500' ; STCFKEY = '186152214' ; /* TEST 11 */
445 1      EC2 = C ; /* TEST 11 */      B3C = 0.15 ; B33 = 0.18 ;
446 1      EC3 = C ; /* TEST 11 */      B45 = -0.18 ;
447 1      B12 = 1C.1 ; /* TEST 11 */
448 1      CC TC KEEPER ;
449 1      FRC(12): A02 = 20 ;
450 1      PRTEST = 17 ;
451 1      CVALP = 6 ;
452 1      PCNUM = 1 ;
453 1      REMNUM = 12 ;
454 1      STARKEY = '192140200' ; STCFKEY = '192140814' ; /* TEST 12 */
455 1      EC2 = -75 ; /* TEST 12 */      B3C = 0.2 ; B33 = 0.15 ;
456 1      EC3 = +.3 ; /* TEST 12 */      B42 = -5 ;
457 1      E13 = C ; /* TEST 12 */      B45 = 0.062 ;
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LOGC050C

MYSTIC: PROCEDURE OPTI(INS(MAIN)) ;

STMT LEVEL NEST

```

480 1 GC TC KEEPER ;
481 1 FFC(13): AC2 = 1000 ;
482 1 A45 = 1.12 ;
483 1 LABEL (26),LABEL (27),LABEL (30) = BLANK7 ;
484 1 LABEL (32) = CF ;
485 1 PRITEST = 17 ;
486 1 CYNUP = 7 ;
487 1 FCALP = 6 ;
488 1 REMNUM = 12 ;
489 1 STARKEY = '19305115' ; STCPKEY = '192051655' ; /* TEST 12 */
490 1 EC1 = +20 ; /* TEST 13*/ B30 = 0 ;
491 1 EC2 = 0 ; /* TEST 13*/ B32 = 0.066 ;
492 1 EC3 = +3 ; /* TEST 13*/ B34 = +10 ;
493 1 EC4 = +1.2 ; /* TEST 13*/ B42 = C ;
494 1 EC7 = C ; /* TEST 13*/ B45 = 0 ;
495 1 EC12 = +1C ; /* TEST 13*/
496 1 GC TC KEEPER ;
497 1 FFC(14): AC2 = 250 ;
498 1 PRITEST = 17 ;
499 1 CYNUP = 2 ;
500 1 FCALP = 7 ;
501 1 REMNUM = 4 ;
502 1 STARKEY = '193151630' ; STCPKEY = '193152014' ; /* TEST 14 */
503 1 EC1 = C ; /* TEST 14*/ B32 = 0.176 ;
504 1 EC2 = -100 ; /* TEST 14*/ B34 = 0 ;
505 1 EC3 = C ; /* TEST 14*/
506 1 EC4 = +1.0 ; /* TEST 14*/
507 1 EC12 = C ; /* TEST 14*/
508 1 GC TC KEEPER ;
509 1 FFC(15):
510 1 PRITEST = 17 ;
511 1 CYNUP = 2 ;
512 1 FCALP = 11 ;
513 1 REMNUM = 12 ;
514 1 LABEL (31) = '1 F2L *' ;
515 1 LABEL (32) = CF ;
516 1 LABEL (30) = BLANK7 ;
517 1 AC2 = 1000 ;
518 1 A20 = 1.12 ;
519 1 A22 = 1.12 ;
520 1 STARKEY = '218124315' ; STCPKEY = '21812425' ; /* TEST 15 */
521 1 EC2 = C ; /* TEST 15*/ B33 = 0.048 ;
522 1 EC3 = +1.0 ; /* TEST 15*/ B34 = 50 ;
523 1 EC4 = C ; /* TEST 15*/ B45 = 0.001 ;
524 1 GC TC KEEPER ;
525 1 FFC(16):
526 1 LABEL (31) = BLANK7 ;
527 1 AC1 = 0.3 ;
528 1 AC2 = 0.3 ;
529 1 AC3 = 250 ;
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C00C050C

MYSTIC: FRCCECE (FTICKS(MAIN)) ;

SIMT LEVEL NEST

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542 1 AC4 = 0.25 ;
543 1 AC5 = C.5 ;
544 1 PRITEST = 17 ;
545 1 CVALP = E ;
546 1 PCALP = E ;
547 1 REPMUM = 5 ;
548 1 STARKEY = '21S1104C2' ; STOPKEY = '21S110859' ; /* TEST 16 */
549 1 EC1 = -20 ; /* TEST 16*/ B32 = C.0C1 ;
550 1 EC2 = -35 ; /* TEST 16*/ B34 = 0 ;
551 1 EC3 = C ; /* TEST 16*/ B45 = C.001 ;
552 1 EC4 = +.1 ; /* TEST 16*/
553 1 GO TO KEEPER ;
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558 1 FRC(17):
559 1 ACC = 2 ;
560 1 A30 = +312 ;
561 1 A33 = +312 ;
562 1 A45 = +312 ;
563 1 LABEL (11) = 'X H2C *' ;
564 1 LABEL (26) = INMC ; LABEL (27) = EF ;
565 1 PRITEST = 17 ;
566 1 CVALP = 8 ;
567 1 PCALP = E ;
568 1 REPMUM = 6 ;
569 1 STARKEY = '220111252' ; STOPKEY = '220111659' ; /* TEST 17 */
570 1 EC1 = -20 ; /* TEST 17*/ B3C = 0.050 ; B33 = 0.0C61 ; B24 = 15 ;
571 1 EC2 = -480 ; /* TEST 17*/ B42 = 10 ; B45 = 0 ;
572 1
573 1 GC TO KEEPER ;
574 1
575 1 FRC(18):
576 1 LABEL (7) = 'X H2 ' ;
577 1 PRITEST = 17 ;
578 1 CVALP = 1 ;
579 1 PCALP = E ;
580 1 REPMUM = 7 ;
581 1 STARKEY = '2211521C0' ; STOPKEY = '221152544' ; /* TEST 18 */
582 1 EC1 = -25 ; /* TEST 18*/ B20 = 0.012 ; B33 = 0.075 ;
583 1 EC2 = -50 ; /* TEST 18*/ B34 = -16 ;
584 1 EC3 = 0 ; /* TEST 18*/ B45 = -0.05 ;
585 1 GC TO KEEPER ;
586 1
587 1
588 1
589 1
590 1 FRC(15):
591 1 A01 = 3 ;
592 1 A02 = 3 ;
593 1 PRITEST = 12 ;
594 1 CVALP = 9 ;
595 1 PCALP = E ;
596 1 REPMUM = 12 ;
597 1 STARKEY = '2251111C0' ; STOPKEY = '225111529' ; /* TEST 19 */
598 1 EC1 = -80 ; /* TEST 19*/ B3C = 0.002 ; B33 = 0.081 ;
599 1 EC2 = +0.5 ; /* TEST 19*/ B34 = 30 ; B42 = 35 ; B45 = -0.003 ;
600 1 GC TO KEEPER ;
601 1
602 1
603 1
604 1
605 1 FRC(12C):
606 1 PRITEST = 12 ;
607 1
608 1
609 1
610 1

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00063400

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350891

C00C05C0

MYSTIC: FFC0C0FE CFTICNS(PFIA) ;

STMT LEVEL NEST

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611 1          CVALUM = 8 ;
612 1          PGNLUM = 8 ;
613 1          REMNUM = 12 ;
614 1          STARKY = '226110800' ; STCPKEY = '226111229' ; /* TEST 20 */
616 1          EC1 = -175 ; /* TEST 20*/ LABEL (23) = 'PRI-P' ;
618 1          EC2 = 0 ; /* TEST 20*/ B2C = -0.01 ; B31 = -15 ; B33 = 0.2 ;
622 1          B3E = +15 ; /* TEST 20*/ B34 = 20 ; B42 = 10 ; B45 = -0.006 ;
626 1          GC TC KEEPER ;
627 1          FFC(21) ;

628 1          WRITEST = 14 ;
629 1          A00 = 1*5 ;
630 1          CVALUM = 1 ;
631 1          PGNLUM = 8 ;
632 1          REMNUM = 2 ;
633 1          STARKY = '227105815' ; STCPKEY = '227111629' ; /* TEST 21 */
634 1          EC1 = -50 ; /* TEST 21*/ LABEL (23) = 'ST-C' ; B45 = C.04 ;
637 1          EC2 = -2 ; /* TEST 21*/ B2C = -0.06 ; B31 = -6C ;
640 1          B13 = C ; /* TEST 21*/ B23 = 0.05 ; B34 = 110 ; B42 = 20 ;
644 1          GC TC KEEPER ;
645 1          FFC(22) ;

646 1          A05 = 1 ;
647 1          PRITEST = 17 ;
648 1          CVALUM = 5 ;
649 1          PGNLUM = 5 ;
650 1          REMNUM = 12 ;
651 1          LABEL (25), LABEL (26), LABEL (27), LABEL (32), LABEL (35) = BLANK7 ;
652 1          B23 = 1-12 ;
653 1          STARKY = '227153701' ; STCPKEY = '227154144' ; /* TEST 22 */
655 1          EC1 = -200 ; /* TEST 22*/ B33 = 0.005 ; B34 = 10 ;
658 1          EC2 = -200 ; /* TEST 22*/
659 1          EC7 = C ; /* TEST 22*/
660 1          E13 = +12 ; /* TEST 22*/
661 1          GC TC KEEPER ;
662 1          FFC(23) ;

663 1          AC3 = 1000 ;
664 1          AC4 = 1 ;
665 1          LABEL (2) = 'PPM2SL2' ;
666 1          LABEL (3) = 'PFMAH2S' ;
667 1          PRITEST = 15 ;
668 1          CVALUM = 10 ;
669 1          PGNLUM = 5 ;
670 1          REMNUM = 12 ;
671 1          STARKY = '228151545' ; STCPKEY = '228152029' ; /* TEST 23 */
672 1          EC1 = C ; /* TEST 23*/ B22 = 0.001 ; B24 = -5 ;
673 1          EC2 = C ; /* TEST 23*/
674 1          EC7 = -2 ; /* TEST 23*/
675 1          E13 = 0 ; /* TEST 23*/
676 1          GC TC KEEPER ;
677 1          FFC(24) ;
678 1          AC3 = 250 ;
679 1

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CCCCC50C

MYSTIC: PROCEDURE CTTICASMAIN ;

SYMT LEVEL NEST

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746 1 EC1 = -50 ; /* TEST 27*/ B24 = 0 ;
748 1 EC2 = -50 ; /* TEST 27*/
749 1 EC7 = +.4 ; /* TEST 27*/
750 1 EC15 = +1C ; /* TEST 27*/
751 1 EC TC KEEPER ;
752 1 PFC(28) ;
753 1 LABEL (28) = INNC ;
754 1 LABEL (05) = 'PPM NOX' ;
755 1 LABEL (25) = CF ;
756 1 LABEL (32),LABEL (35) = BLANK7 ;
757 1 PRITEST = 17 ;
758 1 GVALM = 0 ;
759 1 FCLNP = 5 ;
760 1 STARKEY = '235140655' ; SUCFKEY = '235140655' ; /* TEST 28 */
761 1 EC1 = 0 ; /* TEST 28*/ B33 = 0.1 ;
762 1 EC2 = 0 ; /* TEST 28*/
763 1 EC7 = 0 ; /* TEST 28*/
764 1 EC12 = - 5 ; /* TEST 28*/
765 1 KEEPER ;
766 1 MCNTF2 = MCNTF1 ;
767 1 ANN = TEST ;
768 1 DAY = DAY ;
769 1 CVC = CVEN (CVALM) ;
770 1 PRICH = PRI (PRIEST) ;
771 1 RENCH = FEM (RENUM) ;
772 1 KPREC = KEY ;
773 1 CC1 = 1 TC 25 ;
774 1 LAFCH (1) = LABEL (1) ;
775 1 END ;
776 1
777 1 WRITE FILE (CUT) FROM (HEADER) ;
778 1 PUT EDIT (KEY1Z,MCNTF2,CAYF,LAECH(1)) DO I = 1 TO 29,DVRC,MRICH,
779 1 REMCP,KKXREG,ANN,TEST HEADER) (PAGE,46(X(1),A),F(5),X(2),A) ;
780 1 PA1 = 1250 * A01 + B01 ;
781 1 PA2 = 1250 * A02 + B02 ;
782 1 MAX5 = 12.5 * ACS + B05 ;
783 1 PUT FILE (MAX) EDIT ('ARCE THRESHOLD REPERT TEST -',TEST,
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785 1 'C04','C05','C06',
786 1 'C07','C08','C09',
787 1 'C10','C11','C12',
788 1 'C13','C14','C15',
789 1 'C16','C17','C18',
790 1 'C19','C20','C21',
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1177 1 'C1180','C1181','C1182',
1178 1 'C1183','C1184','C1185',
1179 1 'C1186','C1187','C1188',
1180 1 'C1189','C1190','C1191',
1181 1 'C1192','C1193','C1194',
1182 1 'C1195','C1196','C1197',
1183 1 'C1198','C1199','C1200',
1184 1 'C1201','C1202','C1203',
1185 1 'C1204','C1205','C1206',
1186 1 'C1207','C1208','C1209',
1187 1 'C1210','C1211','C1212',
1188 1 'C1213','C1214','C1215',
1189 1 'C1216','C1217','C1218',
1190 1 'C1219','C1220','C1221',
1191 1 'C1222','C1223','C1224',
1192 1 'C1225','C1226','C1227',
1193 1 'C1228','C1229','C1230',
1194 1 'C1231','C1232','C1233',
1195 1 'C1234','C1235','C1236',
1196 1 'C1237','C1238','C1239',
1197 1 'C1240','C1241','C1242',
1198 1 'C1243','C1244','C1245',
1199 1 'C1246','C1247','C1248',
1200 1 'C1249','C1250','C1251',
1201 1 'C1252','C1253','C1254',
1202 1 'C1255','C1256','C1257',
1203 1 'C1258','C1259','C1260',
1204 1 'C1261','C1262','C1263',
1205 1 'C1264','C1265','C1266',
1206 1 'C1267','C1268','C1269',
1207 1 'C1270','C1271','C1272',
1208 1 'C1273','C1274','C1275',
1209 1 'C1276','C1277','C1278',
1210 1 'C1279','C1280','C1281',
1211 1 'C1282','C1283','C1284',
1212 1 'C1285','C1286','C1287',
1213 1 'C1288','C1289','C1290',
1214 1 'C1291','C1292','C1293',
1215 1 'C1294','C1295','C1296',
1216 1 'C1297','C1298','C1299',
1217 1 'C1300','C1301','C1302',
1218 1 'C1303','C1304','C1305',
1219 1 'C1306','C1307','C1308',
1220 1 'C1309','C1310','C1311',
1221 1 'C1312','C1313','C1314',
1222 1 'C1315','C1316','C1317',
1223 1 'C1318','C1319','C1320',
1224 1 'C1321','C1322','C1323',
1225 1 'C1324','C1325','C1326',
1226 1 'C1327','C1328','C1329',
1227 1 'C1330','C1331','C1332',
1228 1 'C1333','C1334','C1335',
1229 1 'C1336','C1337','C1338',
1230 1 'C1339','C1340','C1341',
1231 1 'C1342','C1343','C1344',
1232 1 'C1345','C1346','C1347',
1233 1 'C1348','C1349','C1350',
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1235 1 'C1354','C1355','C1356',
1236 1 'C1357','C1358','C1359',
1237 1 'C1360','C1361','C1362',
1238 1 'C1363','C1364','C1365',
1239 1 'C1366','C1367','C1368',
1240 1 'C1369','C1370','C1371',
1241 1 'C1372','C1373','C1374',
1242 1 'C1375','C1376','C1377',
1243 1 'C1378','C1379','C1380',
1244 1 'C1381','C1382','C1383',
1245 1 'C1384','C1385','C1386',
1246 1 'C1387','C1388','C1389',
1247 1 'C1390','C1391','C1392',
1248 1 'C1393','C1394','C1395',
1249 1 'C1396','C1397','C1398',
1250 1 'C1399','C1400','C1401',
1251 1 'C1402','C1403','C1404',
1252 1 'C1405','C1406','C1407',
1253 1 'C1408','C1409','C1410',
1254 1 'C1411','C1412','C1413',
1255 1 'C1414','C1415','C1416',
1256 1 'C1417','C1418','C1419',
1257 1 'C1420','C1421','C1422',
1258 1 'C1423','C1424','C1425',
1259 1 'C1426','C1427','C1428',
1260 1 'C1429','C1430','C1431',
1261 1 'C1432','C1433','C1434',
1262 1 'C1435','C1436','C1437',
1263 1 'C1438','C1439','C1440',
1264 1 'C1441','C1442','C1443',
1265 1 'C1444','C1445','C1446',
1266 1 'C1447','C1448','C1449',
1267 1 'C1450','C1451','C1452',
1268 1 'C1453','C1454','C1455',
1269 1 'C1456','C1457','C1458',
1270 1 'C1459','C1460','C1461',
1271 1 'C1462','C1463','C1464',
1272 1 'C1465','C1466','C1467',
1273 1 'C1468','C1469','C1470',
1274 1 'C1471','C1472','C1473',
1275 1 'C1474','C1475','C1476',
1276 1 'C14
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CC000500

MYSTIC: PRCELLFE OPTICS(MAIN) ;

STMT LEVEL NEST

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825 2 2 00077302
826 2 1 00077303
827 2 2 00077305
828 2 2 00077310
829 2 2 00077317
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911 2 2 00077317

CTRREC_REC_IC(1),CTRREC_CTR(1),CTRREC_SEC(1,S),I,S)
(SKIP(3),A,1(4),SKIP(A,X12),A,X12),A,2(1(4))) ;
END ;
IF S04 = BLK2 THEN DO ;
  CPG4 (1,S) = TR04 ;
  IF (K04 <= TIM & S04 <= CTRREC_SEC(1,S)) THEN DO ;
    K04 = BLANK4 ; S04 = ELK2 ; END ;
  END ;
IF S05 = BLK2 THEN DO ;
  CH05 (1,S) = TR05 ;
  IF (K05 <= TIM & S05 <= CTRREC_SEC(1,S)) THEN DO ;
    K05 = BLANK4 ; S05 = ELK2 ; END ;
  END ;
IF S07 = BLK2 THEN DO ;
  CH07 (1,S) = TR07 ;
  IF (K07 <= TIM & S07 <= CTRREC_SEC(1,S)) THEN DO ;
    K07 = BLANK4 ; S07 = ELK2 ; END ;
  END ;
IF S09 = BLK2 THEN DO ;
  CH09 (1,S) = TR09 ;
  IF (K09 <= TIM & S09 <= CTRREC_SEC(1,S)) THEN DO ;
    K09 = BLANK4 ; S09 = ELK2 ; END ;
  END ;
IF S30 = BLK2 THEN DO ;
  CH30 (1,S) = TR30 ;
  IF (K30 <= TIM & S30 <= CTRREC_SEC(1,S)) THEN DO ;
    K30 = BLANK4 ; S30 = ELK2 ; END ;
  END ;
IF S31 = BLK2 THEN DO ;
  CH31 (1,S) = TR31 ;
  IF (K31 <= TIM & S31 <= CTRREC_SEC(1,S)) THEN DO ;
    K31 = BLANK4 ; S31 = ELK2 ; END ;
  END ;
IF S32 = BLK2 THEN DO ;
  CH32 (1,S) = TR32 ;
  IF (K32 <= TIM & S32 <= CTRREC_SEC(1,S)) THEN DO ;
    K32 = BLANK4 ; S32 = ELK2 ; END ;
  END ;
IF S33 = BLK2 THEN DO ;
  CH33 (1,S) = TR33 ;
  IF (K33 <= TIM & S33 <= CTRREC_SEC(1,S)) THEN DO ;
    K33 = BLANK4 ; S33 = ELK2 ; END ;
  END ;
IF S34 = BLK2 THEN DO ;
  CH34 (1,S) = TR34 ;
  IF (K34 <= TIM & S34 <= CTRREC_SEC(1,S)) THEN DO ;
    K34 = BLANK4 ; S34 = ELK2 ; END ;
  END ;
IF S45 = BLK2 THEN DO ;
  CH45 (1,S) = TR45 ;
  IF (K45 <= TIM & S45 <= CTRREC_SEC(1,S)) THEN DO ;
    K45 = BLANK4 ; S45 = ELK2 ; END ;
  END ;
IF CHC0 (1,S) < C THEN CHC0 (1,S) = C ;
IF CHC1 (1,S) < C THEN CHC1 (1,S) = C ;
IF CHC2 (1,S) < C THEN CHC2 (1,S) = C ;

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3 50896

C00C05C0

MYSTIC: PROCEDURE CPTICAS(MAIN) ;

STMT LEVEL NEST

```

965 2 2 DC ;
966 2 1 PUT FILE (REPC) EDIT ('02',LABEL(C3))(LINE(13),A,X(3),A) ;C00808CC
967 2 1 L = DIG (03) ;
968 2 1 CC = 1 TC 15 ;
969 2 2 IF CH02 (1,S) == 955555.5 THEN DO ;
970 2 3 IF CH02 (1,S) > MAX2 THEN DO ;
971 2 4 PUT FILE (MAX1) EDIT (QTRREC_REC_ID (1),
972 2 4 QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),
973 2 4 QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),
974 2 4 QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),
975 2 4 QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),
976 2 4 QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),
977 2 4 QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),QTRREC_REC_ID (1),
978 2 3 ELSE PUT FILE (REPO) EDIT ;
979 2 3 (CH02 (1,S)) (COL(S*8+5),F(6,D)) ;
980 2 2 END ;
981 2 1 ELSE PUT EDIT (*MISSING LABEL DATA *** TEST*,TEST,'C0C2',1,S,
982 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
983 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
984 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
985 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
986 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
987 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
988 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
989 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
990 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
991 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
992 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
993 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
994 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
995 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
996 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
997 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
998 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
999 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1000 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1001 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1002 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1003 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1004 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1005 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1006 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1007 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1008 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1009 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1010 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1011 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1012 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),
1013 2 1 QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),QTRREC_REC_ID(1),

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MYSTIC: PROCEDURE OPTIONS(MAIN);

STMT LEVEL NEXT

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1014 2 2          CTRREC_REC_ID(1),QTRREC_SEC(1,S))
1015 2 1          (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1016 2 1          END ;
1017 2 1          PUT FILE (REPC) EDIT ('06',LABEL(07)) (LINE(17),A,X(2),A) ;
1018 2 1          C = DIG (07) ;
1019 2 1          CC S = 1 TC 15 ;
1020 2 1          IF CHC6 (1,S) = 9559,555 THEN PUT FILE (REPC) EDIT
1021 2 1          (CHC6 (1,S)) (COL(S*8+5),F(6,C)) ;
1022 2 1          ELSE PUT EDIT ('MISSING LAGGED DATA *** TEST',TEST,'CP06',I,S,
1023 2 1          CTRREC_REC_ID(1),QTRREC_SEC(1,S))
1024 2 1          (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1025 2 1          END ;
1026 2 1          PUT FILE (REPC) EDIT ('07',LABEL(08)) (LINE(18),A,X(2),A) ;
1027 2 1          C = DIG (08) ;
1028 2 1          CC S = 1 TC 15 ;
1029 2 1          IF CHC7 (1,S) = 9559,555 THEN PUT FILE (REPC) EDIT
1030 2 1          (CHC7 (1,S)) (COL(S*8+5),F(6,C)) ;
1031 2 1          ELSE PUT EDIT ('MISSING LAGGED DATA *** TEST',TEST,'CP07',I,S,
1032 2 1          CTRREC_REC_ID(1),QTRREC_SEC(1,S))
1033 2 1          (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1034 2 1          END ;
1035 2 1          PUT FILE (REPC) EDIT ('08',LABEL(09)) (LINE(19),A,X(2),A) ;
1036 2 1          C = DIG (09) ;
1037 2 1          CC S = 1 TC 15 ;
1038 2 1          IF CHC8 (1,S) = 9559,999 THEN PUT FILE (REPC) EDIT
1039 2 1          (CHC8 (1,S)) (COL(S*8+5),F(6,C)) ;
1040 2 1          ELSE PUT EDIT ('MISSING LAGGED DATA *** TEST',TEST,'CP08',I,S,
1041 2 1          CTRREC_REC_ID(1),QTRREC_SEC(1,S))
1042 2 1          (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1043 2 1          END ;
1044 2 1          PUT FILE (REPC) EDIT ('09',LABEL(10)) (LINE(20),A,X(2),A) ;
1045 2 1          C = DIG (10) ;
1046 2 1          CC S = 1 TC 15 ;
1047 2 1          IF CHC9 (1,S) = 9559,999 THEN PUT FILE (REPC) EDIT
1048 2 1          (CHC9 (1,S)) (COL(S*8+5),F(6,C)) ;
1049 2 1          ELSE PUT EDIT ('MISSING LAGGED DATA *** TEST',TEST,'CP09',I,S,
1050 2 1          CTRREC_REC_ID(1),QTRREC_SEC(1,S))
1051 2 1          (SKIP(2),A,F(4),X(2),A,2(F(4)),2(X(2),A)) ;
1052 2 1          END ;
1053 2 1          IF LABEL (26) = ' ' THEN
1054 2 2          CC ;

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CUC00560

MYSTIC: PROCEDURE CFTICNS(MAIN);

```

      STMT LEVEL NEST
1055 2 1      C = DIG (26) ;                                000872CC
1056 2 1      PUT FILE (REFC) ECIT ('26',LABEL(26)) (LINE(23),A,X(2),A);000873CC
1057 2 1      CC S = 1 TC 15 ;                                000874CC
1058 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REFC) ECIT 000875CC
      (CH30 (1,S))(COL(S*8+5),F(8,C)) ;
1060 2 2      END ;                                           000876CC
1061 2 1      END ;                                           000877CC
1062 2 1      IF LABEL (27) = ' ' THEN                          000878CC
1063 2 2      CC ;                                           000879CC
1064 2 1      C = DIG (27) ;                                000880CC
1065 2 1      PUT FILE (REFC) ECIT ('27',LABEL(27)) (LINE(24),A,X(3),A);000881CC
1066 2 1      CC S = 1 TC 15 ;                                000882CC
1067 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REFC) ECIT 000883CC
      (CH31 (1,S))(COL(S*8+5),F(8,C)) ;
1069 2 2      END ;                                           000884CC
1070 2 1      END ;                                           000885CC
1071 2 1      IF LABEL (28) = ' ' THEN                          000886CC
1072 2 2      CC ;                                           000887CC
1073 2 1      C = DIG (28) ;                                000888CC
1074 2 1      PUT FILE (REFC) ECIT ('28',LABEL(28)) (LINE(25),A,X(3),A);000889CC
1075 2 1      CC S = 1 TC 15 ;                                000890CC
1076 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REFC) ECIT 000891CC
      (CH33 (1,S))(COL(S*8+5),F(8,C)) ;
1078 2 2      END ;                                           000892CC
1079 2 1      END ;                                           000893CC
1080 2 1      IF LABEL (29) = ' ' THEN                          000894CC
1081 2 2      CC ;                                           000895CC
1082 2 1      C = DIG (29) ;                                000896CC
1083 2 1      PUT FILE (REFC) ECIT ('29',LABEL(29)) (LINE(26),A,X(3),A);000897CC
1084 2 1      CC S = 1 TC 15 ;                                000898CC
1085 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REFC) ECIT 000899CC
      (CH34 (1,S))(COL(S*8+5),F(8,C)) ;
1087 2 2      END ;                                           000900CC
1088 2 1      END ;                                           000901CC
1089 2 1      IF LABEL (30) = ' ' THEN                          000902CC
1090 2 2      CC ;                                           000903CC
1091 2 1      C = DIG (30) ;                                000904CC
1092 2 1      PUT FILE (REFC) ECIT ('30',LABEL(30)) (LINE(27),A,X(3),A);000905CC
1093 2 1      CC S = 1 TC 15 ;                                000906CC
1094 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REFC) ECIT 000907CC
      (CH45 (1,S))(COL(S*8+5),F(8,C)) ;
1096 2 2      END ;                                           000908CC
1097 2 1      END ;                                           000909CC
1098 2 1      IF LABEL (32) = ' ' THEN                          000910CC
1099 2 2      CC ;                                           000911CC
1100 2 1      C = DIG (32) ;                                000912CC
1101 2 1      PUT FILE (REFC) ECIT ('32',LABEL(32)) (LINE(28),A,X(3),A);000913CC
1102 2 1      CC S = 1 TC 15 ;                                000914CC
1103 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REFC) ECIT 000915CC
      (CH42 (1,S))(COL(S*8+5),F(8,C)) ;
1105 2 2      END ;                                           000916CC

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3-50900

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MYSTIC: PROCEDURE OPTIONS(MAIN);

STMT LEVEL NEST

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1106 2 1      ENCL ;
1107 2      IF LABEL (31) = ' ' THEN
1108 2      DO ;
1109 2 1      C = DIG (31) ;
1110 2 1      PUT FILE (REPC) EDIT ('41',LABEL(31)) (LINE(29),A,X(3),A) ;
1111 2 1      DO S = 1 TO 15 ;
1112 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REPC) EDIT
1113 2 2      (CH41 (1,S))(COL(S*8+5),F(8,C)) ;
1114 2 2      ENCL ;
1115 2 1      ENCL ;
1116 2 1      IF LABEL (32) = ' ' THEN
1117 2 1      DO ;
1118 2 1      C = DIG (33) ;
1119 2 1      PUT FILE (REPC) EDIT ('43',LABEL(33)) (LINE(30),A,X(3),A) ;
1120 2 1      DO S = 1 TO 15 ;
1121 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REPC) EDIT
1122 2 2      (CH43 (1,S))(COL(S*8+5),F(8,C)) ;
1123 2 2      ENCL ;
1124 2 1      ENCL ;
1125 2 1      IF LABEL (34) = ' ' THEN
1126 2 1      DO ;
1127 2 1      C = DIG (34) ;
1128 2 1      PUT FILE (REPC) EDIT ('44',LABEL(34)) (LINE(31),A,X(3),A) ;
1129 2 1      DO S = 1 TO 15 ;
1130 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REPC) EDIT
1131 2 2      (CH44 (1,S))(COL(S*8+5),F(6,D)) ;
1132 2 2      ENCL ;
1133 2 1      ENCL ;
1134 2 1      IF LABEL (36) = ' ' THEN
1135 2 1      DO ;
1136 2 1      C = DIG (36) ;
1137 2 1      PUT FILE (REPC) EDIT ('37',LABEL(36)) (LINE(32),A,X(3),A) ;
1138 2 1      DO S = 1 TO 15 ;
1139 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REPC) EDIT
1140 2 2      (CH37 (1,S))(COL(S*8+5),F(8,C)) ;
1141 2 2      ENCL ;
1142 2 1      ENCL ;
1143 2 1      IF LABEL (30) = ' ' THEN
1144 2 1      DO ;
1145 2 1      C = DIG (30) ;
1146 2 1      PUT FILE (REPC) EDIT ('40',LABEL(30)) (LINE(33),A,X(3),A) ;
1147 2 1      DO S = 1 TO 15 ;
1148 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REPC) EDIT
1149 2 2      (CH40 (1,S))(COL(S*8+5),F(8,C)) ;
1150 2 2      ENCL ;
1151 2 1      ENCL ;
1152 2 1      IF LABEL (37) = ' ' THEN
1153 2 1      DO ;
1154 2 1      C = DIG (37) ;
1155 2 1      PUT FILE (REPC) EDIT ('39',LABEL(37)) (LINE(34),A,X(3),A) ;
1156 2 1      DO S = 1 TO 15 ;
1157 2 2      IF CTRREC.SEC (1,S) = ' ' THEN PUT FILE (REPC) EDIT
1158 2 2      (CH39 (1,S))(COL(S*8+5),F(8,C)) ;
1159 2 2      ENCL ;
1160 2 1      ENCL ;

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MYSTIC: PROCEDURE OPTICS(MAIN) ;

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      STMT LEVEL NEST
1148 2 2 IF CTRREC*SEC (I,S) = ' ' THEN PUT FILE (REFC) EDIT
      (CH35 (I,S))(COL(S*8+5),F(8,D)) ;
      END ;
1150 2 2 C = DIG (11) ;
1151 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1152 2 1 C = DIG (11) ;
1153 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1154 2 1 C = DIG (11) ;
1155 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1157 2 1 C = DIG (11) ;
1158 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1159 2 1 C = DIG (11) ;
1160 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1161 2 1 C = DIG (11) ;
1162 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1163 2 1 C = DIG (11) ;
1164 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1165 2 1 C = DIG (11) ;
1166 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1167 2 1 C = DIG (11) ;
1168 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1169 2 1 C = DIG (11) ;
1170 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1171 2 1 C = DIG (11) ;
1172 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1173 2 1 C = DIG (11) ;
1174 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1175 2 1 C = DIG (11) ;
1176 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1177 2 1 C = DIG (11) ;
1178 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1180 2 1 C = DIG (11) ;
1181 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1182 2 1 C = DIG (11) ;
1183 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1184 2 1 C = DIG (11) ;
1185 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1187 2 1 C = DIG (11) ;
1188 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1189 2 1 C = DIG (11) ;
1190 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1191 2 1 C = DIG (11) ;
1192 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1194 2 1 C = DIG (11) ;
1195 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1196 2 1 C = DIG (11) ;
1197 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;
1198 2 1 C = DIG (11) ;
1199 2 1 PUT FILE (REFC) EDIT ('10',LABEL(11)) (LINE(35),A,X(3),A) ;

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3-50902

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MYSTIC: PROCECUE (FTICASIMAIN) :

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STMT LEVEL NEST
1199 2 1 IF CH20(I,S) = '1' THEN PUT FILE (REPC) EDIT 00102300
1201 2 1 ELSE IF CH20(I,S) = 'E' THEN PUT FILE (REPC) EDIT (ERFLAG)
1203 2 1 (CCL(S*8+5),A) ;
1204 2 1 END ;
1205 2 1 PUT FILE (REPC) EDIT (*21*,LABEL(20)) (LINE(43),A,X(13),A);00102700
1206 2 1 CC S = 1 TC 15 ;
1208 2 1 IF CH21(I,S) = '1' THEN PUT FILE (REPO) EDIT 00102800
1210 2 1 (CCL(S*8+5),A) ;
1211 2 1 END ;
1212 2 1 ELSE IF CH21(I,S) = 'E' THEN PUT FILE (REPC) EDIT (ERFLAG)
1213 2 1 (COL(S*8+5),A) ;
1215 2 1 END ;
1217 2 1 PUT FILE (REPC) EDIT (*22*,LABEL(21)) (LINE(44),A,X(13),A);00103100
1218 2 1 CC S = 1 TC 15 ;
1219 2 1 IF CH22(I,S) = '1' THEN PUT FILE (REPC) EDIT 00103300
1220 2 1 (CCL(S*8+5),A) ;
1221 2 1 END ;
1222 2 1 ELSE IF CH22(I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
1223 2 1 (COL(S*8+5),A) ;
1224 2 1 END ;
1225 2 1 PUT FILE (REPC) EDIT (*23*,LABEL(22)) (LINE(45),A,X(13),A);00103700
1226 2 1 CC S = 1 TC 15 ;
1227 2 1 IF CH23(I,S) = '1' THEN PUT FILE (REPC) EDIT 00103900
1228 2 1 (CCL(S*8+5),A) ;
1229 2 1 END ;
1230 2 1 ELSE IF CH23(I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
1231 2 1 (COL(S*8+5),A) ;
1232 2 1 END ;
1233 2 1 PUT FILE (REPC) EDIT (*24*,LABEL(23)) (LINE(46),A,X(13),A);00104300
1234 2 1 CC S = 1 TC 15 ;
1235 2 1 IF CH24(I,S) = '1' THEN PUT FILE (REPC) EDIT 00104500
1236 2 1 (CCL(S*8+5),A) ;
1237 2 1 END ;
1238 2 1 ELSE IF CH24(I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
1239 2 1 (COL(S*8+5),A) ;
1240 2 1 END ;
1241 2 1 PUT FILE (REPC) EDIT (*25*,LABEL(24)) (LINE(47),A,X(13),A);00104900
1242 2 1 CC S = 1 TC 15 ;
1243 2 1 IF CH25(I,S) = '1' THEN PUT FILE (REPC) EDIT 00105100
1244 2 1 (CCL(S*8+5),A) ;
1245 2 1 END ;
1246 2 1 ELSE IF CH25(I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
1247 2 1 (COL(S*8+5),A) ;
1248 2 1 END ;
1249 2 1 PUT FILE (REPC) EDIT (*48*,LABEL(38)) (LINE(48),A,X(13),A);00105500
1250 2 1 CC S = 1 TC 15 ;
1251 2 1 IF CH48(I,S) = '1' THEN PUT FILE (REPC) EDIT 00105520
1252 2 1 (CCL(S*8+5),A) ;
1253 2 1 END ;
1254 2 1 ELSE IF CH48(I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
1255 2 1 (COL(S*8+5),A) ;
1256 2 1 END ;
1257 2 1 PUT FILE (REPC) EDIT (*49*,LABEL(39)) (LINE(49),A,X(13),A);00105530
1258 2 1 CC S = 1 TC 15 ;
1259 2 1 IF CH49(I,S) = '1' THEN PUT FILE (REPC) EDIT 00105540
1260 2 1 (CCL(S*8+5),A) ;
1261 2 1 END ;
1262 2 1 ELSE IF CH49(I,S) = 'E' THEN PUT FILE (REPO) EDIT (ERFLAG)
1263 2 1 (COL(S*8+5),A) ;
1264 2 1 END ;
1265 2 1 IF TEST < 4 THEN
1266 2 1 CC = CIG (35) ;
1267 2 1 END ;

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[illegible]

C0000500

MYSTIC: PROCEDURE OPTIONS(MAIN) :

STMT LEVEL NEST

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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 = MCC (SC + 4,'C') ;
1295 2 1 PUT STRING (SECE) EDIT (SC) (P'99') ;
1296 2 1 RETURN ;
1297 2 1 END ;
1298 2 1
1299 1 1 TRSETUP: PROCEDURE (A,F) ;
1300 2 1 DCL F CHAR (2) ;
1301 2 1 IF A = '04' THEN CC : K04 = TRANEND ; S04 = SECE ; TRC4 = F:END ;
1302 2 1 ELSE IF A = '05' THEN CC : K05 = TRANEND ; S05 = SECE ; TRC5 = F:END ;
1303 2 1 ELSE IF A = '06' THEN CC : K06 = TRANEND ; S06 = SECE ; TRC6 = F:END ;
1304 2 1 ELSE IF A = '07' THEN CC : K07 = TRANEND ; S07 = SECE ; TRC7 = F:END ;
1305 2 1 ELSE IF A = '08' THEN CC : K08 = TRANEND ; S08 = SECE ; TRC8 = F:END ;
1306 2 1 ELSE IF A = '09' THEN CC : K09 = TRANEND ; S09 = SECE ; TRC9 = F:END ;
1307 2 1 ELSE IF A = '10' THEN CC : K10 = TRANEND ; S10 = SECE ; TRC10 = F:END ;
1308 2 1 ELSE IF A = '11' THEN CC : K11 = TRANEND ; S11 = SECE ; PD = F ;
1309 2 1 TRC1 = PD * 100 ; END ;
1310 2 1 ELSE IF A = '12' THEN CC : K12 = TRANEND ; S12 = SECE ; PD = F ;
1311 2 1 TRC2 = PD * 100 ; END ;
1312 2 1 ELSE IF A = '13' THEN CC : K13 = TRANEND ; S13 = SECE ; TRC13 = F:END ;
1313 2 1 ELSE IF A = '14' THEN CC : K14 = TRANEND ; S14 = SECE ; TRC14 = F:END ;
1314 2 1 ELSE IF A = '15' THEN CC : K15 = TRANEND ; S15 = SECE ; PD = F ;
1315 2 1 TRC5 = PD * 100 ; END ;
1316 2 1 ELSE CC : PUT EDIT (***TRAN ERROR ***ALLEG,A,F) (SKIP(3),
1317 2 1 4(A,X(2))) ; RETURN ; END ;
1318 2 1 PUT FILE (REPT) EDIT (TRREC,TRKEY,SECT,A,F,TRANEND,SECE)
1319 2 1 (X(2),F(3),X(2),95(X(1),A)) ;
1320 2 1 END TRSETUP ;
1321 2 1 END MYSTIC ;
1322 2 1
1323 2 1
1324 2 1
1325 2 1
1326 2 1
1327 2 1
1328 2 1
1329 2 1
1330 2 1
1331 2 1
1332 2 1
1333 2 1
1334 2 1
1335 2 1
1336 2 1
1337 2 1
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1342 2 1
1343 2 1
1344 2 1
1345 2 1
1346 2 1
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1348 2 1
1349 2 1
1350 2 1
1351 2 1
1352 2 1
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1354 2 1
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1356 2 1
1357 2 1
1358 2 1
1359 2 1
1360 2 1
1361 2 1
1362 2 1
1363 2 1
1364 2 1

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00110500

350905

ATTRIBUTE AND CROSS-REFERENCE TABLE

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
1300	A	PARAMETER, UNALIGNED, STRING(2), CHARACTER 1299, 1301, 1307, 1313, 1315, 1325, 1331, 1336, 1345, 1351, 1355, 1362
1265	A	PARAMETER, UNALIGNED, STRING(1), CHARACTER 1264, 1266, 1268
266	A	STATEMENT LABEL CONSTANT 263
30	FOU	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED(7,1) 175, 558, 628
30	A01	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED(7,1) 181, 555, 554, 778
30	A02	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED(7,1) 183, 540, 555, 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, 666
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, 555
30	A31	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED(7,1) 206
30	A33	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED(7,6) 208, 355, 371, 390, 431, 528, 566, 652, 684, 727
30	A34	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED(7,1) 210
30	A36	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED(7,6) 202

OCL 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
	ACCR	GENERIC,BUILT-IN FUNCTION 792
11	ALLBC	BASED(Q1),UNALIGNED,STRING(80),CHARACTER 1359
38	ALLKEY	BASED(Q),UNALIGNED,STRING(11),CHARACTER 90,92
32	BC	IN SAME REC, BASED(Q),UNALIGNED,STRING(14),CHARACTER
30	E01	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 181,292,302,321,337,354,383,451,510,550,571,586,616,634,655,672,746 761,778
30	B02	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 183,295,304,323,339,356,385,463,444,459,473,493,512,531,552,579,589 602,616,658,675,748,763,779
30	B03	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 155,306,325,341,358,387,405,446,462,495,514,533,554
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)

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MYSTIC: PROCELLIFE (OPTIONS(MAIN)) :

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DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
30	B06	173,326,344,405,425,78C AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 163,556,551,657,716
30	B07	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 164,254,307,327,345,361,391,476,495,637,659,676,700,719,734,745,764
32	B1	IN SAMEREC,BASED(C),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	B12	IN SAMEREC,BASED(C),UNALIGNED,STRING(10),CHARACTER
30	B13	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 165,257,268,328,346,362,393,445,464,478,501,516,605,622,640,660,677 703,723,736,750,765
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(C),UNALIGNED,STRING(7),CHARACTER
32	B2	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
32	B20	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(C),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)

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DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
32	B21	204,336,355,384,404,422,445,460,474,492,512,587,603,615,636,696,717
30	B31	IN SAMESEC,BASED(C),UNALIGNED,STRING(2),CHARACTER AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 204,303,322,340,386,423,447,620,639,699,718
32	B22	IN SAMESEC,BASED(C),UNALIGNED,STRING(1),CHARACTER
30	B32	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 206,342,357,406,424,448,461,475,494,511,532,551,573,586,604,621,641 656,673,701,720,735,762
32	B34	IN SAMESEC,BASED(C),UNALIGNED,STRING(2),CHARACTER
30	B24	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 216,305,324,386,426,456,513,534,553,574,590,606,623,642,657,674,702 721,747
32	B26	IN SAMESEC,BASED(Q),UNALIGNED,STRING(10),CHARACTER
30	B36	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 202
32	B37	IN SAMESEC,BASED(C),UNALIGNED,STRING(2),CHARACTER
30	B27	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 224
32	B35	IN SAMESEC,BASED(Q),UNALIGNED,STRING(10),CHARACTER
30	B39	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 226
32	B4	IN SAMESEC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
22	B40	IN SAMESEC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B40	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 212
32	B41	IN SAMESEC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B41	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,3) 214
32	B42	IN SAMESEC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B42	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED(7,1) 216,256,305,427,450,477,498,576,607,624,643,704,722

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MYSTIC: FACCELURE (PTIONS(MAIN) :

LCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
32	B43	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B43	AUTOMATIC,ALIGNED,INITIAL,CECIPAL,FIXED(7,1) 216
32	B44	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B44	AUTOMATIC,ALIGNED,INITIAL,CECIPAL,FIXED(7,3) 220
32	B45	IN SAMEREC,BASED(Q),UNALIGNED,STRING(2),CHARACTER
30	B45	AUTOMATIC,ALIGNED,INITIAL,CECIPAL,FIXED(7,3) 220,253,352,408,428,463,475,500,536,555,577,592,608,625,636,705,720
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	EE1	IN TRANACT,BASED(Q),UNALIGNED,STRING(1),CHARACTER 80,82,84,85,813,815,817,818
12	B92	IN TRANACT,BASED(Q),UNALIGNED,STRING(3),CHARACTER
12	B93	IN TRANACT,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	EE4	IN TRANACT,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	EE5	IN TRANACT,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	EE6	IN TRANACT,BASED(Q),UNALIGNED,STRING(3),CHARACTER
12	EE7	IN TRANACT,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	B98	IN TRANACT,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	EE9	IN TRANACT,BASED(Q),UNALIGNED,STRING(2),CHARACTER
12	EE91	IN TRANACT,BASED(Q),UNALIGNED,STRING(2),CHARACTER

3-50910

OCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
12	RE52	IN TRANACT,BASED(QI),UNALIGNED,STRING(1),CHARACTER
12	RE52	IN TRANACT,BASED(QI),UNALIGNED,STRING(3),CHARACTER
9	ELC2	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 801,803,805,807,809,822,826,832,835,841,844,850,853,855,862,868,871 877,880,886,889,895,898,904
34	BLANK	IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
11	BLANK2	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER
11	BLANK4	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 831,840,845,858,867,876,885,894,902
14	BLANK7	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 288,312,315,374,396,433,483,524,538,650,726,738,755
791	***** C	STATIC,ALIGNED,BINARY,FIXED(15,0)
32	CC0	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 179
32	CC1	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 181
32	CC2	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 183
32	CC3	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 155
32	CC4	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 156
32	CC5	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9V9999) 173
32	CC6	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9V9999) 163
32	CC7	IN SAMEREC,BASED(C),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(S9V9999) 167

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
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32	C11	IN SAMEREC,BASED(C),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) 192
32	C17	IN SAMEREC,BASED(C),UNALIGNED,STRING(I),CHARACTER 192
32	C18	IN SAMEREC,BASED(Q),UNALIGNED,STRING(I),CHARACTER 193
32	C19	IN SAMEREC,BASED(C),UNALIGNED,STRING(I),CHARACTER 194
32	C20	IN SAMEREC,BASED(Q),UNALIGNED,STRING(I),CHARACTER 195
32	C21	IN SAMEREC,BASED(Q),UNALIGNED,STRING(I),CHARACTER 196
32	C22	IN SAMEREC,BASED(Q),UNALIGNED,STRING(I),CHARACTER 197
32	C23	IN SAMEREC,BASED(C),UNALIGNED,STRING(I),CHARACTER 198
32	C24	IN SAMEREC,BASED(Q),UNALIGNED,STRING(I),CHARACTER 199
32	C25	IN SAMEREC,BASED(Q),UNALIGNED,STRING(I),CHARACTER 200
32	C26	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 204
32	C27	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 204
32	C31	IN SAMEREC,BASED(Q),UNALIGNED,DECIMAL,PICTURE(S9V9999) 206
32	C33	IN SAMEREC,BASED(C),UNALIGNED,DECIMAL,PICTURE(S9V9999) 208

MYSTIC: PROCEDURE (FUNCTIONS):

DECL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
32	C34	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 210
32	C36	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 202
32	C37	IN SAMESEC, BASEC(Q), UNALIGNED, DECIMAL, PICTURE(S9999V9) 224
32	C39	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 226
32	C40	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 212
32	C41	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 214
32	C42	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 216
32	C43	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 218
32	C44	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 220
32	C45	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 222
32	C46	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 224
32	C47	IN SAMESEC, BASEC(C), UNALIGNED, DECIMAL, PICTURE(S9999V9) 226
32	C48	IN SAMESEC, BASEC(Q), UNALIGNED, STRING(15), CHARACTER 227
	C53	AUTOMATIC, ALIGNED, DECIMAL, FLOAT(SINGLE) 158
32	C53A	IN SAMESEC, BASEC(Q), UNALIGNED, DECIMAL, PICTURE(S9999V9) 228
35	C600	IN SECSEC(15) IN CTRSEC(4), AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED (7,1) 175,907,508,940,941,1255
35	C601	IN SECSEC(15) IN CTRSEC(4), AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FIXED (7,1) 181,505,510,550,952,955,957,955,1255

MYSTIC: FRECCURE (FTICAS(MAIN) :

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
35	CP02	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,1) 182,511,512,565,571,574,576,578,1255
35	CP03	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,3) 155,913,914,966,967,1256
35	CP04	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,2) 156,826,515,516,553,994,1257
35	CP05	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,1) 173,837,917,918,1002,1004,1007,1009,1011,1255
35	CP06	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,3) 163,915,920,1019,1020,1258
35	CH07	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,2) 164,846,921,922,1026,1027,1257
35	CP08	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,4) 165,166,166,923,924,1033,1034,1256
35	CP09	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,1) 167,855,925,926,1040,1041,1255
35	CP10	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,2) 187,1156
35	CP11	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,C) 186,1162
35	CP13	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,1) 188,185,189,1168
35	CP14	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,2) 150,151,151,1174
35	CP16	IN SECURE(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,4)

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DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
35	CP17	IN SECDEF(15) IN CTRREC(4),ALTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 192,1176,1180,1255
35	CP18	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 193,1185,1187,1255
35	CP19	IN SECDEF(15) IN CTRREC(4),ALTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 194,1192,1194,1255
35	CP20	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 195,1195,1201,1255
35	CP21	IN SECDEF(15) IN CTRREC(4),ALTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 196,1206,1208,1255
35	CP22	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 197,1213,1215,1255
35	CP23	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 198,1220,1222,1255
35	CP24	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 199,1227,1229,1255
35	CP25	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 200,954,573,1066,1255
35	CP30	IN SECDEF(15) IN CTRREC(4),ALTCMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,3) 204,864,1055
35	CP31	IN SECDEF(15) IN CTRREC(4),ALTCMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,1) 206,872,1066
35	CP33	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,2) 208,882,1077
35	CP34	IN SECDEF(15) IN CTRREC(4),AUTCMATIC,ALIGNED,INITIAL,DECIMAL,FINEX (7,1) 210,891,1066

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CCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
35	CP26	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) 224,1121
35	CH35	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 226,1149
35	CP40	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 212,1140
35	CP41	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 214,1113
35	CP42	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 214,1104
35	CP43	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 216
35	CP44	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 226,1122
35	CP45	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,3) 222,900,1055
35	CP46	IN SECREC(15) IN CTRREC(4),AUTOMATIC,UNALIGNED,INITIAL,STRING(1), CHARACTER 227,1235,1237,1255
35	CP53	IN SECREC(15) IN CTRREC(4),AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FIXED (7,1) 158,1245,1246,1255
32	CPA	IN SAMEREC,BASEC(C),UNALIGNED,STRING(10),CHARACTER
34	CPAN	IN DATA(70) IN INPEC,BASEC(10),UNALIGNED,STRING(2),CHARACTER
12	CPENKEY	EASEC(1),UNALIGNED,STRING(5),CHARACTER 86,132,164,783

CCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
1252	CLEAN	STATEMENT LABEL CONSTANT 794
791	***** C	STATIC,ALIGNED,BINARY,FIXED(15,0) 536,941,946,555,967,578,984,987,991,994,1000,1011,1017,1020,1024 1027,1031,1034,1038,1041,1046,1050,1055,1059,1064,1068,1073,1077 1082,1086,1091,1095,1100,1104,1109,1113,1118,1122,1127,1131,1136 1140,1145,1149,1152,1156,1159,1164,1168,1170,1174,1178,1182,1186,1190,1194,1198,1202,1206,1210,1214,1218,1222,1226,1230,1234,1238,1242 IN CATCH(29) IN CTCV,BASEC(2),UNALIGNED,STRING(4),CHARACTER
791	CAT	(7C) IN INREC,BASEC(2),STRUCTURE
24	CATA	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,C)
20	CATARE	106,110,115,280,282
20	CATAMIN	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0)
20	CATASEC	105,110,114,115,281,282
791	CATCH	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0)
40	DAY	59,111,116,124,126,145,147,149,151,155,168,174,283,788
13	LAVA	(25) IN CTCV,BASEC(2),STRUCTURE
24	DEFREC	AUTOMATIC,UNALIGNED,INITIAL,STRING(2),CHARACTER 71,272,788
14	IF	IN FEEDER,AUTOMATIC,UNALIGNED,STRING(2),CHARACTER 786,777
791	***** EIC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 59,59,235,285
21	DEFREC	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 311,315,412,464,523,564,666,687,739,754
1272	ENCSEC	(35) STATIC,ALIGNED,INITIAL,BINARY,FIXED(15,C) 536,946,947,954,959,1000,1017,1024,1031,1036,1046,1055,1064,1073 1082,1091,1100,1109,1118,1127,1136,1145,1152,1156,1164,1170,1174,1178,1182,1186,1190,1194,1198,1202,1206,1210,1214,1218,1222,1226,1230,1234,1238,1242
42	ECF	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 121,121,235,285
		ENTRY,DECIMAL,FLCAT(SINGLE)
		-EC2
		AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 48,65,240,248

MYSTIC: PROCEDURE OPTIONS(PAIN) :

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DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
	INFL1	FILE,EXTERNAL 46,57,86
34	INSEC	BASED(C),STRUCTURE
14	INAC	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 31C,376,563,685,688,741,752
26	ICTR	AUTOMATIC,DEFINED,ALIGNED,BINARY,FIXED(31,0) 54,95,96,96,134,136,137,137,14C,276,766,788
27	ISEC	AUTOMATIC,DEFINED,ALIGNED,BINARY,FIXED(31,0) 95,788
21	J	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 257,258,262,265,265,27C,27C,272,787,787,787,787,787,787,787
34	JC	IN INREC,BASED(10),UNALIGNED,STRING(3),CHARACTER 101,257,274
791	JC2	IN CTCV2,BASED(2),UNALIGNED,STRING(3),CHARACTER
21	JCTF	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 71,71,128,222,250,252,276,284,788
20	JSEC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 124,126,145,147,145,151,224,766,1261,1261
13	JLAK	IN HEADER,AUTOMATIC,UNALIGNED,INITIAL,STRING(1588),CHARACTER
17	***** K	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0)
11	KC4	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 825,831,1303
11	KC5	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 826,84C,1315
11	KC7	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 847,845,1321
11	KC9	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 856,858,1305
11	K2C	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 865,867,1327
11	K21	AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 874,876,1335

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MVS/VS: FACILITY (FUNCTIONS(MAIN) :

LOC NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
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154	LAC_3C	STATEMENT LABEL CONSTANT 144
145	LACCEP	STATEMENT LABEL CONSTANT 133
16	***** LEAF	AUTOMATIC, ALIGNED, BINARY, FIXED(15,0) 255,260,261,262,265,270
19	LC06	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(31,0) 175,176,177,177,179,181,183,788
15	LC15	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(31,C) 165,170,171,171,173,788
15	LC2C	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(31,0) 160,161,162,162,164,165,166,166,167,788
15	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
15	LS15	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(31,C) 168,169,170,170,172,788
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) 155,156,158,788
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) 780,781,1004
3	MAXI	FILE, EXTERNAL, PRINT 781,555,574,1007
34	MIN	IN, INREC, BASED(10), UNALIGNED, STRING(12), CHARACTER 105,114,281
	MCC	GENERIC, BUILT-IN FUNCTION

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MYSTIC: PRECEDURE OPTICASIMAIN) :

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DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
10	PCN_YAR	56,154,162,171,177,186,259,1222,1282,1254 (12)AUTOMATIC,UNALIGNED,INITIAL,STRING(5),CHARACTER 273
41	MCNTH	AUTOMATIC,UNALIGNED,INITIAL,STRING(5),CHARACTER 71,273,766
13	MCNTHA	IN HEADER,AUTOMATIC,UNALIGNED,STRING(12),CHARACTER 766,777
37	MRI	(17)AUTOMATIC,UNALIGNED,INITIAL,STRING(13),CHARACTER 71,770
13	PRICH	IN HEADER,AUTOMATIC,UNALIGNED,STRING(13),CHARACTER 770,777
37	***** MRITEST	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,289,313,314,331,348,377,397,415,438,453,467,485,504,516,544,565 580,596,610,627,646,666,651,710,756,770
1	***** MYSTIC	ENTRY,BINARY,FIXED(15,0)
13	***** MMH	IN HEADER,AUTOMATIC,ALIGNED,BINARY,FIXED(15,0) 767,777
184	MC_LAG	STATEMENT LABEL CONSTANT 153
21	MMIN	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 50,56,87,87,237,235,285
21	MMREC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 135,138,235,235,285
21	MMSTON	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 143,143,236,236,285
34	MMREC	BASIS(1),STRUCTURE
229	MMTEST	STATEMENT LABEL CONSTANT 49,102,125
	MMCHAR	BUILT-IN FUNCTION 64
	MMC000	BUILT-IN FUNCTION 54,64
14	MMFLAG	AUTOMATIC,UNALIGNED,INITIAL,STRING(18),CHARACTER 1179,1186,1193,1200,1207,1214,1221,1228,1236

LOC NL	IDENTIFIER	ATTRIBUTES AND REFERENCES
37	ENLOC	BUILT-IN FUNCTION 64
37	ENSCURE	BUILT-IN FUNCTION 64
37	CUT	FILE,EXTERNAL 776,1251
37	CVEN	{12}AUTOMATIC,UNALIGNED,INITIAL,STRING(4),CHARACTER 71,765
37	LKCC	IN HEADER,AUTOMATIC,UNALIGNED,STRING(4),CHARACTER 765,777
37	***** CUNUM	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,289,213,217,232,345,376,356,416,429,454,468,466,505,519,545,566 581,557,611,629,647,667,692,711,728,742,757,765
37	PAGE	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(31,0) 70,70,71,234,234,238,242,242,243
5	PC	AUTOMATIC,ALIGNED,DECIMAL,FIXED(15,4) 1335,1236,1342,1343,1355,1356
37	PCINT	{12}AUTOMATIC,UNALIGNED,INITIAL,STRING(25),CHARACTER 71
37	***** PCNUM	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 71,289,213,217,232,345,376,356,416,429,454,468,466,505,519,545,566 582,558,612,620,646,668,692,712,729,743,758
31	PEC	{23}AUTOMATIC,INITIAL,LABEL 288,288,299,315,321,346,344,355,411,430,452,466,481,503,516,536,558 575,554,610,627,645,662,675,767,726,738,752,787
37	C	AUTOMATIC,ALIGNED,PCINTER 66,66,50,52,53,57,101,104,105,107,108,109,114,132,136,140,144,155 156,163,164,165,167,173,175,181,185,184,186,187,188,190,192,193,194 195,196,197,198,199,200,202,204,206,208,210,212,214,216,218,220,222 224,226,227,229,231,233,235,237,239,241,243,245,247,249,251,253,255,257,259,261,263,265,267,269,271,273,275,277,279,281,283,285,287,289,291,293,295,297,299,301,303,305,307,309,311,313,315,317,319,321,323,325,327,329,331,333,335,337,339,341,343,345,347,349,351,353,355,357,359,361,363,365,367,369,371,373,375,377,379,381,383,385,387,389,391,393,395,397,399,401,403,405,407,409,411,413,415,417,419,421,423,425,427,429,431,433,435,437,439,441,443,445,447,449,451,453,455,457,459,461,463,465,467,469,471,473,475,477,479,481,483,485,487,489,491,493,495,497,499,501,503,505,507,509,511,513,515,517,519,521,523,525,527,529,531,533,535,537,539,541,543,545,547,549,551,553,555,557,559,561,563,565,567,569,571,573,575,577,579,581,583,585,587,589,591,593,595,597,599,601,603,605,607,609,611,613,615,617,619,621,623,625,627,629,631,633,635,637,639,641,643,645,647,649,651,653,655,657,659,661,663,665,667,669,671,673,675,677,679,681,683,685,687,689,691,693,695,697,699,701,703,705,707,709,711,713,715,717,719,721,723,725,727,729,731,733,735,737,739,741,743,745,747,749,751,753,755,757,759,761,763,765,767,769,771,773,775,777,779,781,783,785,787,789,791,793,795,797,799,801,803,805,807,809,811,813,815,817,819,821,823,825,827,829,831,833,835,837,839,841,843,845,847,849,851,853,855,857,859,861,863,865,867,869,871,873,875,877,879,881,883,885,887,889,891,893,895,897,899,901,903,905,907,909,911,913,915,917,919,921,923,925,927,929,931,933,935,937,939,941,943,945,947,949,951,953,955,957,959,961,963,965,967,969,971,973,975,977,979,981,983,985,987,989,991,993,995,997,999,1001,1003,1005,1007,1009,1011,1013,1015,1017,1019,1021,1023,1025,1027,1029,1031,1033,1035,1037,1039,1041,1043,1045,1047,1049,1051,1053,1055,1057,1059,1061,1063,1065,1067,1069,1071,1073,1075,1077,1079,1081,1083,1085,1087,1089,1091,1093,1095,1097,1099,1101,1103,1105,1107,1109,1111,1113,1115,1117,1119,1121,1123,1125,1127,1129,1131,1133,1135,1137,1139,1141,1143,1145,1147,1149,1151,1153,1155,1157,1159,1161,1163,1165,1167,1169,1171,1173,1175,1177,1179,1181,1183,1185,1187,1189,1191,1193,1195,1197,1199,1201,1203,1205,1207,1209,1211,1213,1215,1217,1219,1221,1223,1225,1227,1229,1231,1233,1235,1237,1239,1241,1243,1245,1247,1249,1251,1253,1255,1257,1259,1261,1263,1265,1267,1269,1271,1273,1275,1277,1279,1281,1283,1285,1287,1289,1291,1293,1295,1297,1299,1301,1303,1305,1307,1309,1311,1313,1315,1317,1319,1321,1323,1325,1327,1329,1331,1333,1335,1337,1339,1341,1343,1345,1347,1349,1351,1353,1355,1357,1359,1361,1363,1365,1367,1369,1371,1373,1375,1377,1379,1381,1383,1385,1387,1389,1391,1393,1395,1397,1399,1401,1403,1405,1407,1409,1411,1413,1415,1417,1419,1421,1423,1425,1427,1429,1431,1433,1435,1437,1439,1441,1443,1445,1447,1449,1451,1453,1455,1457,1459,1461,1463,1465,1467,1469,1471,1473,1475,1477,1479,1481,1483,1485,1487,1489,1491,1493,1495,1497,1499,1501,1503,1505,1507,1509,1511,1513,1515,1517,1519,1521,1523,1525,1527,1529,1531,1533,1535,1537,1539,1541,1543,1545,1547,1549,1551,1553,1555,1557,1559,1561,1563,1565,1567,1569,1571,1573,1575,1577,1579,1581,1583,1585,1587,1589,1591,1593,1595,1597,1599,1601,1603,1605,1607,1609,1611,1613,1615,1617,1619,1621,1623,1625,1627,1629,1631,1633,1635,1637,1639,1641,1643,1645,1647,1649,1651,1653,1655,1657,1659,1661,1663,1665,1667,1669,1671,1673,1675,1677,1679,1681,1683,1685,1687,1689,1691,1693,1695,1697,1699,1701,1703,1705,1707,1709,1711,1713,1715,1717,1719,1721,1723,1725,1727,1729,1731,1733,1735,1737,1739,1741,1743,1745,1747,1749,1751,1753,1755,1757,1759,1761,1763,1765,1767,1769,1771,1773,1775,1777,1779,1781,1783,1785,1787,1789,1791,1793,1795,1797,1799,1801,1803,1805,1807,1809,1811,1813,1815,1817,1819,1821,1823,1825,1827,1829,1831,1833,1835,1837,1839,1841,1843,1845,1847,1849,1851,1853,1855,1857,1859,1861,1863,1865,1867,1869,1871,1873,1875,1877,1879,1881,1883,1885,1887,1889,1891,1893,1895,1897,1899,1901,1903,1905,1907,1909,1911,1913,1915,1917,1919,1921,1923,1925,1927,1929,1931,1933,1935,1937,1939,1941,1943,1945,1947,1949,1951,1953,1955,1957,1959,1961,1963,1965,1967,1969,1971,1973,1975,1977,1979,1981,1983,1985,1987,1989,1991,1993,1995,1997,1999,2001,2003,2005,2007,2009,2011,2013,2015,2017,2019,2021,2023,2025,2027,2029,2031,2033,2035,2037,2039,2041,2043,2045,2047,2049,2051,2053,2055,2057,2059,2061,2063,2065,2067,2069,2071,2073,2075,2077,2079,2081,2083,2085,2087,2089,2091,2093,2095,2097,2099,2101,2103,2105,2107,2109,2111,2113,2115,2117,2119,2121,2123,2125,2127,2129,2131,2133,2135,2137,2139,2141,2143,2145,2147,2149,2151,2153,2155,2157,2159,2161,2163,2165,2167,2169,2171,2173,2175,2177,2179,2181,2183,2185,2187,2189,2191,2193,2195,2197,2199,2201,2203,2205,2207,2209,2211,2213,2215,2217,2219,2221,2223,2225,2227,2229,2231,2233,2235,2237,2239,2241,2243,2245,2247,2249,2251,2253,2255,2257,2259,2261,2263,2265,2267,2269,2271,2273,2275,2277,2279,2281,2283,2285,2287,2289,2291,2293,2295,2297,2299,2301,2303,2305,2307,2309,2311,2313,2315,2317,2319,2321,2323,2325,2327,2329,2331,2333,2335,2337,2339,2341,2343,2345,2347,2349,2351,2353,2355,2357,2359,2361,2363,2365,2367,2369,2371,2373,2375,2377,2379,2381,2383,2385,2387,2389,2391,2393,2395,2397,2399,2401,2403,2405,2407,2409,2411,2413,2415,2417,2419,2421,2423,2425,2427,2429,2431,2433,2435,2437,2439,2441,2443,2445,2447,2449,2451,2453,2455,2457,2459,2461,2463,2465,2467,2469,2471,2473,2475,2477,2479,2481,2483,2485,2487,2489,2491,2493,2495,2497,2499,2501,2503,2505,2507,2509,2511,2513,2515,2517,2519,2521,2523,2525,2527,2529,2531,2533,2535,2537,2539,2541,2543,2545,2547,2549,2551,2553,2555,2557,2559,2561,2563,2565,2567,2569,2571,2573,2575,2577,2579,2581,2583,2585,2587,2589,2591,2593,2595,2597,2599,2601,2603,2605,2607,2609,2611,2613,2615,2617,2619,2621,2623,2625,2627,2629,2631,2633,2635,2637,2639,2641,2643,2645,2647,2649,2651,2653,2655,2657,2659,2661,2663,2665,2667,2669,2671,2673,2675,2677,2679,2681,2683,2685,2687,2689,2691,2693,2695,2697,2699,2701,2703,2705,2707,2709,2711,2713,2715,2717,2719,2721,2723,2725,2727,2729,2731,2733,2735,2737,2739,2741,2743,2745,2747,2749,2751,2753,2755,2757,2759,2761,2763,2765,2767,2769,2771,2773,2775,2777,2779,2781,2783,2785,2787,2789,2791,2793,2795,2797,2799,2801,2803,2805,2807,2809,2811,2813,2815,2817,2819,2821,2823,2825,2827,2829,2831,2833,2835,2837,2839,2841,2843,2845,2847,2849,2851,2853,2855,2857,2859,2861,2863,2865,2867,2869,2871,2873,2875,2877,2879,2881,2883,2885,2887,2889,2891,2893,2895,2897,2899,2901,2903,2905,2907,2909,2911,2913,2915,2917,2919,2921,2923,2925,2927,2929,2931,2933,2935,2937,2939,2941,2943,2945,2947,2949,2951,2953,2955,2957,2959,2961,2963,2965,2967,2969,2971,2973,2975,2977,2979,2981,2983,2985,2987,2989,2991,2993,2995,2997,2999,3001,3003,3005,3007,3009,3011,3013,3015,3017,3019,3021,3023,3025,3027,3029,3031,3033,3035,3037,3039,3041,3043,3045,3047,3049,3051,3053,3055,3057,3059,3061,3063,3065,3067,3069,3071,3073,3075,3077,3079,3081,3083,3085,3087,3089,3091,3093,3095,3097,3099,3101,3103,3105,3107,3109,3111,3113,3115,3117,3119,3121,3123,3125,3127,3129,3131,3133,3135,3137,3139,3141,3143,3145,3147,3149,3151,3153,3155,3157,3159,3161,3163,3165,3167,3169,3171,3173,3175,3177,3179,3181,3183,3185,3187,3189,3191,3193,3195,3197,3199,3201,3203,3205,3207,3209,3211,3213,3215,3217,3219,3221,3223,3225,3227,3229,3231,3233,3235,3237,3239,3241,3243,3245,3247,3249,3251,3253,3255,3257,3259,3261,3263,3265,3267,3269,3271,3273,3275,3277,3279,3281,3283,3285,3287,3289,3291,3293,3295,3297,3299,3301,3303,3305,3307,3309,3311,3313,3315,3317,3319,3321,3323,3325,3327,3329,3331,3333,3335,3337,3339,3341,3343,3345,3347,3349,3351,3353,3355,3357,3359,3361,3363,3365,3367,3369,3371,3373,3375,3377,3379,3381,3383,3385,3387,3389,3391,3393,3395,3397,3399,3401,3403,3405,3407,3409,3411,3413,3415,3417,3419,3421,3423,3425,3427,3429,3431,3433,3435,3437,3439,3441,3443,3445,3447,3449,3451,3453,3455,3457,3459,3461,3463,3465,3467,3469,3471,3473,3475,3477,3479,3481,3483,3485,3487,3489,3491,3493,3495,3497,3499,3501,3503,3505,3507,3509,3511,3513,3515,3517,3519,3521,3523,3525,3527,3529,3531,3533,3535,3537,3539,3541,3543,3545,3547,3549,3551,3553,3555,3557,3559,3561,3563,3565,3567,3569,3571,3573,3575,3577,3579,3581,3583,3585,3587,3589,3591,3593,3595,3597,3599,3601,3603,3605,3607,3609,3611,3613,3615,3617,3619,3621,3623,3625,3627,3629,3631,3633,3635,3637,3639,3641,3643,3645,3647,3649,3651,3653,3655,3657,3659,3661,3663,3665,3667,3669,3671,3673,3675,3677,3679,3681,3683,3685,3687,3689,3691,3693,3695,3697,3699,3701,3703,3705,3707,3709,3711,3713,3715,3717,3719,3721,3723,3725,3727,3729,3731,3733,3735,3737,3739,3741,3743,3745,3747,3749,3751,3753,3755,3757,3759,3761,3763,3765,3767,3769,3771,3773,3775,3777,3779,3781,3783,3785,3787,3789,3791,3793,3795,3797,3799,3801,3803,3805,3807,3809,3811,3813,3815,3817,3819,3821,3823,3825,3827,3829,3831,3833,3835,3837,3839,3841,3843,3845,3847,3849,3851,3853,3855,3857,3859,3861,3863,3865,3867,3869,3871,3873,3875,3877,3879,3881,3883,3885,3887,3889,3891,3893,3895,3897,3899,3901,3903,3905,3907,3909,3911,3913,3915,3917,3919,3921,3923,3925,3927,3929,3931,3933,3935,3937,3939,3941,3943,3945,3947,3949,3951,3953,3955,3957,3959,3961,3963,3965,3967,3969,3971,3973,3975,3977,3979,3981,3983,3985,3987,3989,3991,3993,3995,3997,3999,4001,4003,4005,4007,4009,4011,4013,4015,4017,4019,4021,4023,4025,4027,4029,4031,4033,4035,4037,4039,4041,4043,4045,4047,4049,4051,4053,4055,4057,4059,4061,4063,4065,4067,4069,4071,4073,4075,4077,4079,4081,4083,4085,4087,4089,4091,4093,4095,4097,4099,4101,4103,4105,4107,4109,4111,4113,4115,4117,4119,4121,4123,4125,4127,4129,4131,4133,4135,4137,4139,4141,4143,4145,4147,4149,4151,4153,4155,4157,4159,4161,4163,4165,4167,4169,4171,4173,4175,4177,4179,4181,4183,4185,4187,4189,4191,4193,4195,4197,4199,4201,4203,4205,4207,4209,4211,4213,4215,4217,4219,4221,4223,4225,4227,4229,4231,4233,4235,4237,4239,4241,4243,4245,4247,4249,4251,4253,4255,4257,4259,4261,4263,4265,4267,4269,4271,4273,4275,4277,4279,4281,4283,4285,4287,4289,4291,4293,4295,4297,4299,4301,4303,4305,4307,4309,4311,4313,4315,4317,4319,4321,4323,4325,4327,4329,4331,4333,4335,4337,4339,4341,4343,4345,4347,4349,4351,4353,4355,4357,4359,4361,4363,4365,4367,4369,4371,4373,4375,4377,4379,4381,4383,4385,4387,4389,4391,4393,4395,4397,4399,4401,4403,4405,4407,4409,4411,4413,4415,4417,4419,4421,4423,4425,4427,4429,4431,4433,4435,4437,4439,4441,4443,4445,4447,4449,4451,4453,4455,4457,4459,4461,4463,4465,4467,4469,4471,4473,4475,4477,4479,4481,4483,4485,4487,4489,4491,4493,4495,4497,4499,4501,4503,4505,4507,4509,4511,4513,4515,4517,4519,4521,4523,4525,4527,4529,4531,4533,4535,4537,4539,4541,4543,4545,4547,4549,4551,4553,4555,4557,4559,4561,4563,4565,4567,4569,4571,4573,4575,4577,4579,4581,4583,4585,4587,4589,4591,4593,4595,4597,4599,4601,4603,4605,4607,4609,4611,4613,4615,4617,4619,4621,4623,4625,4627,4629,4631,4633,4635,4637,4639,4641,4643,4645,4647,4649,4651,4653,4655,4657,4659,4661,4663,4665,4667,4669,4671,4673,4675,4677,4679,4681,4683,4685,4687,4689,4691,4693,4695,4697,4699,4701,4703,4705,4707,4709,4711,4713,4715,4717,4719,4721,4723,4725,4727,4729,4731,4733,4735,4737,4739,4741,4743,4745,4747,4749,4751,4753,4755,4757,4759,4761,4763,4765,4767,4769,4771,4773,4775,4777,4779,4781,4783,4785,4787,4789,4791,4793,4795

DECL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
11	545	AUTOMATIC, UNALIGNED, INITIAL, STRING(12), CHARACTER 69, 501, 504, 1354
32	SPNEFEC	BASED(1), STRUCTURE
23	***** SC	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(15, 0) 1261, 1262, 1263, 1264, 1265, 1290, 1291, 1292, 1293, 1294, 1295, 1296
19	SC	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(13, 0) 14, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000
34	SEC	IN INREC, BASED(1), UNALIGNED, STRING(12), CHARACTER 93, 144
35	SEC	IN SECDEF(15) IN CTREC(4), AUTOMATIC, UNALIGNED, INITIAL, STRING(12), CHARACTER 14, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000
12	SECE	IN TRANACT, BASED(1), UNALIGNED, STRING(12), CHARACTER 801, 1275, 1285, 1295, 1304, 1310, 1316, 1322, 1326, 1334, 1341, 1346, 1354, 1362
34	SECFUN	IN INREC, BASED(1), UNALIGNED, STRING(12), CHARACTER
751	SECUP	IN CTGV, BASED(1), UNALIGNED, STRING(12), CHARACTER
35	SECDEF	(15) IN CTREC(4), AUTOMATIC, STRUCTURE
12	SECT	IN TRANACT, BASED(1), UNALIGNED, STRING(12), CHARACTER 79, 81, 83, 796, 812, 814, 816, 1273, 1275, 1281, 1293, 1362
756	SETIREN	STATEMENT LABEL CONSTANT 815
12	STARKEY	AUTOMATIC, UNALIGNED, INITIAL, STRING(19), CHARACTER 68, 250, 300, 315, 335, 352, 381, 401, 419, 442, 457, 471, 489, 506, 529, 546, 569, 584, 600, 614, 632, 653, 670, 695, 714, 732, 744, 759, 783
12	STCFKEY	AUTOMATIC, UNALIGNED, STRING(19), CHARACTER 132, 184, 251, 301, 320, 336, 353, 382, 402, 420, 443, 458, 472, 490, 505, 530, 549, 570, 585, 601, 615, 633, 654, 671, 696, 715, 733, 745, 760
143	STCFE	STATEMENT LABEL CONSTANT 785
	SUBSTP	GENERIC, BUILT-IN FUNCTION

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
11	TF09	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 855,1311
11	TF30	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,3) 864,1325
11	TF31	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 873,1336
11	TF33	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,3) 882,1343
11	TF34	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,1) 891,1349
11	TF45	AUTOMATIC,ALIGNED,DECIMAL,FIXED(7,3) 900,1356
10	TRAN	FILE,EXTERNAL,RECORD,INPUT,SEQUENTIAL,PUFFERED,ENVIRONMENT(F(1600, 80)) 73,76,811
12	TRANACT	BASEC(1),STRUCTURE
12	TRANENC	IN TRANACT,BASEC(1),UNALIGNED,STRING(4),CHARACTER 1276,1285,1286,1292,1303,1305,1315,1321,1327,1333,1340,1347,1353 1362
12	TRANKEY	IN TRANACT,BASEC(1),UNALIGNED,STRING(7),CHARACTER 1276,1279,1284,1286,1290
12	TPC1	IN TRANACT,BASEC(1),UNALIGNED,STRING(2),CHARACTER 803,804
12	TPC2	IN TRANACT,BASEC(1),UNALIGNED,STRING(2),CHARACTER 805,806
12	TPC3	IN TRANACT,BASEC(1),UNALIGNED,STRING(2),CHARACTER 607,608
12	TPC4	IN TRANACT,BASEC(1),UNALIGNED,STRING(2),CHARACTER 805,810
9	TPKEY	BASEC(1),UNALIGNED,STRING(8),CHARACTER 796,1362
23	***** TRREC	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 235,277,286,800,800,1362
11	***** TPSEC	AUTOMATIC,ALIGNED,BINARY,FIXED(15,0)

MYSTIC: PROCELLURE OPTIONS(MAIN) :

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CCCCC50C

QCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
1259	TRSETUP	ENTRY,CEGIMAL,FLCAT(SINGLE) 804,806,808,810
23	***** TRCT	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,0) 243,277,277
12	TRV1	IN TRANACT,BASED(Q1),UNALIGNED,STPINC(8),CHARACTER 804
12	TRV2	IN TRANACT,BASED(Q1),UNALIGNED,STPINC(8),CHARACTER 806
12	TRV3	IN TRANACT,BASED(Q1),UNALIGNED,STPINC(8),CHARACTER 808
12	TRV4	IN TRANACT,BASED(Q1),UNALIGNED,STPINC(8),CHARACTER 810
39	TSECPUN	AUTOMATIC,UNALIGNED,INITIAL,STPINC(2),CHARACTER
24	VCLT	IN DATA(70) IN INREC,BASED(Q),UNALIGNED,STRING(6),CHARACTER
1264	VS	ENTRY,STRING(1),CHARACTER 192,193,154,155,156,157,158,159,200,227
4C	VR	AUTOMATIC,UNALIGNED,INITIAL,STPINC(2),CHARACTER 71,256
	Z	AUTOMATIC,ALIGNED,PCINTER 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	(7C)IN NUREC,BASED(Q),STRUCTURE
34	ZV	IN ZLEV(7C) IN NUREC,BASED(Q),UNALIGNED,STRING(6),CHARACTER

350929

MYSTIC: PROCEURE OPTICAS(MAIN) :

SYNTAX CHECK COMPLETED. COMPIATION CONTINUES.

CCCCC500

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C-78

3-50930

AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
791	DIG	78
13	PRALUF	1528
34	INREC	572
36	LABEL	272
18	PCN-TSE	108
37	PRE	52
34	NOFLC	572
37	CVEN	48
37	FCINT	300
31	FEC	224
4	CTC	4
791	CTCV	1528
791	CTCVZ	7
35	CTREC	7712
37	ALN	408
32	SMREC	420
15	LAB	24
12	TRANACT	20

CCCCC5C

MYSTIC: PROCEDURE OPTIONS(MAIN) :

STORAGE REQUIREMENTS.

THE STORAGE AREA FOR THE PROCEDURE LABELLED MYSTIC IS 13928 BYTES LONG.

THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 47 IS 728 BYTES LONG.

THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 53 IS 732 BYTES LONG.

THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 58 IS 728 BYTES LONG.

THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 62 IS 772 BYTES LONG.

THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 65 IS 560 BYTES LONG.

THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 74 IS 728 BYTES LONG.

THE STORAGE AREA FOR THE PROCEDURE LABELLED FOLS IS 136C BYTES LONG.

THE STORAGE AREA FOR THE PROCEDURE LABELLED HS IS 736 BYTES LONG.

THE STORAGE AREA FOR THE PROCEDURE LABELLED ENSECC 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 RECCFES = 156C,PRCC TEXT STMTS = 1364,OBJECT BYTES = 63788

COMPILER DIAGNOSTICS.

WARNINGS.

IEM0227I NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS. SYSIN/MSYSRINT HAS BEEN
 ASSIGNED 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, 1250, 1253, 1305, 1311, 1317, 1323, 1325,
 1325, 1342, 1349.
 IEM1750I DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS 1355.
 IEM3898I COMPILER CORE REQUIREMENT EXCEEDED SIZE GIVEN. AUXILIARY STORAGE USED.

END OF DIAGNOSTICS.

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

COMPILE TIME 2.28 PMS
 ELAPSED TIME 12.52 PMS

350933

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

CS/36C PL/1 CCPIILER (F)

VERSION 5.3B

PL/1 F CCPIILER OPTIIONS SPECIFIED ARE AS FOLLOWS--

LOAD,NODECK

THE COMPLETE LIST OF OPTIIONS USED DURING THIS COMPIILATION IS--

```

ECCDIC
CHARC
ACMACRC
SOURCE2
ACWACDCK
CCMF
SOURCE
ATR
XREF
NCEXTPEF
NCLIST
LOAD
NODECK
FLAG
STMT
SIZE=C147712
LINECNT=050
CPI=01
SCRPGIN=(C02,C72,CCL)
NCEXTDIC
NEST
CPLIST
SYNCPKS
ECCDIC,CHARC,ACMACRC,SOURCE2,ACWACDCK,CCMF,SOURCE,ATR,XREF,NCEXTPEF,NCLIST,LOAD,
NODECK,FLAG,STMT,SIZE=0147712,LINECNT=C56,CPI=C1,SCRPGIN=(C02,C72,CCL),NCEXTDIC,
NEST,CPLIST,SYNCPKS

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OPTIIONS IN EFFECT
OPTIIONS IN EFFECT
OPTIIONS IN EFFECT

CALC: PROCELUFE CFTIONS(PAIN) ;

SMT LEVEL NEST

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15      1      CLPUT FILE REGRD CLPUT SEQUENTIAL BLUFFERED ;
          ECL J INREC BASEC (C) ,
              5 JC CHAR (3) ,
              5 FF CHAR (2) ,
              5 MINUTE CHAR (2) ,
              5 STR CHAR (1) ,
              5 SECREC (15) ,
              1C SEC CHAR (2) ,
              1C CPOC FIXED DECIMAL (7,1) ,
              1C CP01 FIXED DECIMAL (7,1) ,
              1C CP02 FIXED DECIMAL (7,1) ,
              1C CP03 FIXED DECIMAL (7,3) ,
              1C CP04 FIXED DECIMAL (7,2) ,
              1C CP05 FIXED DECIMAL (7,1) ,
              1C CP06 FIXED DECIMAL (7,3) ,
              1C CP07 FIXED DECIMAL (7,2) ,
              1C CP08 FIXED DECIMAL (7,4) ,
              1C CP09 FIXED DECIMAL (7,1) ,
              1C CP10 FIXED DECIMAL (7,2) ,
              1C CP11 FIXED DECIMAL (7,3) ,
              1C CP12 FIXED DECIMAL (7,1) ,
              1C CP14 FIXED DECIMAL (7,2) ,
              1C CP16 FIXED DECIMAL (7,4) ,
              1C CP20 FIXED DECIMAL (7,3) ,
              1C CP31 FIXED DECIMAL (7,1) ,
              1C CP32 FIXED DECIMAL (7,3) ,
              1C CP34 FIXED DECIMAL (7,1) ,
              1C CP36 FIXED DECIMAL (7,3) ,
              1C CP40 FIXED DECIMAL (7,1) ,
              1C CP41 FIXED DECIMAL (7,3) ,
              1C CP42 FIXED DECIMAL (7,1) ,
              1C CP43 FIXED DECIMAL (7,1) ,
              1C CP44 FIXED DECIMAL (7,3) ,
              1C CP45 FIXED DECIMAL (7,3) ,
              1C CP37 FIXED DECIMAL (7,1) ,
              1C CP35 FIXED DECIMAL (7,1) ,
              1C CP52 FIXED DECIMAL (7,1) ,
              1C CP17 CHAR (1) ,
              1C CP18 CHAR (1) ,
              1C CP19 CHAR (1) ,
              1C CP20 CHAR (1) ,
              1C CP21 CHAR (1) ,
              1C CP22 CHAR (1) ,
              1C CP23 CHAR (1) ,
              1C CP24 CHAR (1) ,
              1C CP25 CHAR (1) ,
              1C CP46 CHAR (1) ,
              1CUTREC BASEC (R) ,
              5 KEY CHAR (8) ,
              5 SECREC (15) ,
              1C CPOO DECIMAL FLOAT (6) ,

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CALC: PROCEDURE OPTIONS(MAIN) ;

SYMT LEVEL NEST

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33 1      CN ENDFILE (INPLT) BEGIN ; ECF = 'Y' ; GO TO NUTEST ; END ;
38 1
    INITIAL:
    ALINES,SLINES = BLANK7 ;
    /* SINCE PRESSURE CHANNELS ARE ".01 IN." AND SCRT IS USED THE
    CONSTANT IS 17.4 INSTEAD OF 174. */
    NEG = 17.4 * FITCT * NEG * SQR (25.52) ;
    SKG = 17.4 * FITCT * SKG * SQR (25.52) ;
    STDMCN = 53C / 29.52 ;
    /* EDIT INITIAL CONSTANT VALUES, NEG = NEG, SKG = SKG,
    STDMCN = STDMCN (SKIF(2),A,3(SKIF,A,F(15,6))) ;
    CC I = 1 TO 3 ;
    AVTEMP (I) = 0 ; MAXTEMP (I) = -100 ; MINTEMP (I) = 99999 ; END ;
    /* EDIT (BIGMAC,BIGMAC) (SKIP(3),A,F(16,2)) ;
    FEAC:
    READ FILE (INPLT) SET (Q) ;
    IF JC = 'KEY' THEN GO TO NUTEST ;
    RECN = RECN + 1 ;
    IF (ALKEY < STARKEY | ALKEY > STOPKEY) THEN GO TO FEAC ;
    IF STOP = 15 THEN STOP = 15; ELSE IF START = 1 THEN START = 1 ;
    CUTREC,KEY = ALKEY ;
    LOCATE OUTREC FILE (OUTPLT) SET (R) ;
    IF ALKEY = STARKEY THEN CC ;
    START = STARSEC ;
    1 1
    1 1      ELSE
    1 1      IF ALKEY = STOPKEY THEN CC ;
    1 1      STOP = STOPSEC ;
    1 1      END ;
    1 1      IF INREC.CTR < '1' | INREC.CTR > '4' THEN DO ; /* FIXUP KEY */
    1 1      IF INREC.SEC (1) = 'GG' | INREC.SEC (15) = '14' THEN
    1 1      INREC.CTR = '1' ;
    1 1      ELSE IF INREC.SEC (1) = '15' | INREC.SEC (15) = '29' THEN
    1 1      INREC.CTR = '2' ;
    1 1      ELSE IF INREC.SEC (1) = '30' | INREC.SEC (15) = '44' THEN
    1 1      INREC.CTR = '3' ;
    1 1      ELSE IF INREC.SEC (1) = '45' | INREC.SEC (15) = '55' THEN
    1 1      INREC.CTR = '4' ;
    1 1      ELSE PUT EDIT ('CTR ERROR',INREC.CTR,INREC.SEC (1) ,INREC.SEC(15),
    1 1      ALKEY) (PAGE,5(SKIF,A)) ;
    1 1      END ;
    1 1      CC I = START TO STOP ;
    1 1      IF I = STOP THEN FIVSEC = C ; ELSE
    1 1      FIVSEC = MCC (1,5) ;
    1 1      AF(1,4),SF(1,4) = C ;
    1 1      CATSEC = CATSEC + 1 ;
    1 1      IF INREC.SEC (I) = ' ' THEN
    1 1      CC ;
    1 1      /* CONVERT AND STORE */
    1 1      CUTREC,SECSEC (I) = INREC,SECSEC (I), BY NAME ;
    1 1      GZA = C ;
    1 1      /* ALL FLOWS STORED IN CFM */

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CALC: FRCEDUPE CPTIONS(MAIN) :

STMT LEVEL NEST

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91      /* ALL TEMP STORED IN DEGREES RANKINE */
92      CO, J = 1, IC, ALNPLCW ;
93      CHAN (I,TEMP(J)) = CHAN (I,TEMP(J)) + 460 ; /* RANKINE*/
94      TN = ICCHAN (I,TEMP(J)) + CHAN (I,PRES(J)) /
95      CUTREC*CH14 (I) ;
96      IF TN < C THEN CC ;
97      TN = 0 ;
98      NEGALP = NEGALP + 1 ;
99      END ;
100      AF (I,J) = FITCN (J) * SCRT (TN) ;
101      IF AF (I,J) <= IC THEN GAP = GAP + 1 ; /* EELCW THRESHOLD */
102      AF (I,4) = AF (I,4) + AF (I,J) ;
103      AFCT (J) = AFCT (J) + AF (I,J) ;
104      /* STD FLW COMP */
105      SF (I,J) = (STCKN * AF (I,J) + CUTREC*CH14 (I))
106      / CHAN (I,TEMP(J)) ;
107      SF (I,4) = SF (I,4) + SF (I,J) ;
108      SFCT (J) = SFCT (J) + SF (I,J) ;
109      AVTEMP (J) = AVTEMP (J) + CHAN (I,TEMP(J)) ;
110      MAXTEMP (J) = MAX (CHAN (I,TEMP(J)),MAXTEMP (J)) ;
111      MINTEMP (J) = MIN (CHAN (I,TEMP(J)),MINTEMP (J)) ;
112      TN = (AF (I,J) / LIM120C) + C.5 ;
113      IF TN < C THEN CC ;
114      PUT EDIT (*INDEX ERROR A*,TN,I,J,AF (I,J)) (SKIP,A,4(F(20,4))) ;
115      TN=C ; END ; ELSE IF TN> 120 THEN CC ;
116      PUT EDIT (*INDEX ERROR A*,TN,I,J,AF (I,J)) (SKIP,A,4(F(20,4))) ;
117      TN = 120 ; END ;
118      AGRAPH (TN) = AGRAPH (TN) + MARK (J) ;
119      TN = (SF (I,J) / LIM120C) + C.5 ;
120      IF TN < C THEN CC ;
121      PUT EDIT (*INDEX ERROR B*,TN,I,J,SF (I,J)) (SKIP,A,4(F(20,4))) ;
122      TN=C ; END ; ELSE IF TN> 120 THEN CC ;
123      PUT EDIT (*INDEX ERROR B*,TN,I,J,SF (I,J)) (SKIP,A,4(F(20,4))) ;
124      TN = 120 ; END ;
125      SGRAPH (TN) = SGRAPH (TN) + MARK (J) ;
126      END ;
127      PUT FILE (C1) EDIT (CUTREC*SEC (I),WASH,ALINES)
128      (SKIP,X(3),A,X(1),2(A)) ;
129      PUT FILE (C2) EDIT (CUTREC*SEC (I),WASH,SLINES)
130      (SKIP,X(3),A,X(1),2(A)) ;
131      AV = AV + SF (I,4) ;
132      IF GAP < C THEN GAP = 1 ; /* NO LCW FLOWS */
133      ELSE IF GAP = ALNPLCW THEN GAP = C ; /* ALL LCW FLOWS */
134      ELSE CC ;
135      GAM = 1 - (GAP / ALNPLCW) ;
136      GAM = 1 / GAM ;
137      END ;
138      ALINES,SLINES = BLANK ;
139      IF FIVSEC = 0 THEN CC ;
140      AV = AV / 4C ;
141      PUT FILE (C4) EDIT (CUTREC*SEC(I),AV) (SKIP,A,F(5)) ;

```

CALC: FRCEDLFE CTIONS(MAIN) ;

SYMT LEVEL NEXT

```

151 1 3      IF = TF + AV ;
152 1 3      AV = C ;
153 1 3      ENC ;
154 1 2      IF LABEL (C) -# BLANK7 THEN CC ;
          /* NET GAS ADJUSTMENT */
156 1 2      TN = (LGC - CLTREC*CHC6 (I)) / 100 ;
157 1 3      CUTREC*CHC6 (I) = CUTREC*CHC6 (I) * TN ;
158 1 2      CUTREC*CHC7 (I) = CUTREC*CHC7 (I) * TN ;
159 1 3      CUTREC*CHC8 (I) = CUTREC*CHC8 (I) * TN ;
160 1 3      CUTREC*CHC9 (I) = CUTREC*CHC9 (I) * TN ;
161 1 3      END ;
          /* CONTINUOUS GAS ANALYSIS
162 1 2      IF LABEL (I) -# ELANK7 THEN
163 1 2      CC ;
164 1 3      AF (I,6) = CLTREC*CHC1 (I) * SF (I,4) ;
165 1 3      SF (I,6) = AF (I,6) * GAM ;
166 1 3      AVGC1 = AVGC1 + 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      A1 = N1 + 1 ;
173 1 3      Z1 = A1 + CLTREC*CHC1 (I) ;
174 1 3      C1 = C1 + CLTREC*CHC1 (I) * GAM ;
175 1 3      IF FVASEC = 0 THEN CC ;
176 1 4      IF A1 -# C THEN CC ;
177 1 4      T11 = T11 + A1 ; T11 = T11 + C1 ;
178 1 5      A1 = A1 / N1 ;
179 1 5      C1 = C1 / N1 ;
180 1 5      FLT FILE (G4) EDIT (A1,C1) (CCL(G12),2(F(8,1))) ;
181 1 5      A1 = 0 ; N1 = 0 ; C1 = 0 ;
182 1 5      ENC ; ENC ;
          /* CHC3 */
183 1 2      AF (I,8) = CLTREC*CHC3 (I) * SF (I,4) ;
184 1 2      SF (I,8) = AF (I,8) * GAM ;
185 1 2      AVG3 = AVG3 + SF (I,8) ;
186 1 2      MAX3 = MAX (MAX3,SF(I,8)) ;
187 1 2      MIN3 = MIN (MIN3,SF(I,8)) ;
188 1 2      AVGC3 = AVGC3 + AF (I,8) ;
189 1 2      MAXC3 = MAX (MAXC3,AF(I,8)) ;
190 1 2      MINC3 = MIN (MINC3,AF(I,8)) ;
191 1 2      P1 = N3 + 1 ;
192 1 2      A1 = A2 + CLTREC*CHC3 (I) ;
193 1 2      C3 = C3 + CLTREC*CHC3 (I) * GAM ;
194 1 2      IF FVASEC = 0 THEN CC ;
195 1 2      IF A2 -# C THEN CC ;
196 1 4      T12 = T12 + A3 ; T12 = T12 + C3 ;
197 1 4      A2 = A2 / N2 ;
198 1 4      C3 = C3 / N2 ;

```

CALC: PROCEEDURE OPTIONS(MAIN) :

STMT LEVEL NEST

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209 1 4      FLT FILE (C4) EDIT (A3,C3) (CCL(C28),2(F(8,1))) ;
210 1 4      A3 = C ; A3 = C ; C3 = C ;
213 1 4      EPC ; END ;
/* CFC4 */
215 1 2      AF (1,5) = CUTREC.CFC4 (1) * SF (1,4) ;
216 1 2      SF (1,5) = AF (1,5) * GAM ;
217 1 2      AVG4 = AVG4 + SF (1,5) ;
218 1 2      MIN4 = MIN (MIN4,SF(1,5)) ;
219 1 2      MAX4 = MAX (MAX4,SF(1,5)) ;
220 1 2      AVG4 = AVG4 / N4 ;
221 1 2      MAX4 = MAX (MAX4,AF(1,5)) ;
222 1 2      MIN4 = MIN (MIN4,AF(1,5)) ;
223 1 2      N4 = N4 + 1 ;
224 1 2      A4 = A4 + CUTREC.CH04 (1) ;
225 1 2      C4 = C4 + CUTREC.CFC4 (1) * GAM ;
226 1 2      IF FINSEC = 0 THEN DO ;
228 1 3      IF N4 = 0 THEN DO ;
230 1 4      T44 = T44 + A4 ; T44 = T44 + C4 ;
232 1 4      A4 = A4 / N4 ;
233 1 4      C4 = C4 / N4 ;
234 1 4      FLT FILE (C4) EDIT (A4,C4) (CCL(C44),2(F(8,1))) ;
235 1 4      A4 = 0 ; N4 = 0 ; C4 = C ;
238 1 4      END ; END ;
/* LABEL (5) == BLANK7 THEN
CC ;
AF (1,1C) = CUTREC.CH05 (1) * SF (1,4) ;
SF (1,1C) = AF (1,10) * GAM ;
AVG5 = AVG5 + SF (1,10) ;
MAX5 = MAX (MAX5,SF(1,1C)) ;
MIN5 = MIN (MIN5,SF(1,10)) ;
AVG5 = AVG5 / N5 ;
MAX5 = MAX (MAX5,AF(1,1C)) ;
MIN5 = MIN (MIN5,AF(1,1C)) ;
N5 = N5 + 1 ;
A5 = A5 + CUTREC.CH05 (1) ;
C5 = C5 + CUTREC.CH05 (1) * GAM ;
IF FINSEC = 0 THEN DO ;
IF N5 = 0 THEN DO ;
T45 = T45 + A5 ; T45 = T45 + C5 ;
A5 = A5 / N5 ;
C5 = C5 / N5 ;
FLT FILE (C4) EDIT (A5,C5) (CCL(C40),2(F(8,2))) ;
A5 = C ; N5 = C ; C5 = C ;
EPC ; END ;
/* CFC5 */
END ;
AF (1,13) = CUTREC.CH08 (1) * SF (1,4) ;
SF (1,13) = AF (1,13) * GAM ;
AVG8 = AVG8 + SF (1,13) ;
MAX8 = MAX (MAX8,SF(1,13)) ;
MIN8 = MIN (MIN8,SF(1,13)) ;

```

CALC: PROCEDURE CPTICKS(MAIN) ;

STMT LEVEL NEST

```

273 1 2 /AVCC = AVCC + AF (I,13) ;
274 1 2 /AVCC = MAX (MAXC,AF(I,13)) ;
275 1 2 /AVCC = MIN (MINCC,AF(I,13)) ;
276 1 2 /AVCC = AF (I,13) ;
277 1 2 /AVCC = AF (I,13) ;
278 1 2 /AVCC = AF (I,13) ;
279 1 2 /AVCC = AF (I,13) ;
280 1 2 /AVCC = AF (I,13) ;
281 1 2 /AVCC = AF (I,13) ;
282 1 2 /AVCC = AF (I,13) ;
283 1 2 /AVCC = AF (I,13) ;
284 1 2 /AVCC = AF (I,13) ;
285 1 2 /AVCC = AF (I,13) ;
286 1 2 /AVCC = AF (I,13) ;
287 1 2 /AVCC = AF (I,13) ;
288 1 2 /AVCC = AF (I,13) ;
289 1 2 /AVCC = AF (I,13) ;
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291 1 2 /AVCC = AF (I,13) ;
292 1 2 /AVCC = AF (I,13) ;
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294 1 2 /AVCC = AF (I,13) ;
295 1 2 /AVCC = AF (I,13) ;
296 1 2 /AVCC = AF (I,13) ;
297 1 2 /AVCC = AF (I,13) ;
298 1 2 /AVCC = AF (I,13) ;
299 1 2 /AVCC = AF (I,13) ;
300 1 2 /AVCC = AF (I,13) ;
301 1 2 /AVCC = AF (I,13) ;
302 1 2 /AVCC = AF (I,13) ;
303 1 2 /AVCC = AF (I,13) ;
304 1 2 /AVCC = AF (I,13) ;
305 1 2 /AVCC = AF (I,13) ;
306 1 2 /AVCC = AF (I,13) ;
307 1 2 /AVCC = AF (I,13) ;
308 1 2 /AVCC = AF (I,13) ;
309 1 2 /AVCC = AF (I,13) ;
310 1 2 /AVCC = AF (I,13) ;
311 1 2 /AVCC = AF (I,13) ;
312 1 2 /AVCC = AF (I,13) ;
313 1 2 /AVCC = AF (I,13) ;
314 1 2 /AVCC = AF (I,13) ;
315 1 2 /AVCC = AF (I,13) ;
316 1 2 /AVCC = AF (I,13) ;
317 1 2 /AVCC = AF (I,13) ;
318 1 2 /AVCC = AF (I,13) ;
319 1 2 /AVCC = AF (I,13) ;
320 1 2 /AVCC = AF (I,13) ;
321 1 2 /AVCC = AF (I,13) ;
322 1 2 /AVCC = AF (I,13) ;
323 1 2 /AVCC = AF (I,13) ;
324 1 2 /AVCC = AF (I,13) ;
325 1 2 /AVCC = AF (I,13) ;
326 1 2 /AVCC = AF (I,13) ;
327 1 2 /AVCC = AF (I,13) ;
328 1 2 /AVCC = AF (I,13) ;
329 1 2 /AVCC = AF (I,13) ;
330 1 2 /AVCC = AF (I,13) ;
331 1 2 /AVCC = AF (I,13) ;
332 1 2 /AVCC = AF (I,13) ;
333 1 2 /AVCC = AF (I,13) ;
334 1 2 /AVCC = AF (I,13) ;
335 1 2 /AVCC = AF (I,13) ;
336 1 2 /AVCC = AF (I,13) ;

```

CALC: PROCEDURE ESTIENS(MAIN) ;

STMT LEVEL NEST

```

337 1 5 PC = C ; AC = 0 ;
338 1 5 END ; END ;
341 1 3 /* CFC6 */
342 1 2 AF (I,11) = CUTREC.CFC6 (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 AVG6 = AVG6 + AF (I,11) ;
348 1 2 MAX6 = MAX (MAX6,AF(I,11)) ;
349 1 2 MIN6 = MIN (MIN6,AF(I,11)) ;
350 1 2 PC = PC + 1 ;
351 1 2 AC = AC + CUTREC.CFC6 (I) ;
352 1 2 IF FINSEC = 0 THEN CC ;
353 1 3 IF AC = C THEN CC ;
354 1 3 TAC = TAC + AC ;
355 1 4 AC = AC / N6 ;
356 1 4 AC = AC / N6 ;
357 1 4 AC = AC / N6 ;
358 1 4 PUT FILE (G4) EDIT (A6) (CCL(116),F(8,1)) ;
359 1 4 AC = C ; N6 = C ;
360 1 4 END ; END ;
361 1 4 /* CFC7 */
362 1 2 AF (I,12) = CUTREC.CFC7 (I) * SF (I,4) ;
363 1 2 SF (I,12) = AF (I,12) * GAM ;
364 1 2 AVG7 = AVG7 + SF (I,12) ;
365 1 2 MAX7 = MAX (MAX7,SF(I,12)) ;
366 1 2 MIN7 = MIN (MIN7,SF(I,12)) ;
367 1 2 AVG7 = AVG7 + AF (I,12) ;
368 1 2 MAX7 = MAX (MAX7,AF(I,12)) ;
369 1 2 MIN7 = MIN (MIN7,AF(I,12)) ;
370 1 2 PC = PC + 1 ;
371 1 2 AC = AC + CUTREC.CFC7 (I) ;
372 1 2 IF FINSEC = 0 THEN CC ;
373 1 2 IF N7 = C THEN CC ;
374 1 3 IF N7 = C THEN CC ;
375 1 3 TAT = TAT + AT ;
376 1 4 AT = AT / N7 ;
377 1 4 AT = AT / N7 ;
378 1 4 AT = AT / N7 ;
379 1 4 PUT FILE (G4) EDIT (A7) (CCL(124),F(8,1)) ;
380 1 4 AC = C ; N7 = C ;
381 1 4 AC = C ; N7 = C ;
382 1 4 END ; END ;
383 1 2 /* ***** SEC (I) = ' ' ???? */
384 1 2 END ;
385 1 1 GC TC READ ;
386 1 1 GC TC READ ;
387 1 1 NUTEST ;
388 1 1 IF TEST > 1 THEN
389 1 1 CC ;
390 1 1 PUT FILE (REC) EDIT (TEST SUMMARY STATISTICS, 'TEST NUMBER',
391 1 1 TEST,RECIN, 'RECORDS IN', DATSEC, 'DATA SECONDS',
(PAGE,CCL(6)),A,CCL(60),A,F(14),SKIP(3),2(F(12),F(2),A)) ;
GC I = 1 TC NUTELCH ;
AFICT (I) = AFICT (I) / 60 ;

```

CALC: PROCEDURE OPTIONS(MAIN) ;

```

STMT LEVEL NEST
392 1 2          SFTCT (1) = SFTCT (1) / 60 ;
393 1 2          AVCTEMP (1) = AVCTEMP (1) / DATSEC ;
394 1 2          PUT FILE (REFC) EDIT ('FLCN',1,'MIN TEMP',MINTEMP(1),
          'AVG TEMP',AVCTEMP(1),'MAX TEMP',MAXTEMP(1),'TEMP CFAN #',
          TEMP(1),'PRES CFAN #',PRES(1),'TOTAL VOLUME (CF)',
          SFTCT(1),'TOTAL STD VOLUME (SCF)',SFTCT(1))
          (SKIP(3),A,F(4),2(X(5),A,F(6)),SKIP,2(X(5),A,F(4)),
          SKIP,2(X(5),A,F(4),4)) ;
395 1 2          AVCTEMP (1) = C ; MAXTEMP (1) = -100 ; MINTEMP (1) = 99999 ;
396 1 2          AFCT (1), SFTCT (1) = 0 ;
397 1 2          ENC ;
398 1 2          PUT FILE (SYSPRINT) EDIT ('TEST',TEST,'NEGATIVE VALUES =',NEGNUM)
399 1 2          (SKIP(2),A,F(4),X(4),A,F(12)) ;
400 1 1          PUT FILE (REFC) EDIT ('CFAN',F(12),F(12)) ;
          'TCT VCL' ( SKIP(2),A,CCL(7),A,CCL(21),4(X(7),A)) ;
          IF LABEL (1) = BLANK7 THEN DO ;
401 1 1          ANCI = AVGCI / SM ;
402 1 1          ANI = ANCI / SM ;
403 1 2          ANCI = ANCI / DATSEC ;
404 1 2          ANI = ANI / DATSEC ;
405 1 2          ANCI = ANCI / DATSEC ;
406 1 2          ANI = ANI / DATSEC ;
407 1 2          PUT FILE (REFC) EDIT ('TOL',LABEL(1),MIN3,AVGCI,MAXCI,ANCI,MIN1,
408 1 2          ANCI,MAXI,ANI) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15),E,-6)),
          E(15,4)) ;
          ENC ;
          IF LABEL (3) = BLANK7 THEN DO ;
409 1 2          ANCI = AVGCI / SM ;
410 1 1          ANI = ANCI / SM ;
411 1 2          ANCI = ANCI / DATSEC ;
412 1 2          ANI = ANI / DATSEC ;
413 1 2          ANCI = ANCI / DATSEC ;
414 1 2          ANI = ANI / DATSEC ;
415 1 2          PUT FILE (REFC) EDIT ('C3',LABEL(3),MIN3,AVGCI,MAXCI,ANCI,MIN1,
416 1 2          ANCI,MAXI,ANI) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15),E,-6)),
          E(15,4)) ;
          ENC ;
          IF LABEL (4) = BLANK7 THEN DO ;
417 1 2          ANCI = AVGCI / SM ;
418 1 1          ANI = ANCI / SM ;
419 1 2          ANCI = ANCI / DATSEC ;
420 1 2          ANI = ANI / DATSEC ;
421 1 2          ANCI = ANCI / DATSEC ;
422 1 2          ANI = ANI / DATSEC ;
423 1 2          PUT FILE (REFC) EDIT ('C4',LABEL(4),MIN4,AVGCI,MAXCI,ANCI,MIN1,
424 1 2          ANCI,MAXI,ANI) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15),E,-6)),
          E(15,4)) ;
          ENC ;
          IF LABEL (5) = BLANK7 THEN DO ;
425 1 2          ANCI = AVGCI / SM ;
426 1 1          ANI = ANCI / SM ;
427 1 2          ANCI = ANCI / DATSEC ;
428 1 2          ANI = ANI / DATSEC ;
429 1 2          ANCI = ANCI / DATSEC ;
430 1 2          ANI = ANI / DATSEC ;
431 1 2          PUT FILE (REFC) EDIT ('C5',LABEL(5),MIN5,AVGCI,MAXCI,ANCI,MIN1,
432 1 2          ANCI,MAXI,ANI) (SKIP(3),A,COL(6),A,2(COL(21),3(F(15),E,-6)),
          E(15,4)) ;
          ENC ;
433 1 2          ENC ;

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CALC: PROCDLFE OPTIONS(MAIN) :

```

STPT LEVEL NEST
434 1 1 ANCB = AVG06 / ST ;
435 1 1 ANE = ANGB / ST ;
436 1 1 ANGE = ANGE / CATSEC ;
437 1 1 ANGC8 = ANGC8 / CATSEC ;
438 1 1 PLT FILE (REFC) EDIT ('CE',LABEL(8),MIN8,AVG06,MAX06,ANCB,MIN8,
    AVG06,MAX06,ANE) (SKIP(3),A,CCL(6),A,2(CCL(21),3(F(15,E,-2)),
    E(15,4))) ;
439 1 1 ANCS = AVG05 / ST ;
440 1 1 ANE = ANGS / ST ;
441 1 1 ANCS = ANGS / CATSEC ;
442 1 1 ANC9 = ANCS / CATSEC ;
443 1 1 PLT FILE (REFC) EDIT ('CS',LABEL(9),MIN9,AVG05,MAX05,ANCS,MIN9,
    AVG05,MAX05,ANS) (SKIP(3),A,CCL(6),A,2(CCL(21),3(F(15,E,-2)),
    E(15,4))) ;
444 1 1 IF LABEL (0) = BLANK7 THEN GO ;
446 1 2 ANCC = ANGCC / ST ;
447 1 2 ANC = ANGO / ST ;
448 1 2 ANCC = ANGC / CATSEC ;
449 1 2 ANCO = ANCC / CATSEC ;
450 1 2 PLT FILE (REFC) EDIT ('CC',LABEL(0),MIN0,AVGCC,MAX00,ANOC,MINC,
    AVGC,MAX0,ANC) (SKIP(3),A,CCL(6),A,2(CCL(21),3(F(15,E,-2)),
    E(15,4))) ;
451 1 2 ENC ;
452 1 1 ANCE = ANGCC / ST ;
453 1 1 ANE = ANGC / ST ;
454 1 1 ANGE = ANGE / CATSEC ;
455 1 1 ANCO6 = ANCO6 / CATSEC ;
456 1 1 PLT FILE (REFC) EDIT ('CG',LABEL(6),MIN06,AVG06,MAX06,ANOC,MINC,
    AVGC,MAX0,ANE) (SKIP(3),A,CCL(6),A,2(CCL(21),3(F(15,E,-2)),
    E(15,4))) ;
457 1 1 ANC7 = ANGC7 / ST ;
458 1 1 ANE = ANGT / ST ;
459 1 1 ANC7 = ANGT / CATSEC ;
460 1 1 ANC7 = ANGT / CATSEC ;
461 1 1 PLT FILE (REFC) EDIT ('C7',LABEL(7),MIN07,AVG07,MAX07,AN07,MIN7,
    AVG7,MAX7,AN7) (SKIP(3),A,CCL(6),A,2(CCL(21),3(F(15,E,-2)),
    E(15,4))) ;
462 1 1 TN = (TF + 60) / CATSEC ;
463 1 1 TAC = TAC / CATSEC ;
464 1 1 TAJ = TAJ / CATSEC ;
465 1 1 TCI = TCI / CATSEC ;
466 1 1 TAE = TAE / CATSEC ;
467 1 1 TCE = TCE / CATSEC ;
468 1 1 TAA = TAA / CATSEC ;
469 1 1 TCA = TCA / CATSEC ;
470 1 1 TAE = TAE / CATSEC ;
471 1 1 TCE = TCE / CATSEC ;
472 1 1 TAE = TAE / CATSEC ;
473 1 1 TAE = TAE / CATSEC ;
474 1 1 TAE = TAE / CATSEC ;
475 1 1 TCE = TCE / CATSEC ;

```


CALC: PRCCCLFE CFICNS(PAIN) :

STAT LEVEL NEST

```

631 1 STARKEY = '10C1E151' ; STOPKEY = '10C1E211' ; /* TEST 11*/
633 1 STARSEC = 5 ; STCPSEC = 6 ; /* TEST 11 */
635 1 GC TC READER ;
636 1 FFC(112): NUMFLCN = 3 ;
637 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = NEG ; /* TEST 12*/
638 1 TEMP (2) = 17;PRES(2)= 16 ; PITKCN (2) = NEG ; /* TEST 12*/
639 1 TEMP (3) = 15;PRES(3)= 18 ; PITKCN (3) = NEG ; /* TEST 12*/
640 1 STARKEY = '19214021' ; STOPKEY = '19214074' ; /* TEST 12*/
641 1 STARSEC = 13 ; STCPSEC = 6 ; /* TEST 12 */
642 1 GC TC READER ;
643 1 FFC(113): NUMFLCN = 2 ;
644 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 13*/
645 1 TEMP (2) = 19;PRES(2)= 18 ; PITKCN (2) = NEG ; /* TEST 13*/
646 1 STARKEY = '15205114' ; STOPKEY = '19305164' ; /* TEST 13*/
647 1 STARSEC = 7 ; STCPSEC = 14 ; /* TEST 13 */
648 1 GC TC READER ;
649 1 FFC(114): NUMFLCN = 2 ;
650 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 14*/
651 1 TEMP (2) = 15;PRES(2)= 18 ; PITKCN (2) = NEG ; /* TEST 14*/
652 1 STARKEY = '15315133' ; STOPKEY = '15315192' ; /* TEST 14*/
653 1 STARSEC = 1 ; STCPSEC = 5 ; /* TEST 14 */
654 1 GC TC READER ;
655 1 FFC(115): NUMFLCN = 2 ;
656 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 15*/
657 1 TEMP (2) = 15;PRES(2)= 18 ; PITKCN (2) = SKG ; /* TEST 15*/
658 1 STARKEY = '21812432' ; STOPKEY = '21812462' ; /* TEST 15*/
659 1 STARSEC = 3 ; STCPSEC = 14 ; /* TEST 15 */
660 1 GC TC READER ;
661 1 FFC(116): NUMFLCN = 2 ;
662 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 16*/
663 1 TEMP (2) = 15;PRES(2)= 18 ; PITKCN (2) = SKG ; /* TEST 16*/
664 1 STARKEY = '21511041' ; STOPKEY = '21511073' ; /* TEST 16*/
665 1 STARSEC = 4 ; STCPSEC = 13 ; /* TEST 16 */
666 1 GC TC READER ;
667 1 FFC(117): NUMFLCN = 3 ;
668 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 17*/
669 1 TEMP (2) = 17;PRES(2)= 16 ; PITKCN (2) = SKG ; /* TEST 17*/
670 1 TEMP (3) = 15;PRES(3)= 18 ; PITKCN (3) = SKG ; /* TEST 17*/
671 1 STARKEY = '22011124' ; STOPKEY = '22011151' ; /* TEST 17*/
672 1 STARSEC = 11 ; STCPSEC = 5 ; /* TEST 17 */
673 1 GC TC READER ;
674 1 FFC(118): NUMFLCN = 2 ;
675 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 18*/
676 1 TEMP (2) = 17;PRES(2)= 16 ; PITKCN (2) = SKG ; /* TEST 18*/
677 1 TEMP (3) = 15;PRES(3)= 18 ; PITKCN (3) = SKG ; /* TEST 18*/
678 1 STARKEY = '22115213' ; STOPKEY = '22115241' ; /* TEST 18*/
679 1 STARSEC = 2 ; STCPSEC = 1 ; /* TEST 18 */
680 1 GC TC READER ;
681 1 FFC(119): NUMFLCN = 3 ;
682 1 TEMP (1) = 23;PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 19*/
683 1 TEMP (2) = 17;PRES(2)= 16 ; PITKCN (2) = SKG ; /* TEST 19*/
684 1

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CALC: FPCCELF CFIJCS(PAIN) ;

STMT LEVEL NEST

```

736 1 TEMP (2) = 15:PRES(2)= 18 ; PITKCN (2) = SKG ; /* TEST 15*/
739 1 STARKEY = '2251111' ; STOPKEY = '22511152' ; /* TEST 15*/
741 1 STARSEC = 5 ; STOPSEC = 1 ; /* TEST 15*/
743 1 GC TC READER ;
744 1 FPC(12): ALMFLCN = 3 ;
745 1 TEMP (1) = 23:PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 20*/
748 1 TEMP (2) = 17:PRES(2)= 16 ; PITKCN (2) = SKG ; /* TEST 20*/
751 1 TEMP (3) = 15:PRES(3)= 18 ; PITKCN (3) = SKG ; /* TEST 20*/
754 1 STARKEY = '22611081' ; STOPKEY = '22611104' ; /* TEST 20*/
756 1 STARSEC = 7 ; STOPSEC = 1 ; /* TEST 20*/
758 1 GC TC READER ;
759 1 FPC(12): ALMFLCN = 3 ;
760 1 TEMP (2) = 17:PRES(2)= 16 ; PITKCN (2) = SKG ; /* TEST 21*/
763 1 TEMP (3) = 15:PRES(3)= 18 ; PITKCN (3) = SKG ; /* TEST 21*/
766 1 TEMP (1) = 23:PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 21*/
769 1 STARKEY = '22711082' ; STOPKEY = '22711103' ; /* TEST 21*/
771 1 STARSEC = 1 ; STOPSEC = 5 ; /* TEST 21*/
773 1 GC TC READER ;
774 1 FPC(22): ALMFLCN = 1 ;
775 1 TEMP (1) = 15:PRES(1)= 18 ; PITKCN (1) = SKG ; /* TEST 22*/
778 1 STARKEY = '22711121' ; STOPKEY = '22711152' ; /* TEST 22*/
780 1 STARSEC = 5 ; STOPSEC = 6 ; /* TEST 22*/
782 1 GC TC READER ;
783 1 FPC(22): ALMFLCN = 1 ;
784 1 TEMP (1) = 15:PRES(1)= 18 ; PITKCN (1) = SKG ; /* TEST 23*/
787 1 STARKEY = '22811154' ; STOPKEY = '22811181' ; /* TEST 23*/
789 1 STARSEC = 6 ; STOPSEC = 10 ; /* TEST 23*/
791 1 GC TC READER ;
792 1 FPC(24): ALMFLCN = 3 ;
793 1 TEMP (2) = 17:PRES(2)= 16 ; PITKCN (2) = SKG ; /* TEST 24*/
796 1 TEMP (3) = 15:PRES(3)= 18 ; PITKCN (3) = SKG ; /* TEST 24*/
799 1 TEMP (1) = 23:PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 24*/
802 1 STARKEY = '22911451' ; STOPKEY = '229114213' ; /* TEST 24*/
804 1 STARSEC = 5 ; STOPSEC = 6 ; /* TEST 24*/
806 1 GC TC READER ;
807 1 FPC(25): ALMFLCN = 3 ;
808 1 TEMP (2) = 17:PRES(2)= 16 ; PITKCN (2) = SKG ; /* TEST 25*/
811 1 TEMP (3) = 15:PRES(3)= 18 ; PITKCN (3) = SKG ; /* TEST 25*/
814 1 TEMP (1) = 23:PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 25*/
817 1 STARKEY = '23411123' ; STOPKEY = '23411152' ; /* TEST 25*/
819 1 STARSEC = 1 ; STOPSEC = 13 ; /* TEST 25*/
821 1 GC TC READER ;
822 1 FPC(126): ALMFLCN = 1 ;
823 1 TEMP (1) = 15:PRES(1)= 18 ; PITKCN (1) = SKG ; /* TEST 26*/
826 1 STARKEY = '23411454' ; STOPKEY = '23411423' ; /* TEST 26*/
828 1 STARSEC = 1 ; STOPSEC = 10 ; /* TEST 26*/
830 1 GC TC READER ;
831 1 FPC(127): ALMFLCN = 1 ;
832 1 TEMP (1) = 23:PRES(1)= 26 ; PITKCN (1) = SKG ; /* TEST 27*/
835 1 STARKEY = '23511153' ; STOPKEY = '23511452' ; /* TEST 27*/
837 1 STARSEC = 1 ; STOPSEC = 8 ; /* TEST 27*/

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CALC: PROCEDURE CFTICNS(MAIN) :

STMT LEVEL NEST

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839 1 GC TC REAPER :
840 1 NUMFLCN = 1 ;
841 1 TEMP (1) = 15;PRES(1)= 18 ; PITKCN (1) = SKG ; /* TEST 28*/
844 1 STARKEY = '23514C14' ; STCPREV = '23514C42' ; /* TEST 28*/
846 1 STARSEC = 1 ; STCPSEC = 4 ; /* TEST 28 */
848 1 REAPER:
      N2 = SUBSTR (STARKEY,8,1) ;
849 1 N2 = (N2 - 1) * 15 + STARSEC - 1 ;
850 1 PUT FILE (G4) EDIT ('CCKE OVEN EMISSION REPORT', 'TEST', TEST, 'OVEN',
      CVEN, REP, 'DATE', PCNT, 'DAY', '1973', 'PMRI TEST', 'PMRI', 'START TIME',
      SUBSTR (STARKEY, 4, 2), ' ', SUBSTR (STARKEY, 6, 2), ' ', ' ',
      'SEC(AD)', 'TOTAL', ' ', DC 1 = 1 TO 116, 'SEC', 'VOLUME', 'ILABEL (1) DC 1 =
      1, 3, 4, 5, 6, 9, 0, 6), SUBSTR (AEL(7), 1, 6), 'CND', 'FLOW', 'PEAS', 'CCRR' DC 1
      , 1 TC 6),
      ('PEAS', 'CC 1 = 1 TC 3), ' ')
      (PAGE, CCL(5C), A, SKIP(2), A, F(4), CCL(70), A, X(11), A, X(2), A, SKIP, A, X(1), A,
      X(1), A, A, CCL(7C), A, X(2), A, SKIP, A, X(2), A, P, 99, SKIP(3), A, CCL(7), A,
      CCL(6C), A, SKIP, A, CCL(6), A, SKIP, CCL(7), A, COL(15), IIE(A), SKIP, A,
      CCL(4), A, CCL(15), 5(A, X(5)), A, X(5), 2(A, X(11)), A, CCL(7), A,
      CCL(16), 15(A, X(4)), SKIP(2), 55(A) ;
      CC TC REAP ;
851 1 ENC CALC ;
852 1

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CALC: FRECELUFE CFTIONS(PAIN) :

OCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
6	ANC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 447,450,481
6	ANCC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 446,450,475,481
6	ANCI	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 404,408,475,481
6	ANC3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 412,416,475,481
6	ANC4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 421,424,475,481
6	ANCS	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 426,432,479,481
6	ANCG	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 452,456,475
6	ANCT	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 457,461,479
6	ANCB	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 434,438,475
6	ANCS	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 435,443,475
6	AN1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 405,408,475,481
6	AN2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 412,416,479,481
6	AN4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 420,424,479,481
6	AN5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 425,432,479,481
6	AN6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 453,456
6	AN7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 458,461
6	ANE	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 435,438,475

DEL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
6	ANS	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE) 440, 442, 475
19	ATI	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE)
19	ATI1A	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE)
19	ATI1A1	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE)
19	ATI2	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE)
19	ATI2A	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE)
19	ATI2A1	AUTOMATIC, ALIGNED, DECIMAL, FLOAT(SINGLE)
19	ATI2	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE)
19	ATI3A	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE)
19	ATI3A1	AUTOMATIC, ALIGNED, DECIMAL, FLOAT(SINGLE)
19	ATI4A	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE)
7	AV	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE) 137, 137, 149, 149, 150, 151, 152
6	AVCC	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE) 322, 322, 447, 448, 448, 450, 450
12	AVCC0	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 225, 325, 446, 446, 448, 450, 485
12	AVCC1	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 166, 166, 404, 407, 407, 408, 485
12	AVCC2	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 485
12	AVCC3	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 195, 195, 412, 415, 415, 416, 485
12	AVCC4	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 220, 220, 421, 423, 423, 424, 485
12	AVCC5	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 247, 247, 428, 431, 431, 432, 485
12	AVCC6	AUTOMATIC, ALIGNED, DECIMAL, FLOAT(SINGLE) 347, 347, 452, 455, 455, 456, 485

CCL NG.	IDENTIFIER	ATTRIBUTES AND REFERENCES
12	AVGC7	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 368,368,457,460,460,461,485
12	AVGC8	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 273,273,434,437,437,438,465
12	AVGC9	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 258,258,435,442,442,443,485
6	AVG1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 167,167,405,406,406,406,456
6	AVG2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 152,152,413,414,414,416,456
6	AVG4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 217,217,420,422,422,424,456
6	AVG5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 244,244,425,425,425,432,456
6	AVG6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 344,344,453,454,454,456,456
6	AVG7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 365,365,458,455,455,461,456
6	AVG8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 270,270,435,436,436,438,496
6	AVG9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 295,295,440,441,441,443,456
20	AVGTEFF	(3)AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 44,107,107,353,353,354,355
5	AX	AUTOMATIC,UNALIGNED,INITIAL,STRING(10),CHARACTER 454,454,454,454,454,454,454,454,454,454,455,455,455,455,455,455
13	BIGPAC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 48,487,498
14	BILLS	IN OUTHEAD,BASED(R),UNALIGNED,STRING(340),CHARACTER 490
20	ELANK7	AUTOMATIC,UNALIGNED,INITIAL,STRING(7),CHARACTER 38,146,154,162,240,318,402,410,416,426,444
15	C	AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(16,0)

CALC: PROCELUFECTIONS(PAIN) :

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
10	C1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 174,174,180,182,183,186
10	C2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE)
10	C3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 206,206,208,208,209,212
10	C4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 225,225,231,233,233,234,237
10	C5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 252,252,258,260,261,264
10	C8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 276,278,284,286,286,287,290
10	C9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 303,303,309,311,311,312,315
1	CALC	ENTRY,DECIMAL,FLCAT(SINGLE)
19	CHCC	IN SECRC(15) IN INREC,BASEC(1),ALIGNED,DECIMAL,FIXED(7,1)
19	CHCC	IN SECRC(15) IN CUTREC,BASEC(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 156,220,225
19	CHC1	IN SECRC(15) IN INREC,BASEC(1),ALIGNED,DECIMAL,FIXED(7,1)
19	CHC1	IN SECRC(15) IN CUTREC,BASEC(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 164,173,174
19	CHC2	IN SECRC(15) IN INREC,BASEC(1),ALIGNED,DECIMAL,FIXED(7,1)
19	CHC2	IN SECRC(15) IN CUTREC,BASEC(R),ALIGNED,DECIMAL,FLCAT(SINGLE)
19	CHC3	IN SECRC(15) IN INREC,BASEC(1),ALIGNED,DECIMAL,FIXED(7,3)
19	CHC3	IN SECRC(15) IN CUTREC,BASEC(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 150,155,200
19	CHC4	IN SECRC(15) IN INREC,BASEC(1),ALIGNED,DECIMAL,FIXED(7,2)
19	CHC4	IN SECRC(15) IN CUTREC,BASEC(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 215,224,225
19	CHC5	IN SECRC(15) IN INREC,BASEC(1),ALIGNED,DECIMAL,FIXED(7,1)
19	CHC5	IN SECRC(15) IN CUTREC,BASEC(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 242,251,252

CALC: PROCEDURE OPTIONS(MAIN) :

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 157,157,342,351
15	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 158,158,343,372
19	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,4)
19	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 159,159,248,277,278
19	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
19	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 160,160,253,302,303
19	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE)
15	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,C)
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE)
15	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,1)
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE)
15	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,2)
19	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE) 53,104
19	CFCC	IN SECFEC(15) IN INREC,BASED(C),ALIGNED,DECIMAL,FIXED(7,4)
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),ALIGNED,DECIMAL,FLCAT(SINGLE)
15	CFCC	IN SECFEC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
15	CFCC	IN SECFEC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
15	CFCC	IN SECFEC(15) IN OUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
15	CFCC	IN SECFEC(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	CF19	IN SECDEF(15) IN CUTREC,BASED(F),UNALIGNED,STRING(1),CHARACTER
19	CF20	IN SECDEF(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CF20	IN SECDEF(15) IN CUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CF21	IN SECDEF(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CF21	IN SECDEF(15) IN CUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CF22	IN SECDEF(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CF22	IN SECDEF(15) IN CUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CF23	IN SECDEF(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CF23	IN SECDEF(15) IN CUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CF24	IN SECDEF(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CF24	IN SECDEF(15) IN CUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CF25	IN SECDEF(15) IN INREC,BASED(C),UNALIGNED,STRING(1),CHARACTER
19	CF25	IN SECDEF(15) IN CUTREC,BASED(R),UNALIGNED,STRING(1),CHARACTER
19	CF30	IN SECDEF(15) IN INREC,BASED(C),ALIGNED,DECIMAL,STRING(7,3)
19	CF30	IN SECDEF(15) IN CUTREC,BASED(R),ALIGNED,DECIMAL,STRING(7,3)
19	CF31	IN SECDEF(15) IN INREC,BASED(C),ALIGNED,DECIMAL,STRING(7,1)
19	CF31	IN SECDEF(15) IN CUTREC,BASED(R),ALIGNED,DECIMAL,STRING(7,1)
19	CF32	IN SECDEF(15) IN INREC,BASED(C),ALIGNED,DECIMAL,STRING(7,2)
19	CF32	IN SECDEF(15) IN CUTREC,BASED(R),ALIGNED,DECIMAL,STRING(7,2)
19	CF34	IN SECDEF(15) IN INREC,BASED(C),ALIGNED,DECIMAL,STRING(7,1)
19	CF34	IN SECDEF(15) IN CUTREC,BASED(R),ALIGNED,DECIMAL,STRING(7,1)
19	CF36	IN SECDEF(15) IN INREC,BASED(C),ALIGNED,DECIMAL,STRING(7,3)
19	CF36	IN SECDEF(15) IN CUTREC,BASED(R),ALIGNED,DECIMAL,STRING(7,3)
19	CF37	IN SECDEF(15) IN INREC,BASED(C),ALIGNED,DECIMAL,STRING(7,1)
19	CF37	IN SECDEF(15) IN CUTREC,BASED(R),ALIGNED,DECIMAL,STRING(7,1)
19	CF39	IN SECDEF(15) IN INREC,BASED(C),ALIGNED,DECIMAL,STRING(7,1)

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	CF39	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
19	CF40	IN SECRC(15) IN INREC, BASEC(C), ALIGNED, DECIMAL, FIXED(7,1)
19	CF40	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
19	CF41	IN SECRC(15) IN INREC, BASEC(C), ALIGNED, DECIMAL, FIXED(7,2)
19	CF41	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
19	CF42	IN SECRC(15) IN INREC, BASEC(C), ALIGNED, DECIMAL, FIXED(7,1)
19	CF42	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
19	CF43	IN SECRC(15) IN INREC, BASEC(C), ALIGNED, DECIMAL, FIXED(7,1)
19	CF43	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
19	CF44	IN SECRC(15) IN INREC, BASEC(C), ALIGNED, DECIMAL, FIXED(7,2)
19	CF44	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
19	CF45	IN SECRC(15) IN INREC, BASEC(C), ALIGNED, DECIMAL, FIXED(7,2)
19	CF45	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
19	CF46	IN SECRC(15) IN INREC, BASEC(C), UNALIGNED, STRING(1), CHARACTER
19	CF46	IN SECRC(15) IN CTRREC, BASEC(R), UNALIGNED, STRING(1), CHARACTER
19	CF52	IN SECRC(15) IN INREC, BASEC(C), ALIGNED, DECIMAL, FIXED(7,1)
19	CF53	IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE)
20	CFAN	IN CFVLY(29) IN SECRC(15) IN CTRREC, BASEC(R), ALIGNED, DECIMAL, FLCAT(SINGLE) 92,92,93,93,104,107,106,106
20	CFVLY	(25) IN SECRC(15) IN CTRREC, BASEC(R), STRUCTURE
20	CCPFPL	(14) IN SECRC(15) IN CTRREC, BASEC(R), STRUCTURE
17	CATHEAC	AUTOMATIC, DEFINED, UNALIGNED, STRING(240), CHARACTER 48E
19	DATSEC	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(31,0) 86,86,385,385,406,407,414,415,422,423,430,431,436,437,441,442,448 449,454,455,455,460,462,463,464,465,466,467,468,469,470,471,472,473 474,475,476,477,484

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	INREC	BASED(1), STRUCTURE
19	J	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(16,0) 51,52,53,54,55,100,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123
19	JC	IN INREC, BASED(1), UNALIGNED, STRING(3), CHARACTER 50
19	K	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(16,0)
19	KEY	IN OUTREC, BASED(1), UNALIGNED, STRING(8), CHARACTER 59
16	KEYIC	IN HEADER, AUTOMATIC, UNALIGNED, STRING(3), CHARACTER 493
16	KEYREC	IN F-HEADER, AUTOMATIC, UNALIGNED, STRING(7), CHARACTER 493
20	KEYS	IN OUTER, BASED(1), UNALIGNED, STRING(8), CHARACTER 493
19	L	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(16,0) 493
16	LABEL	(0:38) IN HEADER, AUTOMATIC, UNALIGNED, STRING(7), CHARACTER 154,162,240,318,402,406,410,416,418,424,426,432,438,443,444,445,456,461,463,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560,561,562,563,564,565,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,582,583,584,585,586,587,588,589,590,591,592,593,594,595,596,597,598,599,600,601,602,603,604,605,606,607,608,609,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,651,652,653,654,655,656,657,658,659,660,661,662,663,664,665,666,667,668,669,670,671,672,673,674,675,676,677,678,679,680,681,682,683,684,685,686,687,688,689,690,691,692,693,694,695,696,697,698,699,700,701,702,703,704,705,706,707,708,709,710,711,712,713,714,715,716,717,718,719,720,721,722,723,724,725,726,727,728,729,730,731,732,733,734,735,736,737,738,739,740,741,742,743,744,745,746,747,748,749,750,751,752,753,754,755,756,757,758,759,760,761,762,763,764,765,766,767,768,769,770,771,772,773,774,775,776,777,778,779,780,781,782,783,784,785,786,787,788,789,790,791,792,793,794,795,796,797,798,799,800,801,802,803,804,805,806,807,808,809,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,850,851,852,853,854,855,856,857,858,859,860,861,862,863,864,865,866,867,868,869,870,871,872,873,874,875,876,877,878,879,880,881,882,883,884,885,886,887,888,889,890,891,892,893,894,895,896,897,898,899,900,901,902,903,904,905,906,907,908,909,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926,927,928,929,930,931,932,933,934,935,936,937,938,939,940,941,942,943,944,945,946,947,948,949,950,951,952,953,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,973,974,975,976,977,978,979,980,981,982,983,984,985,986,987,988,989,990,991,992,993,994,995,996,997,998,999,1000
20	LIP12CC	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE) 110,122
19	MARK	(4) AUTOMATIC, UNALIGNED, INITIAL, STRING(8), EIT 121,133
	MAX	GENERIC, BUILT-IN FUNCTION 108,168,170,173,176,215,221,245,248,271,274,256,299,323,326,345,348,366,365
6	PAXO	AUTOMATIC, ALIGNED, INITIAL, DECIMAL, FLCAT(SINGLE) 323,323,450,497
12	PAXCC	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 326,326,450,486
12	PAXC1	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 170,170,408,486
12	PAXC2	AUTOMATIC, ALIGNED, DECIMAL, FLCAT(SINGLE) 486

DDL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
12	MAXC3	AUTOMATIC,ALIGNED,DECIMAL,FLOAT(SINGLE) 154,156,416,466
12	MAXC4	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 221,221,424,466
12	MAXC5	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 245,248,432,466
12	MAXC6	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 346,346,456,466
12	MAXC7	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 365,365,461,466
12	MAXC8	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 274,274,428,466
12	MAXC9	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 295,295,443,466
6	MAX1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 168,168,408,457
6	MAX3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 193,193,416,457
6	MAX4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 215,215,424,457
6	MAX5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 245,245,432,457
6	MAX6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 345,345,456,457
6	MAX7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 366,366,461,457
6	MAX8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 271,271,438,457
6	MAX9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 256,256,443,457
20	MAXTEMP	(3)AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 45,106,106,354,356
	MIN	GENERIC,BUILT-IN FUNCTION 105,145,171,154,157,218,222,246,245,212,215,257,300,324,327,346,349

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
6	MINC	367,37C AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 324,324,450,456
12	MINC	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 327,327,450,467
12	MINC1	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 171,171,468,467
12	MINC2	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 487
12	MINC3	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 157,157,416,467
12	MINC4	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 222,222,424,467
12	MINC5	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 245,245,432,467
12	MINC6	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 245,345,456,467
12	MINC7	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 37C,37C,461,467
12	MINC8	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 275,275,438,467
12	MINC9	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 30C,300,443,467
6	MIN1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 165,165,408,456
6	MIN3	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 194,194,416,458
6	MIN4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 216,216,424,458
6	MIN5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 246,246,432,458
6	MIN6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 346,346,456,498
6	MIN7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE)

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, PIVFY, FIXED(31,0) 57, 57, 400, 484
19	ALKEY	BASEC(I), UNALIGNED, STRING(8), CHARACTER 53, 53, 55, 61, 65, 79
19	ALPFLCH	AUTOMATIC, ALIGNED, INITIAL, BINARY, FIXED(16,0) 91, 140, 143, 356, 500, 513, 525, 537, 545, 541, 576, 551, 606, 621, 636, 651, 663 675, 687, 699, 714, 729, 744, 755, 774, 783, 792, 807, 822, 831, 840
387	ALTEST	STATEMENT LABEL CONSTANT 21, 36, 51
	CNCHPR	BUILT-IN FUNCTION 29
	CNCCCE	BUILT-IN FUNCTION 24, 29
	CALCC	BUILT-IN FUNCTION 29
	CNSOURCE	BUILT-IN FUNCTION 29
20	CLTER	BASEC(R), STRUCTURE
14	CLTPEAC	BASEC(R), STRUCTURE 485
16	CLTBLT	FILE, EXTERNAL, RECORD, CLTPL1, SEQUENTIAL, BUFFERED 60, 489
15	CLTREC	BASEC(R), STRUCTURE 60
16	CVEN	IN-HEADER, AUTOMATIC, UNALIGNED, STRING(4), CHARACTER 493, 850
20	FITKCA	(3) AUTOMATIC, ALIGNED, DECIMAL, FLOAT(SINGLE) 59, 507, 507, 516, 516, 528, 531, 540, 543, 552, 555, 564, 567, 570, 575, 582 585, 594, 597, 600, 605, 612, 615, 624, 627, 630, 639, 642, 645, 654, 657, 666, 669 676, 681, 690, 693, 702, 705, 708, 717, 726, 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	FITCI	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 39,4C
20	***** PUES	(3)AUTOMATIC,ALIGNED,BINAFY,FINEC(8,C) 53,354,5C4,5C5,50C,51E,51E,527,52C,555,542,551,554,563,566,565,578 581,584,593,596,599,608,611,614,623,626,629,636,641,644,653,656,665 668,671,68C,689,692,701,704,707,716,719,722,731,734,737,746,749,752 761,764,767,776,785,794,797,80C,80S,81E,81E,824,833,842
15	FFC	(2)AUTOMATIC,INITIAL,LABEL 50C,500,513,525,537,549,561,576,591,606,621,636,651,662,675,687,699 714,725,744,755,774,783,792,807,822,831,840,499
	Q	AUTOMATIC,ALIGNED,FCINTER 49,5C,53,55,61,65,65,65,71,71,72,73,73,74,75,75,76,77,77,78,79,79 79,79,87,89,488,49C
15	CTF	IN INREC,BASEC(10),UNALIGNED,STRING(1),CHARACTER 65,65,72,74,76,78,79
11	F	AUTOMATIC,ALIGNED,PCINTER 59,6C,80,85,85,89,92,92,92,93,93,95,10C,10C,102,102,103,104,104,104 104,105,105,105,107,108,109,110,111,112,112,112,112,113,113,113,113 150,156,157,157,158,158,159,159,16C,16C,164,164,164,165,165,166,167 168,168,170,171,173,174,174,174,174,174,174,174,174,174,174,174,174 195,200,215,215,215,216,216,217,217,217,217,217,217,217,217,217,217 242,243,243,244,244,244,244,244,244,244,244,244,244,244,244,244 271,272,273,274,275,277,278,278,278,278,278,278,278,278,278,278 30C,30C,303,30C,30C,320,321,321,321,321,321,321,321,321,321,321,321 342,343,343,344,345,346,347,348,349,351,363,363,363,364,364,365,366 367,368,369,370,372,485,49C
45	FEFE	STATEMENT LABEL CONSTANT 54,386,851
64E	FEDEF	STATEMENT LABEL CONSTANT 512,524,536,548,560,575,59C,60C,62C,635,65C,66C,674,686,698,712,728 742,75E,773,782,791,806,821,83C,835
15	RECIN	AUTOMATIC,ALIGNED,INITIAL,FINAFY,FINEC(21,C) 52,52,55,484
12	HEW	IN HEADER,AUTOMATIC,UNALIGNED,STRING(34),CHARACTER 493,85C
	REFC	FILE,EXTERNAL 21,385,354,401,40E,416,424,427,43E,443,45C,456,461
15	SEC	IN SECRC(15),IN INREC,BASEC(10),UNALIGNED,STRING(2),CHARACTER 71,71,73,73,75,75,77,77,79,79,87

CALC: PRECELUFE CPTIONS(PAIN) :

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ECL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
19	SEC	IN SECRC(15) IN CUTREC,BASEC(R),UNALIGNED,STRING(2),CHARACTER 135,136,150
20	SEC	IN SECRC(15) IN CUTER,BASEC(R),UNALIGNED,STRING(2),CHARACTER
15	SECRC	(15)IN INREC,BASEC(Q),STRUCTURE 89
15	SECRC	(15)IN CUTREC,BASEC(R),STRUCTURE 89
20	SECRC	(15)IN CUTER,BASEC(R),STRUCTURE
19	SF	IN FLCS(14) IN SECRC(15) IN CUTREC,BASEC(R),ALIGNED,DECIMAL, FLOAT(SINGLE) 85,104,105,105,105,106,122,125,130,127,164,165,167,168,169,150,151 192,163,154,215,216,217,218,219,242,243,244,245,246,268,269,270,271 272,263,254,255,256,257,320,321,322,323,324,342,343,344,345,346,347 348,349,350,351
19	SFCT	(3)AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 106,106,352,352,354,358
15	SGRAPH	(0:120)AUTOMATIC,UNALIGNED,STRING(8),EIT 132,132
15	SKG	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 40,40,42,519,531,543,555,564,567,570,575,582,585,594,597,600,654,666 676,681,650,653,702,705,708,717,720,723,722,735,738,747,750,753,762 765,766,777,786,795,798,801,810,813,816,825,834,843
19	SLINES	AUTOMATIC,DEFINED,UNALIGNED,STRING(121),CHARACTER 38,136,146
3	SM	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 404,405,412,413,420,421
	SGRT	GENERIC,BUILT-IN FUNCTION 39,40,59
4	ST	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLOAT(SINGLE) 426,429,434,435,439,440,446,447,452,453,457,458
15	STARKEY	AUTOMATIC,UNALIGNED,STRING(8),CHARACTER 53,61,510,520,532,544,556,571,586,601,616,631,646,656,670,682,694 705,724,735,754,765,778,787,802,817,826,835,844,848,850,850
15	***** STARSEC	AUTOMATIC,ALIGNED,ENMAPY,FIXED(8,0) 63,508,522,534,546,558,573,586,603,618,633,648,660,672,684,696,711 726,741,756,771,780,785,804,815,828,837,846,849

DECL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
15	***** START	AUTOMATIC,ALIGNED,BINARY, FIXED(18,C) 57,58,63,81
20	STDFC	IN COMPFL(14) IN SECRC(15) IN CLTER,BASEC(R),ALIGNED,DECIMAL, FLCAT(SINGLE)
15	STDMCN	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 41,42,104
15	***** STEP	AUTOMATIC,ALIGNED,BINARY, FIXED(18,C) 55,56,67,81,82
15	STEPKEY	AUTOMATIC,UNALIGNED,STRING(8), CHARACTER 53,65,111,521,535,545,557,572,587,602,617,632,647,659,671,683,695 710,725,740,755,770,779,788,803,818,827,826,845
15	***** STEPSEC	AUTOMATIC,ALIGNED,BINARY, FIXED(18,C) 67,509,523,535,547,559,574,585,604,615,634,649,661,673,685,697,712 727,742,757,772,781,790,805,820,825,838,847
	SLESTR	GENERIC,PLTLY-IN FUNCTION F4E,ESC,ESC,ESC
20	SNVLY	{1C} IN SECRC(15) IN CLTER,BASEC(R),STRUCTURE
20	SNTH	IN SNVLY(10) IN SECRC(15) IN CLTER,BASEC(R),UNALIGNED,STRING (1), CHARACTER
	SYSPRINT	FILE,EXTERNAL 21,25,29,42,46,75,113,118,125,130,400,493
2	TAC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 334,334,463,463,478,482
2	TA1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 175,175,464,464,478,482
2	TA2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 205,205,466,466,478,482
2	TA4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 230,230,468,468,478,482
2	TA5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 257,257,470,470,478,482
2	TA6	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 356,356,472,472,478,482
2	TA7	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 377,377,473,473,478,482

CALC: PROCEDURE OPTIONS(MAIN) :

CCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
2	TAE	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 283,283,474,474,478,482
2	TAS	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 306,308,476,476,478,482
2	TC1	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 180,180,465,465,478,482
2	TC2	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 206,206,467,467,478,482
2	TC4	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 231,231,469,469,478,482
2	TC5	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 256,256,471,471,478,482
2	TC8	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 284,284,475,475,478,482
2	TC9	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 305,305,477,477,478,482
20	***** TEMP	(3)AUTOMATIC,ALIGNED,BINARY,FIXED(8,C) 92,192,593,104,107,108,109,354,501,502,503,514,517,526,525,538,541,550 553,562,565,568,577,580,583,592,595,598,607,610,613,622,625,626,637 640,643,652,655,664,667,676,679,688,691,700,703,706,715,718,721,730 732,736,745,748,751,760,763,766,775,784,793,796,799,808,811,814,823 832,841
16	***** TEST	IN HEADER,AUTOMATIC,ALIGNED,INITIAL,BINARY,FIXED(15,C) 387,389,400,453,454,455,455,850
2	TF	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 151,151,462,479,482
20	TA	AUTOMATIC,ALIGNED,DECIMAL,FLCAT(SINGLE) 93,94,96,99,110,111,112,114,116,118,119,121,122,123,125,126,128 130,131,132,133,156,157,158,159,160,462,478
14	VALUES	{52}IN CUTEAC,BASEDIR,ALIGNED,DECIMAL,FLOAT(SINGLE)
20	WASH	AUTOMATIC,UNALIGNED,INITIAL,STRING(1),CHARACTER 135,136
15	WEC	AUTOMATIC,ALIGNED,INITIAL,DECIMAL,FLCAT(SINGLE) 39,39,42,507,516,528,540,552,609,612,615,624,627,630,639,642,645,657 669

CALC: PRECEDELE OPTIENS(MAJN) ;

SANJAX CHECK COMPLETES. (COMPLIATION CENTRALES.

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AGGREGATE LENGTH TABLE

STATEMENT NO.	IDENTIFIER	LENGTH IN BYTES
15	AFTCT	12
15	AGRAFT	121
20	AVCTEMP	12
16	FEATER	240
15	INREC	1528
15	MARK	4
20	MAXTEMP	12
20	MINTEMP	12
20	CTIEP	3608
14	CTIEAC	3608
15	CUTREC	3608
20	FLKCN	12
20	PRES	6
15	FFC	224
15	SFICT	12
15	SGRAFT	121
20	TEPF	6

CALC: PRCCCLFF CFTICNS(MAIN) :

STORAGE REQUIREMENTS.

THE STORAGE AREA FOR THE PROCEDURE LABELLED CALC IS 3028 BYTES LONG.
THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 23 IS 764 BYTES LONG.
THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 28 IS 812 BYTES LONG.
THE STORAGE AREA FOR THE CN UNIT AT STATEMENT NO. 34 IS 760 BYTES LONG.
THE PROGRAM CSECT IS NAMEL CALC AND IS 36228 BYTES LONG.
THE STATIC CSECT IS NAMED **CALCA AND IS 4897 BYTES LONG.

STATISTICS SOURCE RECORDS = 640,PRCG TEXT STMTS = 852,OBJECT BYTES = 30328

COMPILER DIAGNOSTICS.

ERRORS.

1EM11051 15 THE DATA CHARACTERISTICS OF SLINES DECLARED IN STATEMENT NUMBER 15 DO NOT MATCH THOSE OF THE
DEFINING CASE.

1EM11051 15 THE DATA CHARACTERISTICS OF ALINES DECLARED IN STATEMENT NUMBER 15 DO NOT MATCH THOSE OF THE
DEFINING CASE.

1EM11041 17 THE DEFINING OF CATHEAD DECLARED IN STATEMENT NUMBER 17 INVOLVES DATA NOT ALLOWED FOR STRING
CLASS OVERLAY DEFINING.

WARNINGS.

1EM02271 NO FILE/STRING OPTION SPECIFIED IN ONE OR MORE GET/PUT STATEMENTS. SYSIN/SYSPRINT HAS BEEN
ASSUMED IN EACH CASE.

1EM17901 DATA CONVERSIONS WILL BE DONE BY SUBROUTINE CALL IN THE FOLLOWING STATEMENTS 41, 848.

1EM30581 COMPILER CODE REQUIREMENT EXCEEDED SIZE GIVEN. AUXILIARY STORAGE USED.

END OF DIAGNOSTICS.

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

CCPILE 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,

CCKE CVEN EMISSION REPORT

OVEN 3-3 MRI ACTIVATED MANUALLY - RENT BCCM
MRI TEST W1

TEST 2 JUNE 15, 1973
DATE START TIME 16:37:00

FIVE SECCNC AVERAGE

SEC NO	FIVE SECNC TOTAL FLOW	PPM SC2		PPM NC		PPM NO2		% THC		% CO		% CO2		% H2C		% H2 *		% O2	
		MEAS	CCFF	MEAS	CCRR	MEAS	CCRR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
04	22	176.6	264.6	0.0	0.0	0.0	0.0	0.52	0.78	0.38	0.57	0.0	0.0	0.2	0.0	0.0	0.0	18.3	0.0
09	14	118.4	204.6	0.0	0.0	0.0	0.0	1.18	2.13	0.45	0.80	0.0	0.0	0.2	0.0	0.0	0.0	18.5	0.0
14	9	87.2	226.0	0.0	0.0	0.0	0.0	0.50	2.40	0.34	0.52	0.0	0.0	0.2	0.0	0.0	0.0	18.9	0.0
19	8	60.3	156.6	0.0	0.0	0.0	0.0	0.50	1.32	0.23	0.61	0.0	0.0	0.3	0.0	0.0	0.0	19.2	0.0
24	7	49.8	134.1	0.0	0.0	0.0	0.0	0.50	0.63	0.19	0.52	0.0	0.0	0.3	0.0	0.0	0.0	19.5	0.0
29	4	36.6	96.7	0.0	0.0	0.0	0.0	0.12	0.30	0.15	0.45	0.0	0.0	0.3	0.0	0.0	0.0	19.8	0.0
34	9	34.2	103.7	0.0	0.0	0.0	0.0	0.12	0.18	0.17	0.51	0.0	0.0	0.2	0.0	0.0	0.0	19.9	0.0
39	1	24.2	15.0	0.0	0.0	0.0	0.0	0.00	0.00	0.16	0.11	0.0	0.0	0.3	0.0	0.0	0.0	19.9	0.0
44	5	30.2	75.4	0.0	0.0	0.0	0.0	0.00	0.00	0.15	0.41	0.0	0.0	0.3	0.0	0.0	0.0	19.9	0.0
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	0.3	0.0	0.0	0.0	19.8	0.0
54	8	11.2	23.6	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.41	0.0	0.0	1.2	0.0	0.0	0.0	19.8	0.0
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	0.0	0.0	19.8	0.0
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	0.0	0.0	19.8	0.0
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	0.0	0.0	19.8	0.0
14	5	1.5	4.6	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.41	0.0	0.0	1.1	0.0	0.0	0.0	19.9	0.0
19	6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.12	0.40	0.0	0.0	1.1	0.0	0.0	0.0	20.0	0.0
24	7	1.8	5.3	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.42	0.0	0.0	1.1	0.0	0.0	0.0	20.1	0.0
29	6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.42	0.0	0.0	1.1	0.0	0.0	0.0	20.1	0.0
34	6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.41	0.0	0.0	1.2	0.0	0.0	0.0	20.3	0.0
39	5	2.0	6.0	0.0	0.0	0.0	0.0	0.00	0.00	0.15	0.46	0.0	0.0	1.2	0.0	0.0	0.0	20.3	0.0
44	6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.14	0.42	0.0	0.0	1.2	0.0	0.0	0.0	20.2	0.0
49	6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.12	0.37	0.0	0.0	1.2	0.0	0.0	0.0	20.3	0.0
54	6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.12	0.35	0.0	0.0	1.2	0.0	0.0	0.0	20.3	0.0
59	7	1.6	4.8	0.0	0.0	0.0	0.0	0.00	0.00	0.15	0.45	0.0	0.0	1.2	0.0	0.0	0.0	20.3	0.0
AVG	26	27.6	55.6	0.1	0.2	0.0	0.0	0.15	0.32	0.18	0.46	0.0	0.0	0.3	0.0	0.0	0.0	15.8	0.0
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	0.0E+00	0.0E+00	3.4E+01	0.0

CCKE CVEN EMISSION REPORT

TEST 3 JUNE 21, 1972
DATE
START TIME 11:48:45

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

FIVE SECOND AVERAGE

SEC NO	VOLUME FLOW	PPM SC2		PPM NC		PPM NC2		% TFC		% CC		% CO2		% H2O		% H2 *	
		MEAS	CCFF	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
49	27	13.5	12.5	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	4.0	4.0	0.0	0.0
54	27	31.0	31.0	0.0	0.0	0.0	0.0	-0.09	0.00	0.15	0.15	0.3	0.3	4.3	4.3	0.0	0.0
59	27	35.2	35.2	0.0	0.0	0.0	0.0	0.00	0.00	0.26	0.26	0.3	0.3	4.4	4.4	0.0	0.0
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	4.6	0.0	0.0
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	5.0	0.0	0.0
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	5.2	5.2	0.0	0.0
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	5.3	5.3	0.0	0.0
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	5.3	0.0	0.0
29	27	134.5	134.5	0.0	0.0	0.0	0.0	0.00	0.00	0.79	0.79	0.3	0.3	5.3	5.3	0.0	0.0
34	26	158.5	158.5	0.0	0.0	0.0	0.0	0.00	0.00	0.94	0.94	0.4	0.4	5.6	5.6	0.0	0.0
39	26	167.5	167.5	0.0	0.0	0.0	0.0	0.00	0.00	1.15	1.15	0.5	0.5	5.7	5.7	0.0	0.0
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	6.0	0.0	0.0
49	26	203.6	203.6	0.0	0.0	0.0	0.0	0.00	0.00	1.58	1.58	0.6	0.6	6.4	6.4	0.0	0.0
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	6.4	0.0	0.0
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	6.2	0.0	0.0
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	5.6	0.0	0.0
09	26	146.5	146.5	0.0	0.0	0.0	0.0	0.00	0.00	1.15	1.15	0.4	0.4	5.4	5.4	0.0	0.0
11	11	156.1	156.1	0.0	0.0	0.0	0.0	0.00	0.00	0.55	0.55	0.3	0.3	5.3	5.3	0.0	0.0
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	5.2	0.0	0.0
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	2.5E+01	4.0E+03	8.4E+01

COKE EVEN EMISSION REPORT

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

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

FIVE SECOND AVERAGE

ENC ING SEC ND	FIVE SECOND TOTAL VOLUME FLOW	PPH SCZ		PPM AC		PPM NOX		% TFC		% CC		% CO2		% H2O		% O2	
		MEAS	CLFF	MEAS	CCRR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
19	24	34.3	3.2	0.1	0.1	0.0	0.0	0.00	0.00	0.04	0.04	0.1	0.1	1.4	0.0	0.0	19.3
24	24	13.0	1.0	0.0	0.0	0.0	0.0	0.00	0.00	0.03	0.03	0.1	0.1	1.4	0.0	0.0	19.3
29	24	19.2	1.5	0.6	0.6	0.0	0.0	0.00	0.00	0.06	0.06	0.2	0.2	1.4	0.0	0.0	19.3
34	24	11.1	1.1	0.6	0.6	0.1	0.1	0.00	0.00	0.10	0.10	0.2	0.2	1.5	0.0	0.0	19.1
39	24	24.0	2.4	0.8	0.8	0.1	0.1	0.00	0.00	0.09	0.09	0.2	0.2	1.6	0.0	0.0	19.1
44	24	25.7	2.5	0.5	0.5	0.0	0.0	0.00	0.00	0.07	0.07	0.2	0.2	1.6	0.0	0.0	19.1
49	24	25.1	2.5	0.5	0.5	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	1.6	0.0	0.0	19.1
54	24	26.8	2.6	0.5	0.5	0.0	0.0	0.00	0.00	0.06	0.06	0.2	0.2	1.6	0.0	0.0	19.2
59	24	25.7	2.5	0.5	0.5	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	1.5	0.0	0.0	19.2
04	24	26.6	2.6	0.9	0.9	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	1.6	0.0	0.0	19.2
09	24	38.2	3.8	0.5	0.5	0.0	0.0	0.00	0.00	0.07	0.07	0.1	0.1	1.6	0.0	0.0	19.2
14	24	37.8	3.7	0.5	0.5	0.0	0.0	0.00	0.00	0.20	0.20	0.3	0.3	1.6	0.0	0.0	19.2
19	24	37.7	3.7	0.5	0.5	0.0	0.0	0.00	0.00	0.34	0.34	0.3	0.3	1.7	0.0	0.0	19.1
24	24	28.8	2.8	0.5	0.5	0.0	0.0	0.00	0.00	0.32	0.32	0.3	0.3	1.7	0.0	0.0	18.8
29	24	35.0	3.5	0.9	0.9	0.0	0.0	0.00	0.00	0.19	0.19	0.2	0.2	1.7	0.0	0.0	18.7
34	24	28.8	2.8	0.5	0.5	0.0	0.0	0.00	0.00	0.11	0.11	0.2	0.2	1.5	0.0	0.0	18.8
39	24	36.8	3.6	0.9	0.9	0.0	0.0	0.00	0.00	0.09	0.09	0.2	0.2	1.8	0.0	0.0	18.9
44	24	36.4	3.6	0.9	0.9	0.0	0.0	0.00	0.00	0.09	0.09	0.2	0.2	1.7	0.0	0.0	19.0
49	24	35.1	3.5	0.5	0.5	0.0	0.0	0.00	0.00	0.05	0.05	0.1	0.1	1.7	0.0	0.0	19.0
54	24	15.4	1.5	0.5	0.5	0.0	0.0	0.00	0.00	0.04	0.04	0.2	0.2	1.7	0.0	0.0	19.1
59	24	18.3	1.8	0.9	0.9	0.0	0.0	0.00	0.00	0.04	0.04	0.2	0.2	1.7	0.0	0.0	19.3
04	24	33.4	3.3	0.7	0.7	0.0	0.0	0.00	0.00	0.06	0.06	0.1	0.1	1.7	0.0	0.0	19.4
09	24	25.1	2.5	0.7	0.7	0.0	0.0	0.00	0.00	0.05	0.05	0.1	0.1	1.7	0.0	0.0	19.5
10	5	28.0	2.8	0.1	0.1	0.0	0.0	0.00	0.00	0.04	0.04	0.1	0.1	1.7	0.0	0.0	19.5
AVG	284	26.3	2.6	0.8	0.8	0.0	0.0	0.00	0.00	0.10	0.10	0.2	0.2	1.6	0.0	0.0	19.1
TOT	550																

4.3E-04 3.8E-06 3.8E-06 0.0E+00 5.4E-01 9.0E-01 9.0E-01 9.0E+00 4.8E-02 1.1E+02

CCKE OVEN EMISSION REPORT

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

OVEN 3-6
PFI TEST #4

FIVE SECOND AVERAGE

SEC NO	FIVE SECOND TOTAL VOLUME FLOW	PPM SC2		PPM NO		PPM NX		% TPC		% CG		% CD2		% H2C		% H2 *		% O2 O	
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
14	4	C.C	C.C	0.0	0.0	0.0	0.0	C.CC	0.00	0.04	0.00	0.0	0.0	0.6	0.0	0.0	0.0	19.7	0.0
19	4	C.C	C.C	0.0	0.0	0.0	0.0	C.CC	0.00	0.02	0.00	0.0	0.0	0.6	0.0	0.0	0.0	19.7	0.0
24	20	27.8	27.8	0.0	0.0	1.6	1.6	C.CC	0.00	0.09	0.00	0.3	0.3	0.6	0.3	0.0	0.0	19.6	0.0
29	21	55.0	55.0	0.0	0.0	21.8	21.8	C.CC	0.00	0.22	0.00	0.4	0.4	0.6	0.4	0.0	0.0	19.3	0.0
34	20	97.3	97.3	0.0	0.0	31.5	31.5	C.CC	0.00	0.21	0.00	0.1	0.1	0.6	0.1	0.0	0.0	19.2	0.0
39	18	66.2	66.2	0.0	0.0	23.5	23.5	C.CC	0.00	0.18	0.00	0.3	0.3	0.6	0.3	0.0	0.0	19.0	0.0
44	21	63.2	63.2	0.0	0.0	21.3	21.3	C.CC	0.00	0.21	0.00	0.0	0.0	0.6	0.0	0.0	0.0	19.2	0.0
49	21	88.5	88.5	0.0	0.0	25.0	25.0	C.CC	0.00	0.32	0.00	0.0	0.0	0.6	0.0	0.0	0.0	19.1	0.0
54	20	125.0	125.0	0.0	0.0	31.0	31.0	C.CC	0.00	0.38	0.00	0.0	0.0	0.6	0.0	0.0	0.0	19.2	0.0
59	20	142.0	142.0	0.0	0.0	28.2	28.2	C.CC	0.00	0.39	0.00	0.0	0.0	0.6	0.0	0.0	0.0	19.2	0.0
04	19	142.5	142.5	0.0	0.0	22.1	22.1	C.CC	0.00	0.37	0.00	0.0	0.0	0.9	0.0	0.0	0.0	19.2	0.0
09	21	163.5	163.5	0.0	0.0	17.5	17.5	C.CC	0.00	0.52	0.00	0.0	0.0	1.0	0.0	0.0	0.0	19.1	0.0
14	23	185.5	185.5	0.0	0.0	21.7	21.7	C.CC	0.00	0.63	0.00	0.0	0.0	1.1	0.0	0.0	0.0	18.6	0.0
19	22	203.0	203.0	2.8	2.8	24.2	24.2	C.CC	0.00	1.01	0.00	0.0	0.0	1.3	0.0	0.0	0.0	18.2	0.0
24	17	184.4	184.4	26.5	26.5	17.3	17.3	C.CC	0.00	0.81	0.00	0.0	0.0	1.4	0.0	0.0	0.0	18.1	0.0
29	22	208.4	208.4	44.7	44.7	10.7	10.7	C.CC	0.00	0.80	0.00	0.0	0.0	1.3	0.0	0.0	0.0	18.2	0.0
34	55	418.8	418.8	47.5	47.5	24.2	24.2	C.CC	0.00	1.59	0.00	0.0	0.0	1.2	0.0	0.0	0.0	17.0	0.0
39	52	654.6	654.6	32.0	32.0	40.0	40.0	C.CC	0.00	2.02	0.00	0.0	0.0	1.5	0.0	0.0	0.0	15.6	0.0
44	42	821.0	821.0	17.5	17.5	47.5	47.5	C.CC	0.00	1.88	0.00	0.0	0.0	2.7	0.0	0.0	0.0	15.0	0.0
49	28	808.4	808.4	32.7	32.7	39.7	39.7	C.CC	0.00	1.23	0.00	0.0	0.0	2.9	0.0	0.0	0.0	15.8	0.0
54	34	742.6	742.6	41.1	41.1	22.7	22.7	C.CC	0.00	1.43	0.00	0.0	0.0	2.4	0.0	0.0	0.0	16.8	0.0
59	48	787.4	787.4	19.9	19.9	22.3	22.3	C.CC	0.00	1.50	0.00	0.0	0.0	1.8	0.0	0.0	0.0	16.6	0.0
04	45	807.0	807.0	9.1	9.1	30.7	30.7	C.CC	0.00	1.50	0.00	0.0	0.0	2.1	0.0	0.0	0.0	16.0	0.0
09	35	711.6	711.6	3.3	3.3	25.2	25.2	C.CC	0.00	0.82	0.00	0.0	0.0	2.6	0.0	0.0	0.0	16.8	0.0
14	30	635.8	635.8	2.6	2.6	14.7	14.7	C.CC	0.00	0.44	0.00	0.0	0.0	2.1	0.0	0.0	0.0	17.8	0.0
19	28	598.6	598.6	6.5	6.5	9.3	9.3	C.CC	0.00	0.30	0.00	0.0	0.0	1.5	0.0	0.0	0.0	18.4	0.0
24	37	593.0	593.0	2.2	2.2	16.7	16.7	C.CC	0.00	0.34	0.00	0.0	0.0	1.1	0.0	0.0	0.0	18.6	0.0
29	39	603.8	603.8	0.2	0.2	13.3	13.3	C.CC	0.00	0.48	0.00	0.0	0.0	1.2	0.0	0.0	0.0	18.4	0.0
34	30	592.5	592.5	6.5	6.5	13.7	13.7	C.CC	0.00	0.35	0.00	0.0	0.0	1.3	0.0	0.0	0.0	18.5	0.0
39	30	605.6	605.6	15.8	15.8	10.0	10.0	C.CC	0.00	0.21	0.00	0.0	0.0	1.3	0.0	0.0	0.0	18.7	0.0
44	48	675.1	675.1	18.2	18.2	15.2	15.2	C.CC	0.00	0.48	0.00	0.0	0.0	1.3	0.0	0.0	0.0	18.5	0.0
49	53	785.0	785.0	33.7	33.7	27.5	27.5	C.CC	0.00	0.69	0.00	0.0	0.0	1.7	0.0	0.0	0.0	18.0	0.0
54	51	501.6	501.6	56.5	56.5	34.8	34.8	C.CC	0.00	0.76	0.00	0.0	0.0	2.1	0.0	0.0	0.0	17.7	0.0
58	44	1088.1	1088.1	21.7	21.7	47.5	47.5	C.CC	0.00	1.06	0.00	0.0	0.0	2.2	0.0	0.0	0.0	17.3	0.0
AVG	371	427.5	427.5	14.0	14.0	22.2	22.2	C.CC	0.00	0.68	0.00	0.0	0.0	1.4	0.0	0.1	0.1	18.1	0.0
TCT	1038																		

2.0E-02 2.0E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02 2.6E-02

CCKE CVEN EMISSION REPORT

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

CVEN 3-10
PRI TEST M5

FIVE SECOND AVERAGE

END ING	FIVE SECOND	TOTAL	SEC VOLUME	ONC FLOW	FFM MEAS	SC2 CCLF	FFM MEAS	SC2 CCLF	PPM MEAS	ACX CCRR	THC MEAS	CCRR	MEAS	CC MEAS	CCRR	CO2 MEAS	CO2 CCRR	H2C MEAS	H2C CCRR	H2O MEAS	H2O CCRR
49	12	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.58	0.58	3.5	3.5	2.2	2.2	0.0	0.0
54	27	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.75	0.75	2.5	2.5	2.2	2.2	0.0	0.0
59	21	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.54	0.54	1.7	1.7	2.1	2.1	0.0	0.0
04	21	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.54	0.54	1.2	1.2	2.3	2.3	0.0	0.0
09	19	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.87	0.87	0.9	0.9	2.5	2.5	0.0	0.0
14	16	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.84	0.84	0.7	0.7	3.4	3.4	0.0	0.0
19	17	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.81	0.81	0.6	0.6	3.4	3.4	0.0	0.0
24	20	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.85	0.85	0.6	0.6	3.3	3.3	0.0	0.0
29	23	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.53	0.53	0.6	0.6	3.3	3.3	0.0	0.0
34	29	C.C	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00	1.00	1.1	1.1	3.6	3.6	0.0	0.0
39	44	116.0	116.0	116.0	37.6	37.6	37.6	37.6	60.4	60.4	0.96	0.96	1.14	1.14	1.53	3.5	7.2	4.2	4.2	0.0	0.0
44	55	245.2	245.2	245.2	33.0	33.0	33.0	33.0	103.2	103.2	1.02	1.02	1.84	1.84	2.15	8.1	7.2	6.2	6.2	0.0	0.0
49	54	293.6	293.6	293.6	25.0	25.0	25.0	25.0	103.8	103.8	1.84	1.84	2.15	2.15	1.91	7.9	7.9	10.3	10.3	0.0	0.0
54	44	290.7	290.7	290.7	17.7	17.7	17.7	17.7	78.6	78.6	1.58	1.58	1.51	1.51	1.19	5.5	5.5	10.4	10.4	0.0	0.0
59	63	166.4	166.4	166.4	11.8	11.8	11.8	11.8	48.8	48.8	0.70	0.70	0.70	0.70	0.85	4.2	4.2	9.2	9.2	0.0	0.0
04	39	88.4	88.4	88.4	7.8	7.8	7.8	7.8	17.3	17.3	0.34	0.34	0.34	0.34	0.73	3.7	3.7	7.5	7.5	0.0	0.0
09	32	44.0	44.0	44.0	8.4	8.4	8.4	8.4	1.4	1.4	0.20	0.20	0.20	0.20	0.73	3.2	3.2	5.1	5.1	0.0	0.0
AVE	396	76.1	76.1	76.1	11.7	11.7	11.7	11.7	42.2	42.2	0.73	0.73	1.08	1.08	1.08	3.2	3.2	5.1	5.1	0.0	0.0
TOT	542				8.3E-03	8.3E-03	2.7E-02	2.7E-02	4.5E+00	4.5E+00	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		

CCKE CVEN EMISSION REPORT

TEST 7 JUNE 28, 1973
DATE
START TIME 15:22:54

CVEN 3-8
MRI TEST W6

FIVE SECOND AVERAGE

ENC ING SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FFM SCZ		FFM AC		FFM NOX		TFC		CC		CO2		H2 *		C2 O	
		MEAS	CCFF	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
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	0.0	17.5	17.5
55	98	404.5	404.5	50.2	50.2	11.4	11.4	0.96	0.96	2.37	2.37	2.7	2.7	0.0	0.0	15.8	15.8
04	28	522.2	522.2	27.3	27.3	85.2	85.2	0.90	0.90	2.88	2.88	2.5	2.5	0.0	0.0	14.0	14.0
09	18	483.6	483.6	4.2	4.2	256.4	256.4	0.44	0.44	1.70	1.70	1.5	1.5	0.0	0.0	15.2	15.2
14	14	375.6	375.6	0.7	0.7	483.8	483.8	0.20	0.20	0.71	0.71	0.3	0.3	0.0	0.0	17.1	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	0.0	18.0	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	0.0	18.5	18.5
29	14	251.1	251.1	0.0	0.0	70.4	70.4	0.00	0.00	0.17	0.17	0.0	0.0	0.0	0.0	18.9	18.9
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	0.0	18.9	18.9
39	16	278.2	278.2	3.5	3.5	40.0	40.0	0.00	0.00	0.13	0.13	0.0	0.0	0.0	0.0	18.9	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	0.0	18.9	18.9
49	22	217.2	217.2	35.3	35.3	29.0	29.0	0.00	0.00	0.27	0.27	0.5	0.5	0.0	0.0	18.4	18.4
54	46	473.4	473.4	49.5	49.5	46.8	46.8	0.02	0.02	0.56	0.56	3.0	3.0	0.0	0.0	13.0	13.0
55	46	584.4	584.4	48.5	48.5	56.0	56.0	0.48	0.48	1.15	1.15	5.1	5.1	0.0	0.0	13.0	13.0
04	45	647.4	647.4	49.1	49.1	52.2	52.2	1.22	1.22	1.82	1.82	5.8	5.8	0.0	0.0	10.7	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	0.0	9.7	9.7
14	41	646.5	646.5	35.7	35.7	150.6	150.6	0.44	0.44	1.12	1.12	6.0	6.0	0.0	0.0	10.1	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	0.0	13.0	13.0
24	57	557.0	557.0	42.7	42.7	129.5	129.5	4.64	4.64	1.67	1.67	2.4	2.4	0.0	0.0	13.0	13.0
29	68	620.2	620.2	45.6	45.6	122.7	122.7	6.34	6.34	1.54	1.54	1.7	1.7	0.0	0.0	13.5	13.5
34	55	715.3	715.3	56.7	56.7	111.0	111.0	5.56	5.56	1.54	1.54	1.7	1.7	0.0	0.0	13.6	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	0.0	13.8	13.8
43	47	857.5	857.5	52.2	52.2	106.8	106.8	5.72	5.72	1.55	1.55	1.6	1.6	0.0	0.0	14.1	14.1
AVC	465	496.5	506.4	30.5	31.4	124.5	125.5	1.57	1.57	1.18	1.19	2.1	2.2	0.0	0.0	15.1	15.1
YCT	859			2.5E-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	1.2E+02

CCKE EVEN EMISSION REPORT

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

OVEN 3-8
PRI TEST W7

FIVE SECOND AVERAGE

END ING TOTAL SEC NO	FIVE SECOND TOTAL VOLUME FLOW	FFM NC		FFM NOX		CC		CO2		H2O		H2	
		MEAS	CCFR	MEAS	CCFR	MEAS	CCFR	MEAS	CCFR	MEAS	CCFR	MEAS	CCFR
25	49	70.8	76.5	0.0	0.0	0.20	0.21	0.1	0.1	0.6	0.1	0.0	0.0
34	55	57.1	57.1	10.4	10.4	0.51	0.91	1.4	1.4	0.8	1.4	0.0	0.0
39	12	33.8	40.2	115.4	143.2	1.03	1.22	1.0	1.0	1.3	1.0	0.0	0.0
44	6	21.2	31.0	143.1	204.9	0.66	0.96	0.5	0.5	0.7	0.5	0.0	0.0
49	8	13.8	22.4	76.4	128.1	0.46	0.75	0.0	0.0	1.2	0.0	0.0	0.0
54	8	9.2	17.2	41.7	76.1	0.37	0.68	0.0	0.0	0.0	0.0	0.0	0.0
59	8	6.2	5.4	23.7	35.5	0.30	0.45	0.0	0.0	1.2	0.0	0.0	0.0
04	11	4.4	6.6	17.3	25.5	0.30	0.45	0.0	0.0	0.0	0.0	0.0	0.0
09	9	4.3	8.2	12.6	22.6	0.30	0.54	0.0	0.0	0.0	0.0	0.0	0.0
14	12	2.5	3.8	10.8	16.2	0.28	0.42	0.0	0.0	1.1	0.0	0.0	0.0
19	10	4.0	6.1	6.7	14.2	0.28	0.55	0.0	0.0	1.1	0.0	0.0	0.0
24	17	4.4	7.6	5.5	6.6	0.29	0.35	0.0	0.0	1.2	0.0	0.0	0.0
29	27	221.0	221.0	7.0	7.0	0.26	0.36	0.0	0.0	0.9	0.0	0.0	0.0
34	103	259.4	259.4	34.5	34.5	1.72	1.72	0.0	0.0	0.7	0.0	0.0	0.0
39	78	336.0	336.0	118.7	118.7	3.34	3.34	1.3	1.3	1.2	1.3	0.0	0.0
44	96	214.0	214.0	144.3	144.3	3.23	3.23	3.2	3.2	2.9	3.2	0.0	0.0
49	73	214.4	214.4	128.2	128.2	3.22	3.22	4.1	4.1	4.4	4.1	0.1	0.1
54	67	181.0	199.8	117.9	129.8	2.58	2.84	4.5	4.5	5.2	4.5	0.2	0.2
59	71	155.5	155.5	113.5	113.5	2.46	2.46	4.1	4.1	5.3	4.1	0.0	0.0
04	62	142.4	142.4	105.7	105.7	1.65	1.65	4.0	4.0	5.1	4.0	0.0	0.0
09	57	155.4	174.3	93.5	103.5	1.49	1.63	3.0	3.0	4.4	3.0	0.0	0.0
14	49	160.1	205.3	101.7	131.7	1.48	2.19	1.4	1.4	3.7	1.4	0.0	0.0
19	65	105.5	105.5	110.0	110.0	1.37	1.37	0.6	0.6	3.6	0.6	0.0	0.0
24	59	66.0	66.0	102.1	102.1	1.11	1.11	0.4	0.4	2.9	0.4	0.0	0.0
28	45	46.0	46.0	80.3	80.3	0.79	0.79	0.0	0.0	2.5	0.0	0.0	0.0
AVG	517	106.5	112.4	66.6	76.8	1.22	1.34	1.2	1.3	2.3	1.3	0.0	0.0
TOT	1069	1.8E-01	1.8E-01	9.4E-02	9.4E-02	1.9E+01	2.0E+01	2.1E+01	2.2E+01	3.2E+01	3.2E+01	2.9E-01	1.4E+02

COKE EVEN EMISSION REPORT

TEST 9 JULY C3, 1572
DATE START TIME 11:43:11

CVEN 3-10
MRI TEST WS

FIVE SECOND AVERAGE

SEC NO	VOLUME FLOW	PPM NO		PPM NOX		THC *		CC		CO2		H2C *		H2O *		O2	
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
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	0.0	0.0	20.0	20.0
59	13	0.1	0.1	3.2	4.5	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	20.0	20.0
64	8	0.0	0.0	3.0	5.5	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	20.0	20.0
09	1	0.1	0.1	4.0	4.3	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	15.9	15.9
14	6	0.1	0.1	4.3	5.1	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	15.9	15.9
19	4	0.0	0.0	3.5	6.7	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	15.9	15.9
24	5	0.0	0.0	3.6	8.2	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	15.9	15.9
29	4	0.0	0.0	3.5	6.5	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	15.9	15.9
34	3	0.1	0.3	2.0	2.5	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	15.9	15.9
39	11	0.0	0.0	2.3	3.4	0.00	0.00	0.04	0.06	0.0	0.0	0.5	0.0	0.0	0.0	15.9	15.9
44	8	0.0	0.0	4.0	12.5	0.00	0.00	0.05	0.15	0.0	0.0	0.3	0.0	0.0	0.0	15.9	15.9
49	9	0.0	0.0	4.2	4.4	0.00	0.00	0.04	0.07	0.0	0.0	0.3	0.0	0.0	0.0	15.9	15.9
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	0.0	0.0	15.9	15.9
59	12	0.0	0.0	2.5	5.0	0.00	0.00	0.03	0.05	0.0	0.0	0.4	0.0	0.0	0.0	15.9	15.9
64	8	0.0	0.0	2.1	3.1	0.00	0.00	0.03	0.05	0.0	0.0	0.3	0.0	0.0	0.0	15.9	15.9
69	67	0.0	0.0	3.2	3.2	0.00	0.00	0.03	0.05	0.0	0.0	0.3	0.0	0.0	0.0	15.9	15.9
74	14	0.0	0.0	1.4	2.1	0.00	0.00	0.03	0.05	0.0	0.0	0.2	0.0	0.0	0.0	15.9	15.9
79	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	0.0	0.0	15.9	15.9
84	24	0.0	0.0	2.2	3.4	0.00	0.00	0.04	0.04	0.0	0.0	0.2	0.0	0.0	0.0	15.9	15.9
89	29	0.1	0.1	0.6	1.2	0.00	0.00	0.04	0.06	0.0	0.0	0.2	0.0	0.0	0.0	15.9	15.9
94	34	0.0	0.0	1.2	1.6	0.00	0.00	0.04	0.06	0.0	0.0	0.2	0.0	0.0	0.0	15.9	15.9
99	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	0.0	0.0	15.9	15.9
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	0.0	0.0	15.9	15.9
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	0.0	0.0	15.9	15.9
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	0.0	0.0	15.9	15.9
59	68	0.5	1.3	0.8	1.2	0.00	0.00	0.05	0.07	0.0	0.0	0.2	0.0	0.0	0.0	15.9	15.9
64	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	0.0	0.0	15.9	15.9
69	52	1.5	2.6	2.2	3.4	0.00	0.00	0.07	0.11	0.0	0.0	0.2	0.0	0.0	0.0	15.9	15.9
74	62	2.0	3.1	2.7	4.1	0.00	0.00	0.10	0.15	0.0	0.0	0.2	0.0	0.0	0.0	15.9	15.9
79	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	0.0	0.0	15.9	15.9
84	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	0.0	0.0	15.9	15.9
AVG	366	C.C	C.C	2.5	4.0	0.00	0.00	0.05	0.07	0.0	0.0	0.3	0.0	0.0	0.0	15.9	15.9
TCT	927	5.9E-04	7.8E-04	2.0E-02	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	0.0E+00	0.0E+00	1.8E+02	1.8E+02

CCME (VEN EMISSION) REPORT

TEST 10
DATE JULY
START TIME 15:26:05

ENC FIVE
ING SECOND
TOTAL
SEC VOLUME
NO FLOW

TEST 10
DATE JULY
START TIME 15:26:05

ENC FIVE
ING SECOND
TOTAL
SEC VOLUME
NO FLOW

CVEN 2-11
PRI TEST WLC

FIVE SECOND AVERAGE

TOTAL VOLUME FLOW	FPM SC2 MEAS	FPM NC MEAS	FPM NOX MEAS	% 1HC		% CC		% CO2		% H2C MEAS	% H2 * MEAS	% C2 D MEAS
				MEAS	CORR	MEAS	CORR	MEAS	CORR			
1	C.C	C.C	C.C	C.C	C.C	C.C	C.C	C.C	C.C	6.6	0.0	16.7
7	C.C	C.C	C.C	0.0	0.0	0.05	0.12	0.0	0.0	5.2	0.0	16.9
7	0.0	0.0	0.0	0.0	0.0	0.01	0.03	0.0	0.0	4.2	0.0	16.9
23	C.C	C.C	0.0	0.0	0.0	0.04	0.05	0.0	0.0	4.1	0.0	16.6
22	7.2	5.0	2.4	0.0	0.0	0.04	0.37	0.0	0.0	4.5	0.0	16.0
19	65.3	88.5	41.0	0.0	0.0	0.68	0.55	0.0	0.0	4.6	0.0	15.3
334	112.7	165.0	83.6	0.0	0.0	0.82	1.24	0.0	0.1	4.6	0.0	14.7
15	133.6	272.2	95.3	0.0	0.0	0.50	1.28	0.0	0.0	4.7	0.0	14.6
25	145.5	180.8	87.0	0.0	0.0	0.68	0.81	0.1	0.1	4.7	0.0	16.2
27	147.4	164.1	74.8	0.0	0.0	0.71	0.78	0.0	0.0	4.6	0.0	16.2
26	105.4	115.2	70.0	0.0	0.0	0.61	0.66	0.0	0.0	5.1	0.0	16.1
34	95.5	56.5	54.4	0.0	0.0	0.63	0.63	0.1	0.1	5.0	0.0	16.1
04	99.5	56.5	50.4	0.0	0.0	0.72	0.72	0.2	0.2	4.8	0.0	16.2
38	170.3	170.3	50.4	0.0	0.0	0.72	0.72	0.2	0.2	4.8	0.0	16.2
40	225.5	225.5	56.5	0.0	0.0	1.02	1.02	0.8	0.8	5.4	0.0	15.6
14	276.5	276.5	74.0	0.0	0.0	1.78	1.78	1.4	1.4	5.8	0.0	13.7
41	267.3	267.3	106.2	0.0	0.0	2.63	2.63	1.8	1.8	6.6	0.0	11.7
36	391.5	351.5	120.5	0.0	0.0	2.80	2.80	1.6	1.6	8.0	0.0	11.0
25	441.2	441.2	110.4	0.0	0.0	1.56	1.56	1.0	1.0	8.6	0.0	11.4
34	410.3	410.3	95.7	0.0	0.0	1.10	1.10	0.6	0.6	8.0	0.0	12.4
31	410.3	410.3	75.2	0.0	0.0	0.52	0.52	0.1	0.1	6.5	0.0	13.5
38	370.7	370.7	72.6	0.0	0.0	1.38	1.38	0.3	0.3	6.3	0.0	12.6
32	445.4	445.4	74.2	0.0	0.0	1.35	1.35	1.6	1.6	6.7	0.0	12.6
31	454.2	454.2	74.2	0.0	0.0	1.35	1.35	1.6	1.6	6.7	0.0	12.6
32	370.7	370.7	61.6	0.0	0.0	0.80	0.80	1.3	1.3	7.2	0.0	13.5
30	298.3	298.3	44.0	0.0	0.0	0.47	0.47	0.9	0.9	6.7	0.0	13.5
30	236.6	236.6	33.5	0.0	0.0	0.35	0.35	1.5	1.5	6.1	0.0	13.6
30	236.6	236.6	33.5	0.0	0.0	0.40	0.40	1.8	1.8	5.8	0.0	14.1
31	244.6	244.6	31.6	0.0	0.0	0.47	0.47	1.5	1.5	5.7	0.0	13.7
28	223.1	223.1	33.4	0.0	0.0	0.54	0.54	2.0	2.0	6.2	0.0	13.6
30	246.4	246.4	37.5	0.0	0.0	0.54	0.54	2.0	2.0	6.2	0.0	13.6
6	210.0	210.0	40.0	0.0	0.0	0.53	0.53	2.0	2.0	6.2	0.0	13.6
AVG	221.6	221.6	57.5	0.0	0.0	0.88	0.54	0.7	0.7	5.8	0.0	14.4
TOT			4.9E-02	5.1E-02	0.0E+00	0.0E+00	7.8E+00	8.1E+00	6.4E+00	4.6E+01	0.0E+00	1.1E+02

CEKE CVEN EMISSION REPORT

OVEN 3-8 GAS LEAKS
PRI TEST W11

TEST 11 JULY C5, 1972
DATE
START TIME 15:15:04

FIVE SECOND AVERAGE

FIVE SECOND AVERAGE																																						
INC	FIVE SECOND TOTAL	SEC VOLUME FLOW	FFM SCZ				FFM NC				FFM NCX				% TFC				% CC				% CO2				% H2C				% H2 *				% C2 O			
			MEAS	CCFF	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR				
04	5		0.0	C.C	0.0	0.0	0.0	C.C	C.C	C.C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
09	24		5.4	5.4	0.1	0.1	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
14	24		36.4	36.4	10.6	10.6	C.C	C.C	C.C	C.C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
19	47		163.7	163.7	56.8	56.8	0.1	0.1	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
24	49		354.0	354.0	125.6	125.6	2.0	2.0	1.54	1.54	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	
29	45		573.1	573.1	196.7	196.7	2.0	2.0	1.54	1.54	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	
34	42		575.0	575.0	196.7	196.7	2.0	2.0	1.54	1.54	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	
39	48		426.0	426.0	146.0	146.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
44	46		343.3	343.3	116.0	116.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
49	44		216.8	216.8	74.5	74.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
54	44		285.3	285.3	100.0	100.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
59	44		282.2	282.2	100.0	100.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
04	44		271.4	271.4	94.4	94.4	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
09	47		274.2	274.2	94.4	94.4	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
14	44		296.5	296.5	104.4	104.4	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
19	35		456.0	456.0	160.0	160.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
24	32		510.5	510.5	180.0	180.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
29	20		432.5	432.5	152.0	152.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
34	24		435.5	435.5	152.0	152.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
39	42		577.7	577.7	204.0	204.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
44	32		654.1	654.1	232.0	232.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
49	29		618.2	618.2	218.0	218.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
54	35		580.4	580.4	208.0	208.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
59	30		501.8	501.8	176.0	176.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
04	20		415.0	415.0	148.0	148.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
09	4		275.0	275.0	98.0	98.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
AVC	443		388.0	402.6	146.6	146.6	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TOT	901				8.1E-02	8.1E-02	1.4E+01	1.4E+01	7.6E+00	7.6E+00	7.5E+00	7.5E+00	7.7E+00	7.7E+00	2.2E+01	2.2E+01	0.8	0.8	0.9	0.9	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		

CCKE CVEN EMISSION REPORT

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

CVEN 3-9
MPI TEST

FIVE SECOND AVERAGE

FIVE SECOND TOTAL VOLUME FLOW		FIVE SECOND AVERAGE																
SEC NO		FFM MEAS	SC2 CORR	FFM MEAS	NC CORR	PPM MEAS	NOX CORR	% MEAS	THC CORR	% MEAS	CC CORR	% MEAS	CO2 CORR	% MEAS	H2C MEAS	H2 MEAS	C2 MEAS	
14	15	15.0	25.0	12.0	15.0	0.0	0.0	0.00	0.00	0.07	0.12	0.0	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	0.0	19.0	
24	36	24.0	24.0	9.0	9.0	48.0	48.0	0.18	0.18	0.43	0.43	0.7	0.7	1.0	0.0	0.0	18.0	
29	39	97.0	97.0	5.0	5.0	106.0	106.0	0.58	0.58	0.80	0.80	1.0	1.0	2.0	0.0	0.0	18.2	
34	37	121.0	121.0	4.0	4.0	116.0	116.0	0.76	0.76	0.51	0.51	0.8	0.8	2.0	0.0	0.0	17.8	
39	41	136.0	136.0	3.0	3.0	102.0	102.0	0.80	0.80	0.63	0.63	0.8	0.8	3.0	0.0	0.0	17.7	
44	34	176.0	176.0	3.0	3.0	53.0	53.0	0.84	0.84	0.67	0.67	0.8	0.8	3.0	0.0	0.0	17.7	
49	39	163.0	163.0	4.0	4.0	85.0	85.0	0.96	0.96	1.00	1.00	0.8	0.8	3.0	0.0	0.0	17.6	
54	39	145.0	145.0	4.0	4.0	85.0	85.0	1.18	1.18	1.14	1.14	0.8	0.8	3.0	0.0	0.0	17.5	
59	29	161.0	161.0	12.0	12.0	21.0	21.0	1.48	1.48	1.21	1.21	0.8	0.8	3.0	0.0	0.0	17.3	
04	36	145.0	145.0	16.0	16.0	35.0	35.0	1.82	1.82	1.40	1.40	0.8	0.8	3.0	0.0	0.0	17.0	
09	51	206.0	206.0	37.0	37.0	86.0	86.0	2.82	2.82	1.80	1.80	1.0	1.0	3.0	0.0	0.0	16.5	
14	47	335.0	335.0	38.0	38.0	109.0	109.0	4.24	4.24	2.47	2.47	1.5	1.5	4.0	0.0	0.0	15.0	
19	40	385.0	385.0	36.0	36.0	113.0	113.0	5.64	5.64	2.82	2.82	2.0	2.0	5.0	0.0	0.0	13.5	
24	36	424.0	424.0	33.0	33.0	103.0	103.0	5.98	5.98	2.61	2.61	2.0	2.0	6.0	0.0	0.0	12.8	
29	33	378.0	378.0	33.0	33.0	90.0	90.0	5.70	5.70	2.19	2.19	1.7	1.7	6.0	0.0	0.0	12.9	
34	31	364.0	364.0	33.0	33.0	73.0	73.0	5.48	5.48	1.86	1.86	1.4	1.4	6.0	0.0	0.0	13.5	
39	32	454.0	454.0	32.0	32.0	66.0	66.0	4.16	4.16	1.53	1.53	1.3	1.3	5.0	0.0	0.0	14.0	
44	26	460.0	460.0	24.0	24.0	62.0	62.0	2.70	2.70	1.22	1.22	1.5	1.5	5.0	0.0	0.0	14.2	
49	30	415.0	415.0	12.0	12.0	61.0	61.0	1.70	1.70	0.96	0.96	1.4	1.4	5.0	0.0	0.0	14.5	
54	24	331.0	331.0	4.0	4.0	53.0	53.0	0.70	0.70	0.57	0.57	0.8	0.8	5.0	0.0	0.0	15.3	
59	32	234.0	234.0	1.5	1.5	35.0	35.0	0.14	0.14	0.25	0.25	0.0	0.0	4.0	0.0	0.0	16.6	
04	25	162.0	162.0	1.0	1.0	21.0	21.0	0.00	0.00	0.16	0.16	0.0	0.0	3.0	0.0	0.0	17.7	
09	25	100.0	100.0	15.0	15.0	12.0	12.0	0.00	0.00	0.11	0.11	0.0	0.0	2.0	0.0	0.0	18.4	
14	34	71.0	71.0	25.0	25.0	7.0	7.0	0.00	0.00	0.12	0.12	0.0	0.0	2.0	0.0	0.0	16.7	
19	32	127.0	127.0	25.0	25.0	19.0	19.0	0.40	0.40	0.30	0.30	0.3	0.3	2.0	0.0	0.0	18.4	
24	26	236.0	236.0	13.0	13.0	55.0	55.0	0.92	0.92	0.54	0.54	0.8	0.8	2.0	0.0	0.0	17.4	
29	25	244.0	244.0	15.0	15.0	57.0	57.0	0.50	0.50	0.43	0.43	0.6	0.6	3.0	0.0	0.0	17.0	
34	28	184.0	184.0	24.0	24.0	34.0	34.0	0.16	0.16	0.25	0.25	0.2	0.2	3.0	0.0	0.0	17.5	
39	33	193.0	193.0	43.0	43.0	27.0	27.0	0.24	0.24	0.23	0.23	0.2	0.2	3.0	0.0	0.0	17.8	
44	32	220.0	220.0	26.0	26.0	52.0	52.0	0.48	0.48	0.41	0.41	0.5	0.5	3.0	0.0	0.0	17.1	
49	25	267.0	267.0	18.0	18.0	75.0	75.0	0.46	0.46	0.48	0.48	1.1	1.1	3.0	0.0	0.0	16.5	
54	28	296.0	296.0	37.0	37.0	61.0	61.0	0.18	0.18	0.32	0.32	0.4	0.4	4.0	0.0	0.0	16.7	
59	34	293.0	293.0	54.0	54.0	40.0	40.0	0.32	0.32	0.24	0.24	0.4	0.4	3.0	0.0	0.0	17.4	
04	34	390.0	390.0	55.0	55.0	65.0	65.0	1.06	1.06	0.48	0.48	1.2	1.2	3.0	0.0	0.0	17.1	
09	34	503.0	503.0	34.0	34.0	100.0	100.0	1.32	1.32	0.70	0.70	1.7	1.7	3.0	0.0	0.0	16.2	
14	27	542.0	542.0	18.0	18.0	105.0	105.0	0.88	0.88	1.01	1.01	0.67	0.67	4.0	0.0	0.0	15.7	
19	24	466.0	466.0	24.0	24.0	80.0	80.0	0.32	0.32	0.45	0.45	1.1	1.1	4.0	0.0	0.0	16.2	
24	26	377.0	377.0	36.0	36.0	46.0	46.0	0.20	0.20	0.26	0.26	0.8	0.8	4.0	0.0	0.0	17.1	
29	35	373.0	373.0	29.0	29.0	44.0	44.0	0.24	0.24	0.26	0.26	0.8	0.8	3.0	0.0	0.0	17.6	
34	27	376.0	376.0	13.0	13.0	59.0	59.0	0.26	0.26	0.30	0.30	1.2	1.2	3.0	0.0	0.0	17.3	
39	24	339.0	339.0	4.0	4.0	54.0	54.0	0.08	0.08	0.27	0.27	0.34	0.34	1.0	1.0	3.0	0.0	17.4
44	25	278.0	278.0	0.7	0.7	37.0	37.0	0.00	0.00	0.18	0.22	0.5	0.6	3.0	0.0	0.0	17.9	
49	26	261.0	261.0	0.0	0.0	17.0	17.0	0.00	0.00	0.11	0.14	0.2	0.2	2.0	0.0	0.0	16.4	
54	25	225.0	225.0	3.0	3.0	8.0	8.0	0.00	0.00	0.10	0.11	0.0	0.0	2.0	0.0	0.0	18.9	
59	25	205.0	205.0	5.0	5.0	7.0	7.0	0.00	0.00	0.10	0.11	0.0	0.0	1.0	0.0	0.0	19.0	
04	27	253.0	253.0	6.0	6.0	12.0	12.0	0.00	0.00	0.10	0.13	0.2	0.2	1.0	0.0	0.0	19.1	
09	23	245.0	245.0	2.0	2.0	20.0	20.0	0.00	0.00	0.15	0.20	0.4	0.5	1.0	0.0	0.0	18.9	
14	25	225.0	225.0	0.7	0.7	15.0	15.0	0.00	0.00	0.13	0.14	0.3	0.3	2.0	0.0	0.0	18.5	
19	25	210.0	210.0	0.0	0.0	14.0	14.0	0.00	0.00	0.10	0.10	0.1	0.1	2.0	0.0	0.0	19.0	
24	26	216.0	216.0	0.7	0.7	10.0	10.0	0.00	0.00	0.11	0.11	0.1	0.1	1.0	0.0	0.0	19.1	
29	23	184.0	184.0	12.0	12.0	7.0	7.0	0.00	0.00	0.11	0.12	0.1	0.1	1.0	0.0	0.0	19.1	
34	31	137.0	137.0	23.0	23.0	7.0	7.0	0.00	0.00	0.08	0.09	0.0	0.0	1.0	0.0	0.0	19.1	
39	29	171.0	171.0	28.0	28.0	18.0	18.0	0.02	0.02	0.17	0.20	0.4	0.5	1.0	0.0	0.0	18.8	
44	26	240.0	240.0	12.0	12.0	52.0	52.0	0.10	0.12	0.28	0.34	1.1	1.1	2.0	0.0	0.0	18.3	
49	21	230.0	230.0	9.0	9.0	55.0	55.0	0.08	0.10	0.25	0.30	0.9	1.0	2.0	0.0	0.0	17.5	
54	25	225.0	225.0	9.0	9.0	35.0	35.0	0.00	0.00	0.16	0.16	0.4	0.5	2.0	0.0	0.0	18.3	
59	27	215.0	215.0	5.0	5.0	24.0	24.0	0.00	0.00	0.15	0.15	0.2	0.3	2.0	0.0	0.0	18.6	
04	27	195.0	195.0	1.5	1.5	23.0	23.0	0.00	0.00	0.15	0.15	0.2	0.3	2.0	0.0	0.0	18.7	
09	25	184.0	184.0	0.2	0.2	17.0	17.0	0.00	0.00	0.09	0.09	0.0	0.1	2.0	0.0	0.0	18.8	
14	20	224.0	224.0	0.0	0.0	9.0	9.0	0.00	0.00	0.10	0.14	0.1	0.2	2.0	0.0	0.0	19.0	
19	30	172.0	172.0	0.0	0.0	6.0	6.0	0.00	0.00	0.11	0.12	0.0	0.1	1.0	0.0	0.0	19.0	
24	27	165.0	165.0	0.0	0.0	5.0	5.0	0.00	0.00	0.07	0.08	0.1	0.1	1.0	0.0	0.0	19.1	
29	14	163.0	163.0	0.0	0.0	4.0	4.0	0.00	0.00	0.05	0.21	0.0	0.0	1.0	0.0	0.0	19.2	
34	19	184.0	184.0	0.0	0.0	4.0	4.0	0.00	0.00	0.07	0.15	0.0	0.0	1.0	0.0	0.0	19.3	
39	24	148.0	148.0	0.0	0.0	4.0	4.0	0.00	0.00	0.08	0.10	0.0	0.0	1.0	0.0	0.0	19.3	
44	22	135.0	135.0	0.0	0.0	4.0	4.0	0.00	0.00	0.08	0.05	0.0	0.0	1.0	0.0	0.0	19.4	
49	5	89.0	89.0	0.0	0.0	4.0	4.0	0.00	0.00	0.07	0.11	0.0	0.1	1.0	0.0	0.0	19.4	
50	0	131.0	131.0	0.0	0.0	3.0	3.0	0.00	0.00	0.08	0.00	0.0	0.0	1.0	0.0	0.0	19.4	
AVC	351	239.0	265.0	15.0	16.0	46.0	46.0	0.83	0.87	0.55	0.59	0.6	0.7	3.0	0.4	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		

1951 14
1474 JULY 12, 1955
1951 1474 1474 1474

CYRIL 3-15
MAY TEST

ONE FIVE
ONE FIVE
TOTAL
FIVE FIVE
AL FIVE

[illegible]

C-138

CCKE EVEN EMISSION REPORT
OVEN 3-6 GUIDE GAS PROBE PLUGGED
MPI TEST

TEST 14
DATE JULY 12, 1972
START TIME 15:14:30

FIVE SECOND AVERAGE

SEC NO	FIVE SEC VOLUME FLOW	FPM SC2		PPM NO		PPM NOX		% THC		% CO		% CO2		% H2O		% O2	
		MEAS	CCFF	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
34	8	26.2	52.3	C.C	0.0	2.8	5.6	0.00	0.00	0.03	0.06	0.1	0.2	1.5	0.0	19.1	0.0
39	11	62.4	124.6	0.0	C.C	2.6	5.3	0.00	0.00	0.04	0.08	0.1	0.2	1.5	0.0	19.1	0.0
44	11	62.5	125.0	0.0	0.0	3.6	7.6	0.00	0.00	0.05	0.10	0.2	0.3	2.0	0.0	18.6	0.0
49	9	55.6	115.3	C.C	C.C	13.0	25.5	0.00	0.00	0.10	0.21	0.2	0.4	2.0	0.0	17.6	0.0
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	0.0
59	9	91.2	182.4	0.0	0.0	30.8	61.5	0.00	0.00	0.19	0.38	0.2	0.4	2.2	0.0	17.3	0.0
04	10	82.3	164.6	0.0	0.0	32.7	65.4	0.00	0.00	0.21	0.42	0.1	0.1	2.2	0.0	18.3	0.0
09	11	51.5	103.0	0.0	0.0	28.8	57.6	0.00	0.00	0.21	0.42	0.1	0.1	2.2	0.0	18.7	0.0
14	8	51.1	102.2	C.C	C.C	24.6	49.1	0.02	0.04	0.20	0.40	0.0	0.0	2.2	C.0	19.4	0.0
19	9	55.3	110.6	0.0	0.0	22.0	43.5	0.00	0.00	0.20	0.40	0.0	0.0	2.2	0.0	19.5	0.0
24	11	62.4	124.8	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	0.0
29	12	50.4	100.8	0.0	C.C	17.0	34.1	0.00	0.00	0.15	0.29	0.0	0.0	2.1	0.0	19.6	0.0
34	12	46.2	92.4	0.0	C.C	11.6	23.1	0.00	0.00	0.13	0.26	0.0	0.0	2.1	C.0	19.6	0.0
39	10	53.3	106.6	0.0	C.C	8.8	17.6	0.00	0.00	0.11	0.22	0.0	0.0	2.0	C.0	19.6	0.0
44	10	62.4	124.8	0.0	0.0	7.0	14.0	0.00	0.00	0.09	0.18	0.0	0.0	2.0	C.0	19.1	0.0
49	10	76.0	152.0	C.C	C.C	6.6	13.2	0.00	0.00	0.09	0.18	0.0	0.0	2.0	C.0	19.4	0.0
54	10	59.4	118.8	0.0	0.0	6.6	13.2	0.00	0.00	0.11	0.22	0.0	0.0	2.0	0.0	19.3	0.0
59	8	71.2	142.4	0.0	C.C	7.0	14.0	0.00	0.00	0.14	0.28	0.0	0.0	2.0	0.0	19.1	0.0
04	7	75.0	150.0	0.0	C.C	5.0	10.0	0.00	0.00	0.14	0.28	0.0	0.1	2.0	0.0	18.9	0.0
09	6	78.2	156.4	0.0	0.0	5.5	11.0	0.06	0.12	0.11	0.22	0.0	0.0	2.0	0.0	18.8	0.0
14	6	71.6	143.2	C.C	C.C	5.8	11.6	0.18	0.36	0.12	0.24	0.0	0.0	2.0	0.0	18.8	0.0
19	9	38.2	76.4	0.0	0.0	5.4	10.8	0.10	0.18	0.12	0.24	0.0	0.0	2.0	0.0	18.9	0.0
24	10	44.4	88.8	0.0	0.0	4.7	9.4	0.10	0.18	0.12	0.24	0.0	0.0	2.0	0.0	19.3	0.0
29	10	51.4	102.8	0.0	C.C	4.3	8.6	0.04	0.08	0.09	0.18	0.0	0.0	2.0	0.0	19.3	0.0
34	10	35.5	71.0	0.0	0.0	3.8	7.6	0.00	0.00	0.08	0.16	0.0	0.0	2.0	0.0	19.2	0.0
39	10	36.1	72.2	0.0	C.C	3.1	6.2	0.00	0.00	0.07	0.14	0.0	0.0	2.0	0.0	19.0	0.0
44	9	56.5	113.0	0.0	C.C	2.8	5.6	0.00	0.00	0.07	0.14	0.0	0.0	2.0	0.0	19.8	0.0
49	9	56.0	112.0	C.C	C.C	2.8	5.6	0.00	0.00	0.07	0.14	0.0	0.0	2.0	0.0	19.7	0.0
54	10	85.6	171.2	0.0	0.0	3.3	6.6	0.00	0.00	0.06	0.12	0.0	0.0	2.0	0.0	19.6	0.0
59	10	87.7	175.4	0.0	0.0	3.5	7.0	0.00	0.00	0.06	0.12	0.0	0.0	2.1	C.0	19.9	0.0
04	7	72.3	144.6	0.0	C.C	3.5	7.0	0.00	0.00	0.06	0.12	0.0	0.1	2.1	0.0	19.8	0.0
09	7	91.0	182.0	0.0	0.0	3.0	6.0	0.00	0.00	0.05	0.10	0.0	0.0	2.1	0.0	19.9	0.0
14	8	94.0	188.0	C.C	C.C	3.0	6.0	0.00	0.00	0.06	0.12	0.0	0.0	2.0	C.0	19.8	0.0
19	7	105.5	211.0	0.0	0.0	2.6	5.2	0.00	0.00	0.04	0.08	0.0	0.0	2.1	0.0	19.7	0.0
23	5	76.6	153.2	C.C	C.C	4.1	8.2	0.00	0.00	0.04	0.08	0.0	0.0	2.0	C.0	19.9	0.0
AVG	111	65.2	130.4	0.0	0.0	5.7	11.4	0.01	0.02	0.11	0.22	0.0	0.1	2.1	0.0	19.2	0.0
TOT	321			C.C+CC	C.C+CC	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	0.0

CCKE CVEN EMISSION REPORT

CVEN 3-6
PFI TEST

TEST 15
DATE AUGUST
START TIME 12:43:17

FIVE SECOND AVERAGE

ENC ING	FIVE SECOND TOTAL SEC VOLUME ND	PPM SC2		PPM NC		PPM NOX		% TFC		% CC		% CO2		% H2C		% H2		% C2	
		MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
15	25	37.0	31.0	0.1	0.1	0.0	0.0	0.00	0.00	0.05	0.05	0.0	0.0	5.7	5.7	0.0	0.0	18.7	18.7
24	41	29.3	25.3	0.2	0.2	0.0	0.0	0.00	0.00	0.04	0.04	0.0	0.0	5.7	5.7	0.0	0.0	18.8	18.8
25	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	5.6	0.0	0.0	18.8	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	5.6	0.0	0.0	18.7	18.7
39	42	36.4	38.4	0.1	0.1	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	5.7	5.7	0.0	0.0	18.8	18.8
44	42	31.5	31.5	0.4	0.4	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	5.6	5.6	0.0	0.0	18.7	18.7
45	43	25.0	25.0	0.2	0.2	0.0	0.0	0.00	0.00	0.07	0.07	0.0	0.0	5.6	5.6	0.0	0.0	18.7	18.7
54	43	33.1	33.1	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.06	0.0	0.0	5.6	5.6	0.0	0.0	18.7	18.7
59	44	23.5	23.5	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.07	0.0	0.0	5.5	5.5	0.0	0.0	18.7	18.7
04	46	26.2	26.2	0.0	0.0	0.0	0.0	0.00	0.00	0.05	0.05	0.0	0.0	5.5	5.5	0.0	0.0	18.6	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	5.5	0.0	0.0	18.7	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	5.5	0.0	0.0	18.2	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	5.5	0.0	0.0	18.3	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	5.5	0.0	0.0	18.7	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	5.6	0.0	0.0	18.6	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	5.6	0.0	0.0	18.7	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	5.6	0.0	0.0	18.6	18.6
44	49	67.5	67.5	0.3	0.3	1.8	1.8	0.00	0.00	0.08	0.08	0.0	0.0	5.6	5.6	0.0	0.0	18.6	18.6
45	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	5.6	0.0	0.0	18.6	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	5.6	0.0	0.0	18.6	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	5.6	0.0	0.0	18.4	18.4
04	49	56.5	56.5	0.0	0.0	0.2	0.2	0.00	0.00	0.07	0.07	0.0	0.0	5.6	5.6	0.0	0.0	18.5	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	5.6	0.0	0.0	18.2	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	5.6	0.0	0.0	18.3	18.3
19	37	71.4	71.4	0.4	0.4	0.6	0.6	0.00	0.00	0.07	0.07	0.0	0.0	5.5	5.5	0.0	0.0	18.5	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	5.5	0.0	0.0	18.7	18.7
29	42	56.5	56.5	0.7	0.7	1.0	1.0	0.00	0.00	0.07	0.07	0.0	0.0	5.5	5.5	0.0	0.0	18.7	18.7
34	41	55.7	55.7	0.5	0.5	1.0	1.0	0.00	0.00	0.05	0.05	0.0	0.0	5.5	5.5	0.0	0.0	18.6	18.6
39	36	72.6	72.6	0.6	0.6	1.4	1.4	0.00	0.00	0.08	0.08	0.0	0.0	5.5	5.5	0.0	0.0	18.5	18.5
44	38	233.5	233.5	0.6	0.6	1.0	1.0	0.10	0.10	0.08	0.08	0.0	0.0	5.5	5.5	0.0	0.0	18.6	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	5.5	0.0	0.0	18.6	18.6
54	41	26.0	26.0	0.8	0.8	0.1	0.1	0.14	0.14	0.11	0.11	0.0	0.0	5.4	5.4	0.0	0.0	18.6	18.6
59	42	0.0	0.0	0.9	0.9	0.1	0.1	0.14	0.14	0.05	0.05	0.0	0.0	5.4	5.4	0.0	0.0	18.7	18.7
04	41	0.0	0.0	0.5	0.5	0.0	0.0	0.26	0.26	0.11	0.11	0.0	0.0	5.4	5.4	0.0	0.0	18.6	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	5.5	0.0	0.0	18.5	18.5
14	41	0.0	0.0	0.5	0.5	0.0	0.0	0.48	0.48	0.14	0.14	0.0	0.0	5.4	5.4	0.0	0.0	18.5	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	5.5	0.0	0.0	18.5	18.5
24	39	0.0	0.0	0.7	0.7	0.0	0.0	0.22	0.22	0.11	0.11	0.0	0.0	5.6	5.6	0.0	0.0	18.6	18.6
28	31	0.0	0.0	0.3	0.3	0.3	0.3	0.22	0.22	0.05	0.05	0.0	0.0	5.5	5.5	0.0	0.0	18.6	18.6
AVE	530	51.1	51.8	0.4	0.4	0.4	0.4	0.07	0.07	0.06	0.06	0.0	0.0	5.5	5.5	0.0	0.0	18.6	18.6

TOT 1657 6.0E-04 6.0E-04 7.0E-04 7.1E-04 1.0E+00 1.0E+00 1.4E+00 0.0E+00 0.0E+00 5.4E+01 0.0E+00 3.2E+02

CCKE CVEN EMISSION REPORT

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

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

FIVE SECOND AVERAGE

ENC ING	SEC VOLUME	FIVE SECOND TOTAL FLOW	PPM SC2		PPM NO		PPM NOX		% THC		% CC		% CO2		% H2		% O2
			MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	
04	23	3.1	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	0.0	19.9
09	56	3.7	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	0.0	19.9
14	54	10.2	10.2	10.2	0.0	0.0	4.5	4.5	0.00	0.00	0.06	0.06	0.0	0.0	0.0	0.0	20.0
19	51	13.5	13.5	13.5	0.0	0.0	6.1	6.1	0.00	0.00	0.09	0.09	0.0	0.0	0.0	0.0	20.0
24	58	18.5	18.5	18.5	0.0	0.0	6.5	6.5	0.00	0.00	0.10	0.10	0.0	0.0	0.0	0.0	20.0
29	60	18.4	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	0.0	20.0
34	60	18.5	18.5	18.5	0.0	0.0	7.2	7.2	0.00	0.00	0.11	0.11	0.0	0.0	0.0	0.0	20.0
39	59	17.2	17.2	17.2	0.0	0.0	7.0	7.0	0.00	0.00	0.12	0.12	0.0	0.0	0.0	0.0	20.1
44	62	17.5	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	0.0	20.1
49	63	17.5	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	0.0	20.1
54	62	17.7	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	0.0	20.1
59	61	15.5	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	0.0	20.1
04	61	16.5	16.5	16.5	0.0	0.0	5.7	5.7	0.00	0.00	0.12	0.12	0.0	0.0	0.0	0.0	20.1
09	57	23.7	23.7	23.7	0.0	0.0	8.9	8.9	0.02	0.02	0.13	0.13	0.0	0.0	0.0	0.0	19.9
14	55	51.7	51.7	51.7	0.0	0.0	16.7	16.7	0.20	0.20	0.22	0.22	0.0	0.0	0.0	0.0	19.8
19	59	94.7	94.7	94.7	0.0	0.0	24.9	24.9	0.30	0.30	0.35	0.35	0.0	0.0	0.0	0.0	19.7
24	56	128.2	128.2	128.2	0.0	0.0	34.6	34.6	0.30	0.30	0.35	0.35	0.0	0.0	0.0	0.0	19.7
29	58	131.5	131.5	131.5	0.0	0.0	40.0	40.0	0.22	0.22	0.35	0.35	0.0	0.0	0.0	0.0	19.6
34	57	107.8	107.8	107.8	0.0	0.0	25.9	25.9	0.12	0.12	0.30	0.30	0.0	0.0	0.0	0.0	19.7
39	58	84.5	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	0.0	19.8
44	59	68.5	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	0.0	19.9
49	60	56.5	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	0.0	20.0
54	61	47.6	47.6	47.6	0.0	0.0	6.3	6.3	0.00	0.00	0.08	0.08	0.0	0.0	0.0	0.0	20.0
59	59	42.7	42.7	42.7	0.0	0.0	5.4	5.4	0.00	0.00	0.05	0.05	0.0	0.0	0.0	0.0	20.0
04	58	37.5	37.5	37.5	0.0	0.0	4.5	4.5	0.00	0.00	0.06	0.06	0.0	0.0	0.0	0.0	20.0
09	61	32.1	32.1	32.1	0.0	0.0	4.3	4.3	0.00	0.00	0.06	0.06	0.0	0.0	0.0	0.0	20.0
14	60	31.0	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	0.0	20.0
19	61	33.1	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	0.0	20.0
24	59	37.1	37.1	37.1	0.0	0.0	7.1	7.1	0.00	0.00	0.11	0.11	0.0	0.0	0.0	0.0	20.0
29	59	41.8	41.8	41.8	0.0	0.0	5.1	5.1	0.22	0.22	0.15	0.15	0.0	0.0	0.0	0.0	20.0
34	59	54.6	54.6	54.6	0.0	0.0	14.0	14.0	1.24	1.24	0.35	0.35	0.0	0.0	0.0	0.0	19.9
39	57	87.4	87.4	87.4	0.0	0.0	15.7	15.7	2.98	2.98	0.81	0.81	0.0	0.0	0.0	0.0	19.6
44	58	105.3	105.3	105.3	0.0	0.0	13.4	13.4	2.60	2.60	0.82	0.82	0.0	0.0	0.0	0.0	19.0
49	53	116.4	116.4	116.4	0.0	0.0	13.3	13.3	2.10	2.10	0.63	0.63	0.0	0.0	0.0	0.0	18.6
54	57	118.5	118.5	118.5	0.0	0.0	11.7	11.7	1.38	1.38	0.46	0.46	0.0	0.0	0.0	0.0	18.7
59	58	115.5	115.5	115.5	0.0	0.0	10.1	10.1	0.70	0.70	0.25	0.25	0.0	0.0	0.0	0.0	19.0
04	58	110.1	110.1	110.1	0.0	0.0	8.6	8.6	0.30	0.30	0.20	0.20	0.0	0.0	0.0	0.0	19.3
09	59	103.1	103.1	103.1	0.0	0.0	5.4	5.4	0.10	0.10	0.13	0.13	0.0	0.0	0.0	0.0	19.8
14	59	100.5	100.5	100.5	0.0	0.0	5.7	5.7	0.00	0.00	0.13	0.13	0.0	0.0	0.0	0.0	19.8
19	61	96.5	96.5	96.5	0.0	0.0	6.7	6.7	0.00	0.00	0.13	0.13	0.0	0.0	0.0	0.0	20.0
24	60	90.7	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	0.0	20.0
29	59	86.7	86.7	86.7	0.0	0.0	8.6	8.6	0.00	0.00	0.10	0.10	0.0	0.0	0.0	0.0	19.8
34	58	86.6	86.6	86.6	0.0	0.0	14.3	14.3	0.00	0.00	0.13	0.13	0.0	0.0	0.0	0.0	19.8
39	45	95.6	95.6	95.6	0.0	0.0	16.5	16.5	0.00	0.00	0.16	0.16	0.0	0.0	0.0	0.0	19.6
42	6	97.8	97.8	97.8	0.0	0.0	12.4	12.4	0.00	0.00	0.14	0.14	0.0	0.0	0.0	0.0	19.7
AVG	691	60.7	60.7	60.7	0.7	0.7	11.1	11.2	0.30	0.30	0.20	0.20	0.0	0.0	0.0	0.0	19.8
TOT	2533	1.5E-01	1.5E-01	1.7E-02	1.7E-02	2.4E-02	2.4E-02	7.4E-02	7.4E-02	5.0E+00	5.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E+00	5.0E+02

CCRE CVEN EMISSION REPORT

CVEN 3-4 EARLY PART OF TEST NOT RECORDED
PMT TESTTEST 17
DATE AUGUST 06, 1972
START TIME 11:12:55

FIVE SECOND AVERAGE

LAC INC TOTAL SEC VOLUME NU	FIVE SECOND TOTAL VOLUME FLUX	PPM SC2		PPM NC		PPM NOX		TIC		CO		CC2		H2C		H2C	
		MEAS	CCFF	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
59	64	2.1	3.1	C.C	C.C	4.2	4.3	C.CC	0.CC	C.C5	0.05	0.C	C.C	1.4	C.C	C.1	18.6
04	66	10.5	10.5	0.C	0.C	8.0	8.0	0.C6	0.C6	C.11	C.11	0.1	0.1	1.5	0.1	0.1	18.7
09	66	22.7	22.7	C.C	0.C	14.6	14.6	0.14	0.14	C.17	C.17	0.1	0.1	1.6	0.1	0.1	18.8
14	60	41.5	41.5	0.C	0.C	16.5	16.5	C.20	C.20	C.18	C.18	0.1	0.1	1.6	0.1	0.1	17.8
15	60	62.0	62.0	0.C	0.C	17.7	17.7	0.20	0.20	C.19	C.19	0.1	0.1	1.6	0.1	0.1	17.6
24	62	75.5	75.5	0.C	0.C	20.2	20.2	C.22	C.22	0.18	0.18	0.1	0.1	1.6	0.1	0.1	18.7
29	67	92.5	92.5	0.C	0.C	20.8	20.8	C.28	C.28	0.21	0.21	0.1	0.1	1.7	0.1	0.1	18.6
34	68	95.3	95.3	0.C	0.C	15.7	15.7	0.20	0.20	0.20	0.20	0.1	0.1	1.8	0.1	0.1	18.6
35	76	104.0	104.0	0.C	0.C	21.2	21.2	C.18	0.18	0.15	0.15	0.1	0.1	1.5	0.1	0.1	18.5
44	75	101.0	101.0	C.C	C.C	15.1	15.1	0.10	0.10	0.15	0.15	0.1	0.1	1.5	0.1	0.1	18.5
49	72	85.6	85.6	0.C	0.C	18.6	18.6	0.CC	0.CC	0.1C	0.1C	0.1	0.1	1.5	0.1	0.1	18.9
54	66	74.4	74.4	0.C	0.C	16.0	16.0	0.00	0.00	0.08	0.08	0.1	0.1	1.6	0.1	0.1	17.9
59	66	68.0	68.0	0.C	0.C	12.4	12.4	C.10	0.10	0.05	0.05	0.1	0.1	1.7	0.1	0.1	17.5
64	70	65.0	65.0	0.C	0.C	6.6	6.6	0.14	0.14	C.1C	C.1C	0.1	0.1	1.7	0.1	0.1	19.0
09	75	65.7	65.7	0.4	C.4	6.0	6.0	0.20	0.20	0.10	0.10	0.1	0.1	1.7	0.1	0.1	18.9
14	70	70.5	70.5	2.5	2.5	7.7	7.7	0.52	0.52	0.15	0.15	0.2	0.2	1.7	0.1	0.1	18.9
15	68	62.5	62.5	5.4	5.4	14.1	14.1	1.36	1.36	0.40	0.40	0.4	0.4	1.8	0.1	0.1	18.6
24	63	117.5	117.5	6.0	7.2	15.1	15.1	3.56	4.23	0.56	1.14	0.5	0.6	2.4	0.1	0.1	17.9
25	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	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	2.5	0.1	0.1	16.1
39	74	212.1	212.1	2.5	2.5	13.5	13.5	3.32	3.32	C.65	C.65	0.3	0.3	3.0	0.1	0.1	16.5
44	70	215.8	215.8	3.5	3.5	14.5	14.5	2.50	2.50	0.61	0.61	0.2	0.2	2.8	0.1	0.1	16.5
45	68	231.7	231.7	2.8	2.8	16.6	16.6	2.42	2.42	C.51	C.51	0.2	0.2	2.7	0.1	0.1	17.6
54	68	283.4	283.4	0.5	0.5	17.0	17.0	2.70	2.70	0.56	0.56	0.2	0.2	2.8	0.1	0.1	17.8
55	72	341.2	341.2	0.C	C.C	12.4	12.4	1.64	1.64	0.40	0.40	0.1	0.1	3.1	0.1	0.1	18.0
04	66	342.8	342.8	0.C	0.C	10.5	10.5	0.50	0.50	0.21	0.21	C.1	C.1	2.5	0.1	0.1	18.3
08	54	317.7	317.7	C.C	C.C	7.6	7.6	0.50	0.50	0.13	0.13	0.1	0.1	2.5	0.1	0.1	18.6
AVG	823	130.6	131.6	1.2	1.2	14.1	14.3	1.19	1.22	C.35	C.36	0.2	0.2	2.1	0.1	0.1	18.1
TCT	1337			2.2E-03	2.2E-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	3.6E+00	3.3E+02	

CCKE CVEN EMISSION REPORT

TEST 18
DATE AUGUST 05, 1973
START TIME 15:21:31CVEN 3-3 #3 SENSOR BURNED OUT
MRI TEST

FIVE SECOND AVERAGE

ENC ING SEC NO	FIVE SECOND TOTAL VOLUME FLOW	PPM SC2		PPM AC		PPM NOX		TFC		CO		CO2		H2C		H2	
		MEAS	CCFF	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
34	28	0.0	C.C	0.0	0.0	2.8	5.0	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00
39	45	0.0	0.0	0.0	0.0	3.4	3.4	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00
44	43	7.2	5.1	0.0	0.0	5.4	7.0	0.00	0.00	0.09	0.12	0.00	0.00	0.00	0.00	0.00	0.00
49	31	21.2	38.5	0.0	0.0	17.4	17.4	0.00	0.00	0.11	0.20	0.00	0.00	0.00	0.00	0.00	0.00
54	31	15.6	35.2	1.3	2.2	11.2	20.2	0.00	0.00	0.13	0.23	0.00	0.00	0.00	0.00	0.00	0.00
59	35	22.5	33.7	1.8	2.7	18.2	27.4	0.00	0.00	0.13	0.20	0.00	0.00	0.00	0.00	0.00	0.00
04	39	41.7	54.6	0.3	0.4	24.4	31.7	0.00	0.00	0.26	0.33	0.00	0.00	0.00	0.00	0.00	0.00
09	31	51.3	117.5	0.0	0.0	16.1	43.5	0.00	0.00	0.22	0.58	0.00	0.00	0.00	0.00	0.00	0.00
14	29	46.8	126.7	0.0	0.0	12.4	16.2	0.00	0.00	0.15	0.58	0.00	0.00	0.00	0.00	0.00	0.00
19	43	45.5	71.1	0.0	0.0	11.8	18.9	0.00	0.00	0.14	0.21	0.00	0.00	0.00	0.00	0.00	0.00
24	47	51.4	71.1	0.0	0.0	12.4	16.2	0.00	0.00	0.15	0.58	0.00	0.00	0.00	0.00	0.00	0.00
29	35	54.6	82.2	0.0	0.0	13.5	17.8	0.00	0.00	0.15	0.21	0.00	0.00	0.00	0.00	0.00	0.00
34	45	51.2	56.5	0.0	0.0	12.3	13.5	0.00	0.00	0.15	0.21	0.00	0.00	0.00	0.00	0.00	0.00
39	45	47.5	61.5	0.0	0.0	13.5	13.5	0.00	0.00	0.15	0.21	0.00	0.00	0.00	0.00	0.00	0.00
44	38	48.8	72.2	0.0	0.0	16.1	21.0	0.00	0.00	0.16	0.20	0.00	0.00	0.00	0.00	0.00	0.00
49	35	52.1	72.2	0.0	0.0	15.0	28.5	0.00	0.00	0.17	0.25	0.00	0.00	0.00	0.00	0.00	0.00
54	34	57.0	74.6	0.0	0.0	19.3	27.0	0.00	0.00	0.21	0.31	0.00	0.00	0.00	0.00	0.00	0.00
59	34	62.1	52.1	0.0	0.0	17.9	23.2	0.00	0.00	0.21	0.27	0.00	0.00	0.00	0.00	0.00	0.00
04	40	61.6	52.1	0.0	0.0	14.9	22.4	0.00	0.00	0.17	0.25	0.00	0.00	0.00	0.00	0.00	0.00
09	37	55.5	83.2	0.0	0.0	10.0	15.0	0.00	0.00	0.14	0.21	0.00	0.00	0.00	0.00	0.00	0.00
14	36	46.5	70.4	0.0	0.0	7.7	11.6	0.00	0.00	0.12	0.18	0.00	0.00	0.00	0.00	0.00	0.00
19	36	39.3	58.5	0.0	0.0	6.6	9.5	0.00	0.00	0.07	0.11	0.00	0.00	0.00	0.00	0.00	0.00
24	36	36.0	54.1	0.0	0.0	12.1	18.2	0.00	0.00	0.06	0.09	0.00	0.00	0.00	0.00	0.00	0.00
29	34	36.6	55.2	0.0	0.0	15.6	23.4	0.00	0.00	0.06	0.09	0.00	0.00	0.00	0.00	0.00	0.00
34	36	43.1	64.6	0.0	0.0	18.2	27.3	0.00	0.00	0.17	0.26	0.00	0.00	0.00	0.00	0.00	0.00
39	40	50.5	75.1	0.0	0.0	18.6	27.9	0.00	0.00	0.21	0.32	0.00	0.00	0.00	0.00	0.00	0.00
44	34	60.2	50.2	0.0	0.0	17.5	26.8	0.00	0.00	0.23	0.34	0.00	0.00	0.00	0.00	0.00	0.00
49	38	67.8	101.6	0.0	0.0	15.1	22.6	0.00	0.00	0.15	0.28	0.00	0.00	0.00	0.00	0.00	0.00
54	43	77.2	115.6	0.0	0.0	15.5	23.2	0.00	0.00	0.15	0.28	0.00	0.00	0.00	0.00	0.00	0.00
59	39	92.5	135.7	0.0	0.0	15.1	23.2	0.00	0.00	0.15	0.28	0.00	0.00	0.00	0.00	0.00	0.00
00	7	104.4	156.6	0.0	0.0	18.5	27.8	0.00	0.00	0.15	0.28	0.00	0.00	0.00	0.00	0.00	0.00
AVG	449	45.5	65.1	0.1	0.2	14.2	21.9	0.05	0.08	0.16	0.26	0.00	0.00	0.00	0.00	0.00	0.00
TOT	1123			1.2E-04	1.8E-04	1.6E-02	2.4E-02	6.2E-01	5.3E-01	1.8E+00	2.8E+00	2.1E+00	3.1E+00	1.8E+01	0.0E+00	2.1E+02	2.1E+02

COKE CVEN EMISSION REPORT

TEST 19
DATE AUGUST 13, 1975
START TIME 11:11:04

CVEN 3-5
PPI TEST A1

FIVE SECOND AVERAGE

ENG SEC		FIVE SECOND TOTAL VOLUME FLUX		FIVE SECOND AVERAGE													
		FFM MEAS	SEC2 CCPA	PPM MEAS	HC CCRP	FFM MEAS	NOX CORR	% MEAS	THC CORR	% MEAS	CC CORR	% MEAS	CO2 CORR	% MEAS	% MEAS	% MEAS	% MEAS
04	2	20.4	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	19.4	
05	7	22.9	61.6	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.21	0.0	0.0	2.4	0.0	19.4	
14	7	11.6	35.4	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.15	0.0	0.0	2.4	0.0	19.5	
19	7	15.5	44.6	0.0	0.0	0.0	0.0	0.00	0.00	0.11	0.32	0.0	0.0	2.4	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	2.4	0.0	19.4	
29	3	11.1	22.5	0.0	0.0	0.0	0.0	0.00	0.00	0.05	0.14	0.0	0.0	2.4	0.0	19.4	
34	2	18.3	16.6	0.0	0.0	0.1	0.1	0.00	0.00	0.05	0.08	0.0	0.0	2.4	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	2.4	0.0	19.4	
44	4	10.2	35.0	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	10.3	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	14.5	10.1	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.21	0.0	0.0	2.4	0.0	19.5	
09	6	14.7	44.7	0.0	0.0	0.0	0.0	0.00	0.00	0.06	0.24	0.0	0.0	2.4	0.0	19.5	
14	7	15.3	44.0	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.25	0.0	0.0	2.4	0.0	19.5	
19	5	15.3	44.0	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.29	0.0	0.0	2.5	0.0	19.5	
24	5	14.7	44.7	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	0.05	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	72.7	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.25	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	72.0	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	36.7	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.16	0.0	0.0	2.4	0.0	19.5	
59	3	26.0	45.4	0.0	0.0	0.0	1.9	0.00	0.00	0.08	0.14	0.0	0.0	2.4	0.0	19.5	
04	6	22.0	66.3	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.21	0.0	0.0	2.4	0.0	19.5	
09	7	16.5	45.4	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	35.5	0.3	0.6	0.0	0.0	0.00	0.00	0.07	0.22	0.1	0.2	2.4	0.0	19.6	
19	12	10.4	55.5	5.0	15.1	1.4	5.3	0.50	1.50	0.22	0.67	0.1	0.2	2.4	0.0	19.6	
24	10	55.4	178.1	9.0	27.1	7.8	23.4	2.86	8.58	0.50	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	19.4	
34	9	194.2	582.7	16.5	50.7	12.5	37.4	7.00	21.00	2.25	6.86	0.9	2.4	3.7	0.0	17.3	
39	8	241.0	725.1	20.2	60.6	13.7	41.1	7.00	21.00	2.44	7.23	0.9	2.6	4.2	0.2	19.4	
44	7	297.4	852.3	15.5	48.4	14.2	42.5	7.00	21.00	2.36	7.07	0.9	2.6	4.8	0.7	15.5	
49	7	364.4	1052.7	8.2	24.6	11.7	35.0	6.56	20.86	2.14	6.45	0.8	2.2	5.1	1.0	15.8	
54	8	381.4	1144.7	4.1	12.1	11.3	33.8	6.82	20.46	1.46	4.98	0.6	1.7	5.3	0.1	14.0	
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	0.5	4.5	0.0	17.5	
09	7	250.1	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	872.4	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	245.6	746.7	0.0	0.0	3.3	10.0	0.42	1.26	0.20	0.55	0.1	0.3	3.5	0.0	18.8	
24	6	221.7	677.0	0.0	0.0	1.9	5.6	0.24	0.72	0.16	0.45	0.1	0.2	3.4	0.0	18.9	
29	6	205.4	621.8	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	16	207.7	311.5	0.0	0.0	5.4	6.5	0.34	0.21	0.15	0.25	0.1	0.1	3.4	0.0	18.9	
39	8	228.1	644.2	0.0	0.0	5.5	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	5.2	16.5	0.50	0.90	0.32	0.56	0.1	0.2	3.4	0.0	18.8	
49	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	3.3	0.0	18.9	
59	14	223.8	671.3	0.0	0.0	4.9	14.8	0.14	0.42	0.14	0.43	0.1	0.2	3.2	0.0	18.9	
04	16	204.1	612.1	0.0	0.0	3.2	5.7	0.02	0.06	0.07	0.20	0.1	0.2	3.1	0.0	19.1	
09	15	191.0	572.0	0.0	0.0	1.8	5.5	0.00	0.00	0.11	0.32	0.1	0.2	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	
19	4	145.0	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	332.0	1.8	5.1	3.4	9.7	1.12	3.33	0.41	1.17	0.2	0.4	3.1	0.0	18.4	
TOT	390	5.6E+02	1.5E+01	8.1E-04	2.4E-02	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

CVEN 3-4
PRI TEST K2

TEST 20
DATE AUGUST 14, 1972
START TIME 11:06:06

FIVE SECOND AVERAGE

END ING	FIVE SECOND TOTAL	SEC VOLUME NC	PPM SC2		PPM NC		PPM NOX		% TFC		% CC		% CO2		% H2C		% H2		% O2	
			MEAS	CCRF	MEAS	CCRF	MEAS	CCRF	MEAS	CCRF	MEAS	CCRF	MEAS	CCRF	MEAS	CCRF	MEAS	CCRF	MEAS	CCRF
09	5	6.5	15.6	0.0	0.0	0.0	4.9	7.4	0.00	0.00	0.00	0.00	0.0	0.0	2.2	0.0	0.0	0.0	19.4	19.4
14	13	18.7	56.0	0.0	0.0	0.0	5.0	15.0	0.00	0.00	0.00	0.00	0.0	0.0	2.2	0.0	0.0	0.0	19.4	19.4
19	15	31.2	51.0	0.0	0.0	0.0	8.8	26.5	0.00	0.00	0.00	0.00	0.0	0.0	2.2	0.0	0.0	0.0	19.4	19.4
24	12	51.3	154.0	0.0	0.0	0.0	28.7	86.1	0.02	0.06	0.10	0.30	0.0	0.0	2.4	0.0	0.0	0.0	19.1	19.1
29	13	73.8	221.3	0.0	0.0	0.0	55.6	166.9	0.16	0.48	0.23	0.69	0.0	0.0	2.6	0.0	0.0	0.0	18.9	18.9
34	13	95.2	291.6	0.0	0.0	0.0	42.0	186.0	0.20	0.60	0.30	0.91	0.8	2.3	2.8	0.0	0.0	0.0	18.9	18.9
39	12	124.8	374.3	0.2	1.0	1.0	45.6	196.7	0.20	0.60	0.27	0.81	0.5	1.5	3.0	0.0	0.0	0.0	18.8	18.8
44	8	142.5	428.6	0.5	2.7	2.7	70.2	210.5	0.30	0.90	0.25	0.74	0.4	1.2	3.0	0.0	0.0	0.0	18.9	18.9
49	5	183.6	214.1	1.0	1.3	1.3	44.5	81.4	0.24	0.36	0.23	0.29	0.3	0.3	3.0	0.0	0.0	0.0	19.0	19.0
54	3	191.7	231.5	0.2	0.4	0.4	48.7	64.9	0.16	0.24	0.20	0.24	0.2	0.2	3.0	0.0	0.0	0.0	19.1	19.1
59	2	181.6	96.0	0.0	0.0	0.0	31.2	15.0	0.06	0.00	0.02	0.06	0.1	0.1	2.5	0.0	0.0	0.0	19.1	19.1
04	7	157.4	281.0	0.0	0.0	0.0	19.4	48.4	0.00	0.00	0.01	0.01	0.1	0.1	2.5	0.0	0.0	0.0	19.2	19.2
09	2	135.4	165.8	0.0	0.0	0.0	11.6	14.4	0.00	0.00	0.01	0.01	0.1	0.1	2.4	0.0	0.0	0.0	19.2	19.2
14	6	114.0	280.6	0.0	0.0	0.0	10.1	23.8	0.00	0.00	0.01	0.01	0.1	0.1	2.2	0.0	0.0	0.0	19.3	19.3
19	12	106.0	271.5	0.0	0.0	0.0	5.7	23.3	0.00	0.00	0.01	0.01	0.1	0.1	2.4	0.0	0.0	0.0	19.2	19.2
24	7	92.2	175.3	0.0	0.0	0.0	11.4	15.6	0.00	0.00	0.01	0.01	0.1	0.1	2.3	0.0	0.0	0.0	19.3	19.3
29	8	92.0	155.1	0.0	0.0	0.0	10.5	19.4	0.00	0.00	0.00	0.00	0.1	0.1	2.4	0.0	0.0	0.0	19.3	19.3
34	15	95.6	266.8	0.0	0.0	0.0	5.5	29.8	0.00	0.00	0.00	0.00	0.2	0.2	2.4	0.0	0.0	0.0	19.4	19.4
39	2	83.7	53.8	0.0	0.0	0.0	9.6	6.3	0.00	0.00	0.00	0.00	0.2	0.2	2.3	0.0	0.0	0.0	19.4	19.4
44	15	81.2	258.6	0.0	0.0	0.0	5.7	29.2	0.00	0.00	0.01	0.02	0.1	0.1	2.4	0.0	0.0	0.0	19.3	19.3
49	15	75.8	235.3	0.0	0.0	0.0	5.0	27.1	0.00	0.00	0.00	0.00	0.1	0.1	2.4	0.0	0.0	0.0	19.3	19.3
54	16	75.2	225.6	0.0	0.0	0.0	8.5	25.4	0.00	0.00	0.01	0.02	0.1	0.1	2.4	0.0	0.0	0.0	19.3	19.3
59	1	80.2	46.5	0.0	0.0	0.0	9.1	5.5	0.00	0.00	0.00	0.00	0.1	0.1	2.4	0.0	0.0	0.0	19.3	19.3
04	5	81.8	201.0	0.0	0.0	0.0	16.3	39.6	0.00	0.00	0.00	0.00	0.1	0.1	2.4	0.0	0.0	0.0	19.3	19.3
09	8	82.3	246.8	0.0	0.0	0.0	14.5	43.6	0.00	0.00	0.00	0.00	0.1	0.1	2.4	0.0	0.0	0.0	19.3	19.3
14	14	82.8	246.3	0.0	0.0	0.0	16.6	49.9	0.00	0.00	0.01	0.04	0.1	0.1	2.4	0.0	0.0	0.0	19.2	19.2
19	7	95.8	165.4	0.0	0.0	0.0	12.5	24.7	0.34	0.24	0.03	0.00	0.1	0.1	2.4	0.0	0.0	0.0	19.1	19.1
24	4	117.0	135.4	0.0	0.0	0.0	11.5	15.4	1.42	1.80	0.26	0.37	0.2	0.2	2.5	0.0	0.0	0.0	19.0	19.0
29	14	125.1	315.4	0.0	0.0	0.0	11.8	35.4	1.16	3.48	0.40	1.20	0.2	0.2	2.7	0.0	0.0	0.0	18.9	18.9
34	16	110.1	350.4	0.0	0.0	0.0	8.1	24.4	0.44	1.32	0.18	0.54	0.2	0.2	2.8	0.0	0.0	0.0	19.0	19.0
39	12	115.0	326.1	0.0	0.0	0.0	5.3	16.0	0.10	0.30	0.06	0.16	0.1	0.1	2.7	0.0	0.0	0.0	19.1	19.1
44	3	103.8	124.8	0.0	0.0	0.0	6.3	7.5	0.00	0.00	0.01	0.02	0.1	0.1	2.5	0.0	0.0	0.0	19.1	19.1
45	0	107.0	0.0	0.0	0.0	0.0	5.5	0.0	0.00	0.00	0.04	0.00	0.1	0.1	2.5	0.0	0.0	0.0	19.0	19.0
AVC	111	101.4	215.2	0.1	0.2	0.2	21.2	45.5	0.15	0.32	0.05	0.21	0.1	0.1	2.5	0.0	0.0	0.0	19.2	19.2
TOT	296			2.1E-05	6.2E-05	6.2E-03	1.0E-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	0.0E+00	0.0E+00	0.0E+00	5.7E+01	5.7E+01

CCKE EVEN EMISSION REPORT

TEST #1
DATE AUGUST 15, 1973
START TIME 10:56:15

OVEN 3-3 FLOW STOPPED ON #3
PRT TEST K3

FIVE SECOND AVERAGE

ENL INC	FIVE SECOND TOTAL	PPM MEAS	PPM NO	PPM NOX	% TPO	% CC	% CO2	% H2O	% H2	% O2
SEC NO	VOLUME FLOW	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS
19	73	6.4	6.4	2.1	2.1	0.8	0.8	0.00	0.00	0.09
24	79	24.2	24.2	3.0	3.0	5.7	5.7	0.02	0.02	0.19
25	74	65.4	65.4	2.9	2.9	32.2	32.2	0.22	0.22	0.52
34	74	85.7	85.7	2.5	2.5	42.6	42.6	0.30	0.30	0.58
39	75	115.9	115.9	0.4	0.4	74.3	74.3	0.30	0.30	0.49
44	75	138.6	138.6	0.0	0.0	75.4	75.4	0.30	0.30	0.41
49	75	132.6	132.6	0.0	0.0	64.1	64.1	0.22	0.22	0.35
54	75	120.3	120.3	0.0	0.0	52.6	52.6	0.20	0.20	0.28
59	75	130.7	130.7	0.0	0.0	34.1	34.1	0.34	0.34	0.41
64	75	135.2	135.2	0.0	0.0	30.8	30.8	0.56	0.56	0.52
69	73	185.2	185.2	0.7	0.7	35.8	35.8	1.16	1.16	0.82
74	68	247.4	247.4	2.1	2.1	52.0	52.0	1.40	1.40	0.88
79	69	316.6	316.6	0.0	0.0	63.4	63.4	1.28	1.28	0.75
84	70	340.4	340.4	0.4	0.4	57.4	57.4	1.14	1.14	0.63
89	68	336.5	336.5	3.1	3.1	43.4	43.4	1.76	1.76	0.50
94	69	380.1	380.1	7.2	7.2	40.2	40.2	2.52	2.52	1.67
99	34	513.5	513.5	6.1	6.1	46.5	46.5	4.74	4.74	1.70
104	65	425.7	425.7	3.7	3.7	56.2	56.2	4.22	4.22	1.41
109	71	675.6	675.6	5.8	5.8	45.8	45.8	3.16	3.16	0.55
114	74	644.8	644.8	12.6	12.6	28.5	28.5	4.10	4.10	1.04
119	74	617.5	617.5	19.5	19.5	24.8	24.8	6.80	6.80	1.70
124	73	622.1	622.1	28.5	28.5	24.4	24.4	6.94	6.94	2.27
129	80	667.1	667.1	31.5	31.5	24.1	24.1	6.96	6.96	2.51
134	76	753.5	753.5	33.0	33.0	22.5	22.5	6.56	6.56	2.53
139	76	816.6	816.6	34.2	34.2	24.8	24.8	6.98	6.98	2.44
144	73	885.5	885.5	35.1	35.1	27.0	27.0	6.56	6.56	2.33
149	64	952.7	952.7	37.3	37.3	30.4	30.4	6.56	6.56	2.16
154	57	1024.4	1024.4	40.5	40.5	30.2	30.2	7.00	7.00	2.05
159	43	1107.2	1107.2	43.8	43.8	34.5	34.5	6.52	6.52	1.57
164	37	1236.8	1236.8	46.8	46.8	35.6	35.6	6.94	6.94	2.04
169	45	1306.0	1306.0	48.5	48.5	42.7	42.7	6.58	6.58	2.14
174	46	1512.4	1512.4	45.7	45.7	45.8	45.8	6.94	6.94	2.19
179	60	1651.6	1651.6	50.5	50.5	57.5	57.5	6.52	6.52	2.23
184	60	1793.0	1793.0	50.4	50.4	66.9	66.9	6.52	6.52	2.10
189	80	1955.6	1955.6	52.8	52.8	78.6	78.6	7.00	7.00	2.05
194	65	2156.0	2156.0	54.0	54.0	104.4	104.4	7.00	7.00	2.02
199	72	2371.1	2371.1	47.1	47.1	145.8	145.8	7.00	7.00	2.06
204	69	2586.5	2586.5	40.3	40.3	205.2	205.2	7.00	7.00	2.05
209	72	2750.7	2750.7	40.5	40.5	245.5	245.5	7.00	7.00	1.78
214	70	2532.8	2532.8	35.2	35.2	278.5	278.5	6.54	6.54	1.65
219	69	3113.7	3113.7	28.5	28.5	313.5	313.5	6.94	6.94	1.72
224	70	3252.5	3252.5	28.1	28.1	318.5	318.5	6.54	6.54	1.43
229	72	3380.6	3380.6	22.5	22.5	318.8	318.8	6.52	6.52	1.38
234	73	3471.2	3471.2	13.6	13.6	319.0	319.0	6.88	6.88	1.31
239	70	3405.7	3405.7	7.0	7.0	318.7	318.7	4.74	4.74	0.51
244	68	3430.4	3430.4	3.6	3.6	318.8	318.8	2.72	2.72	0.51
249	70	3311.7	3311.7	1.3	1.3	318.5	318.5	1.64	1.64	0.32
254	68	3122.5	3122.5	0.0	0.0	308.1	308.1	1.14	1.14	0.21
259	72	2542.4	2542.4	0.2	0.2	243.6	243.6	0.50	0.50	0.19
264	59	2731.8	2731.8	1.0	1.0	215.3	215.3	0.80	0.80	0.19
269	42	2581.7	2581.7	3.4	3.4	184.7	184.7	1.08	1.08	0.19
274	34	2432.7	2432.7	1.3	1.3	145.4	145.4	1.20	1.20	0.20
279	11	2274.2	2274.2	0.0	0.0	154.0	154.0	0.90	0.90	0.13
284	11	2115.2	2115.2	0.0	0.0	146.5	146.5	0.58	0.58	0.12
289	45	11592.7	11592.7	0.0	0.0	136.5	136.5	0.44	0.44	0.12
294	12	1898.6	1898.6	0.0	0.0	125.0	125.0	0.40	0.40	0.19
299	11	1811.1	1811.1	0.0	0.0	114.2	114.2	0.40	0.40	0.08
304	10	1751.6	1751.6	0.0	0.0	103.5	103.5	0.40	0.40	0.13
309	08	1667.2	1667.2	0.0	0.0	102.4	102.4	0.30	0.30	0.12
AVC	722	1453.4	1453.4	16.7	16.7	113.7	113.7	3.82	3.82	1.12
TCT	3539			9.4E-02	9.4E-02	6.1E-01	6.1E-01	2.1E+02	2.1E+02	6.4E+01

CCKE CVEN-EMISSION REPORT

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

CVEN 3-11
PRI TEST

FIVE SECOND AVERAGE

ENC ING	FIVE SECOND TOTAL	SEC VOLUME FLOA	NO	PPM SC2		PPM NC		PPM NOX		% TMC		% CC		% CO2		% H2C		% H2		% O2 O	
				MEAS	CLFF	MEAS	CLFF	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
09	18	456.4	456.4	52.0	43.0	0.0	0.0	0.0	0.0	0.05	0.05	1.73	1.73	5.1	5.1	3.6	3.6	0.0	0.0	15.0	15.0
14	30	496.4	456.4	43.0	43.0	2.7	2.7	35.9	35.9	0.10	0.10	1.69	1.69	6.5	6.5	4.1	4.1	0.0	0.0	15.0	15.0
19	11	383.4	383.4	28.8	28.8	35.9	35.9	122.2	122.2	0.00	0.00	1.74	1.74	5.7	5.7	4.6	4.6	0.0	0.0	12.4	12.4
24	3	195.6	155.6	13.4	13.4	9.5	9.5	170.1	170.1	0.00	0.00	0.82	0.82	2.3	2.3	4.1	4.1	0.0	0.0	13.4	13.4
29	1	77.5	77.5	6.4	6.4	153.8	153.8	111.7	111.7	0.00	0.00	0.55	0.55	1.6	1.6	3.7	3.7	0.0	0.0	12.1	12.1
34	2	11.1	11.1	4.3	4.3	75.1	75.1	45.3	45.3	0.00	0.00	0.42	0.42	1.2	1.2	3.2	3.2	0.0	0.0	17.9	17.9
39	3	2.0	2.0	0.0	0.0	33.5	33.5	25.8	25.8	0.00	0.00	0.19	0.19	0.7	0.7	2.8	2.8	0.0	0.0	18.6	18.6
44	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.13	0.13	0.2	0.2	2.7	2.7	0.0	0.0	19.1	19.1
49	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.10	0.2	0.2	2.5	2.5	0.0	0.0	19.6	19.6
54	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.10	0.1	0.1	2.6	2.6	0.0	0.0	19.7	19.7
59	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.08	0.08	0.1	0.1	2.5	2.5	0.0	0.0	19.8	19.8
04	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.04	0.3	0.3	2.6	2.6	0.0	0.0	19.5	19.5
09	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.04	0.3	0.3	2.6	2.6	0.0	0.0	19.5	19.5
14	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.04	0.3	0.3	2.6	2.6	0.0	0.0	19.5	19.5
19	38	26.8	26.8	0.0	0.0	5.7	5.7	9.7	9.7	4.46	4.46	0.55	0.55	0.3	0.3	4.1	4.1	3.9	3.9	18.8	18.8
24	43	368.0	368.0	1.8	1.8	5.5	5.5	9.5	9.5	13.36	13.36	2.89	2.89	1.0	1.0	4.1	4.1	3.9	3.9	18.8	18.8
29	40	904.1	904.1	16.0	16.0	5.8	5.8	9.8	9.8	14.00	14.00	3.76	3.76	1.5	1.5	7.0	7.0	18.4	18.4	12.1	12.1
34	32	1778.1	1478.1	31.5	31.5	16.0	16.0	16.0	16.0	14.00	14.00	3.67	3.67	1.6	1.6	5.2	5.2	24.7	24.7	9.2	9.2
39	14	1728.0	1728.0	24.6	24.6	55.5	55.5	55.5	55.5	13.48	13.48	3.38	3.38	1.2	1.2	9.5	9.5	18.8	18.8	9.7	9.7
44	11	1787.6	1787.6	11.5	11.5	95.6	95.6	10.70	10.70	10.70	10.70	2.32	2.32	0.7	0.7	8.2	8.2	8.6	8.6	12.3	12.3
49	32	1854.0	1854.0	7.4	7.4	115.5	115.5	11.30	11.30	11.30	11.30	1.51	1.51	0.7	0.7	6.2	6.2	4.0	4.0	14.1	14.1
54	34	1824.5	1824.5	7.5	7.5	106.3	106.3	13.58	13.58	13.58	13.58	2.73	2.73	0.8	0.8	5.9	5.9	9.6	9.6	13.8	13.8
59	12	1743.4	1743.4	19.4	19.4	60.7	60.7	80.7	80.7	13.24	13.24	2.99	2.99	0.9	0.9	7.0	7.0	12.5	12.5	12.4	12.4
04	10	1516.0	1516.0	18.7	18.7	60.4	60.4	60.4	60.4	9.08	9.08	2.63	2.63	0.6	0.6	7.3	7.3	5.0	5.0	13.2	13.2
09	7	1562.4	1562.4	3.0	3.0	54.9	54.9	54.9	54.9	6.30	6.30	1.30	1.30	0.5	0.5	6.2	6.2	0.3	0.3	15.1	15.1
14	7	1217.5	1217.5	3.4	3.4	57.7	57.7	57.7	57.7	4.30	4.30	0.92	0.92	0.4	0.4	4.9	4.9	0.0	0.0	16.3	16.3
19	15	1685.3	1685.3	2.1	2.1	53.5	53.5	53.5	53.5	2.50	2.50	0.56	0.56	0.4	0.4	4.1	4.1	0.0	0.0	17.3	17.3
20	3	1610.2	1610.2	2.3	2.3	45.2	45.2	45.2	45.2	1.80	1.80	0.37	0.37	0.2	0.2	3.7	3.7	0.0	0.0	17.8	17.8
AVG	175	697.3	697.3	10.4	10.4	58.5	58.5	58.5	58.5	4.93	4.93	1.42	1.42	1.4	1.4	4.8	4.8	4.0	4.0	15.6	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	2.1E+01	2.7E+01	2.7E+01	5.6E+01	5.6E+01		

CCKE CVEN EMISSION REPORT

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

CVEN 3-12
MPI TEST W12

FIVE SECOND AVERAGE

END ING	FIVE SECOND TOTAL	SEC VOLUME	ND FLW	FFM+SC2		FFM AC		FFM ACX		3 TFC		3 CC		3 CO2		3 H2C		3 C2 C	
				MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
54	23			C.C	C.C	C.C	C.C	C.C	C.C	C.C	C.C	0.11	0.11	0.0	0.0	0.11	0.11	0.0	0.0
55	13			C.C	C.C	C.C	C.C	7.4	7.4	0.00	0.00	0.10	0.10	0.0	0.0	0.10	0.10	0.0	0.0
04	11			C.C	C.C	C.C	C.C	26.0	26.0	0.00	0.00	0.24	0.24	0.0	0.0	0.24	0.24	0.0	0.0
09	8			C.C	C.C	C.C	C.C	28.0	28.0	0.04	0.04	0.31	0.31	0.0	0.0	0.31	0.31	0.0	0.0
14	7			C.C	C.C	C.C	C.C	24.6	24.6	0.16	0.16	0.31	0.31	0.0	0.0	0.31	0.31	0.0	0.0
19	5			C.C	C.C	C.C	C.C	27.5	27.5	0.28	0.28	0.35	0.35	0.0	0.0	0.35	0.35	0.0	0.0
24	5			C.C	C.C	C.C	C.C	25.2	25.2	0.30	0.30	0.43	0.43	0.0	0.0	0.43	0.43	0.0	0.0
29	6			C.C	C.C	C.C	C.C	27.3	27.3	0.26	0.26	0.35	0.35	0.0	0.0	0.35	0.35	0.0	0.0
34	5			C.C	C.C	C.C	C.C	18.6	18.6	0.18	0.18	0.22	0.22	0.0	0.0	0.22	0.22	0.0	0.0
35	5			C.C	C.C	C.C	C.C	15.9	15.9	0.14	0.14	0.27	0.27	0.0	0.0	0.27	0.27	0.0	0.0
44	6			C.C	C.C	C.C	C.C	13.8	13.8	0.18	0.18	0.26	0.26	0.0	0.0	0.26	0.26	0.0	0.0
49	5			C.C	C.C	C.C	C.C	11.2	11.2	0.16	0.16	0.23	0.23	0.0	0.0	0.23	0.23	0.0	0.0
54	5			C.C	C.C	C.C	C.C	10.0	10.0	0.20	0.20	0.25	0.25	0.0	0.0	0.25	0.25	0.0	0.0
55	36			C.C	C.C	C.C	C.C	11.0	11.0	1.74	1.74	0.21	0.21	0.0	0.0	0.21	0.21	0.0	0.0
04	45			C.C	C.C	C.C	C.C	32.1	32.1	9.46	9.46	1.43	1.43	0.0	0.0	1.43	1.43	0.0	0.0
09	31			C.C	C.C	C.C	C.C	70.2	70.2	13.56	13.56	2.55	2.55	0.0	0.0	2.55	2.55	0.0	0.0
14	7			C.C	C.C	C.C	C.C	65.2	65.2	12.00	12.00	2.90	2.90	0.0	0.0	2.90	2.90	0.0	0.0
19	6			C.C	C.C	C.C	C.C	51.1	51.1	7.02	7.02	1.75	1.75	0.0	0.0	1.75	1.75	0.0	0.0
24	8			C.C	C.C	C.C	C.C	37.8	37.8	4.64	4.64	1.06	1.06	0.0	0.0	1.06	1.06	0.0	0.0
25	6			C.C	C.C	C.C	C.C	25.4	25.4	3.58	3.58	0.83	0.83	0.0	0.0	0.83	0.83	0.0	0.0
34	7			C.C	C.C	C.C	C.C	16.6	16.6	2.52	2.52	0.67	0.67	0.0	0.0	0.67	0.67	0.0	0.0
39	9			C.C	C.C	C.C	C.C	8.8	8.8	1.96	1.96	0.46	0.46	0.0	0.0	0.46	0.46	0.0	0.0
44	11			C.C	C.C	C.C	C.C	5.5	5.5	1.34	1.34	0.33	0.33	0.0	0.0	0.33	0.33	0.0	0.0
45	7			C.C	C.C	C.C	C.C	2.3	2.3	1.10	1.10	0.26	0.26	0.0	0.0	0.26	0.26	0.0	0.0
54	17			C.C	C.C	C.C	C.C	1.4	1.4	1.26	1.26	0.20	0.20	0.0	0.0	0.20	0.20	0.0	0.0
59	24			C.C	C.C	C.C	C.C	3.0	3.0	2.20	2.20	0.21	0.21	0.0	0.0	0.21	0.21	0.0	0.0
04	29			C.C	C.C	C.C	C.C	5.0	5.0	6.44	6.44	0.71	0.71	0.0	0.0	0.71	0.71	0.0	0.0
05	25			C.C	C.C	C.C	C.C	14.5	14.5	12.02	12.02	1.41	1.41	0.0	0.0	1.41	1.41	0.0	0.0
AVC	162			3.6	3.6	21.4	21.4	21.3	21.3	3.00	3.00	0.69	0.69	0.0	0.0	0.69	0.69	0.0	0.0
ICT	378			1.0E+00	1.0E+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	0.0E+00	0.0E+00	1.0E+01	1.0E+01	7.1E-01	7.1E-01

CCKE CVEN EMISSION REPORT

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

OVEN 3-3 LCM FLCH - FANS BURNED CUT
PRI TEST K4

FIVE SECOND AVERAGE

SEC NO	FIVE SECOND TOTAL VOLUME FLOW	PPM SCZ		PPM NC		PPM NOX		% THC		% CC		% CO2		% P2C		% P2		% O2	
		MEAS	CLFF	MEAS	CCRP	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
05	1	31.2	36.0	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.02	0.0	0.0	1.9	0.0	0.0	0.0	19.4	19.4
14	6	18.8	21.3	0.0	0.0	0.0	0.0	0.00	0.00	0.01	0.01	0.0	0.0	1.5	0.0	0.1	0.1	19.5	19.5
19	5	35.6	106.5	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.05	0.0	0.0	2.0	0.0	0.1	0.1	19.4	19.4
24	7	33.1	55.4	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.12	0.0	0.0	1.5	0.0	0.1	0.1	19.4	19.4
29	3	47.6	51.5	0.0	0.0	0.0	0.0	0.00	0.00	0.07	0.17	0.0	0.0	1.9	0.0	0.0	0.0	18.9	18.9
34	9	45.1	141.2	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.06	0.0	0.0	1.5	0.0	0.0	0.0	18.9	18.9
39	9	40.7	122.0	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.06	0.0	0.0	2.0	0.0	0.1	0.1	19.0	19.0
44	11	31.5	47.5	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.02	0.0	0.0	2.0	0.0	0.0	0.0	16.6	16.6
49	10	36.8	62.1	0.0	0.0	0.0	0.0	0.00	0.00	0.10	0.21	0.0	0.0	2.0	0.0	0.1	0.1	15.9	15.9
54	11	17.4	25.1	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.06	0.0	0.0	1.9	0.0	0.0	0.0	17.7	17.7
59	9	27.5	42.5	0.0	0.0	0.0	0.0	0.00	0.00	0.04	0.07	0.0	0.0	2.0	0.0	0.0	0.0	16.2	16.2
04	7	23.6	65.1	0.0	0.0	0.0	0.0	0.00	0.00	0.03	0.05	0.0	0.0	1.9	0.0	0.0	0.0	18.2	18.2
09	4	20.0	16.2	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.06	0.0	0.0	2.0	0.0	0.0	0.0	19.3	19.3
14	6	30.8	78.1	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.05	0.0	0.0	2.0	0.0	0.0	0.0	19.3	19.3
19	7	33.0	95.0	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.07	0.0	0.0	2.0	0.0	0.0	0.0	19.3	19.3
24	4	20.8	62.3	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.09	0.0	0.0	2.0	0.0	0.0	0.0	19.2	19.2
29	6	28.1	50.2	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.07	0.0	0.0	2.0	0.0	0.0	0.0	19.2	19.2
34	9	32.6	100.6	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.05	0.0	0.0	2.0	0.0	0.0	0.0	19.2	19.2
39	10	33.7	101.2	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.05	0.0	0.0	2.0	0.0	0.0	0.0	19.2	19.2
44	9	35.0	55.0	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.11	0.0	0.0	2.0	0.0	0.1	0.1	19.1	19.1
49	8	81.0	243.0	0.0	0.0	0.0	0.0	0.08	0.24	0.04	0.11	0.0	0.0	2.0	0.0	0.1	0.1	19.1	19.1
54	10	142.3	324.3	0.0	0.0	0.0	0.0	3.20	5.60	0.61	1.82	0.0	0.0	2.0	0.0	0.1	0.1	18.9	18.9
59	12	200.0	553.3	0.0	0.0	0.0	0.0	4.06	9.93	0.50	2.18	0.0	0.0	2.1	0.0	0.1	0.1	18.2	18.2
04	8	30.6	60.5	0.0	0.0	0.0	0.0	4.68	12.93	0.92	2.52	0.4	1.0	3.1	0.1	0.1	0.1	16.3	16.3
09	8	42.1	761.2	0.0	0.0	0.0	0.0	6.58	18.84	1.34	3.58	0.6	1.6	3.8	0.1	0.1	0.1	15.1	15.1
14	9	55.8	1674.0	0.0	0.0	0.0	0.0	6.20	11.40	1.27	2.47	1.5	2.7	5.0	0.1	0.1	0.1	14.9	14.9
19	7	706.2	2100.6	0.0	0.0	0.0	0.0	6.22	18.66	1.33	3.98	1.8	5.4	5.3	0.1	0.1	0.1	14.3	14.3
24	6	83.3	2455.8	0.0	0.0	0.0	0.0	6.56	20.88	1.54	4.61	1.1	3.4	5.5	0.1	0.1	0.1	13.0	13.0
29	4	827.3	1508.8	0.0	0.0	0.0	0.0	6.58	20.94	1.63	4.90	0.8	2.3	5.8	0.6	0.6	0.6	11.1	11.1
34	6	765.1	1871.6	0.0	0.0	0.0	0.0	5.14	11.58	1.21	2.81	1.3	3.2	6.0	0.1	0.1	0.1	14.3	14.3
35	2	721.2	1081.8	0.0	0.0	0.0	0.0	1.58	4.11	0.59	1.50	1.4	3.4	4.5	0.1	0.1	0.1	14.7	14.7
AVG	89	185.5	455.2	0.0	0.0	0.0	0.0	1.78	4.76	0.41	1.05	0.3	0.8	2.8	0.1	0.1	0.1	11.8	11.8
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	3.6E+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

FIVE SECOND AVERAGE

END ING	FIVE SECOND TITIAL VOLUME UND FLOW	PPM SO ₂		PPM NO		PPM NOX		% THC		% CO		% CO ₂		% H ₂ O		% H ₂		% O ₂	
		MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR	MEAS	CORR
44	28	26.7	26.7	0.0	0.0	0.1	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
49	75	20.9	20.9	0.0	0.0	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	66	29.3	29.3	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	68	33.0	33.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04	72	42.7	42.7	0.0	0.0	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09	75	36.7	36.7	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	71	28.9	28.9	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	70	32.6	32.6	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	67	36.6	36.6	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	73	37.6	37.6	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	71	24.4	24.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39	71	8.8	8.8	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44	70	17.3	17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	75	28.3	28.3	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54	84	26.0	26.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59	79	31.1	31.1	0.0	0.0	1.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	0.8	0.8	0.0	0.0	0.0	0.0
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	1.0	1.0	0.0	0.0	0.0	0.0
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	1.1	1.1	0.0	0.0	0.0	0.0
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	1.1	0.0	0.0	0.0	0.0
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	1.1	0.0	0.0	0.0	0.0
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	1.0	0.0	0.0	0.0	0.0
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	0.9	0.0	0.0	0.0	0.0
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	0.9	0.0	0.0	0.0	0.0
44	76	225.8	225.8	0.0	0.0	5.0	5.0	4.46	4.46	1.05	1.05	1.1	1.1	1.4	1.4	0.0	0.0	0.0	0.0
49	73	326.8	326.8	0.0	0.0	4.0	4.0	8.36	8.36	1.71	1.71	1.2	1.2	2.2	2.2	0.0	0.0	0.0	0.0
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	3.2	3.2	0.1	0.1	0.0	0.0
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	1.1	1.1	1.0	1.0	0.0	0.0
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	3.2	0.5	0.5	0.0	0.0
09	76	431.8	431.8	0.0	0.0	16.0	16.0	9.02	9.02	1.87	1.87	1.5	1.5	3.2	3.2	0.0	0.0	0.0	0.0
14	71	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	3.8	0.0	0.0	0.0	0.0
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	4.9	0.1	0.1	0.0	0.0
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	5.7	0.0	0.0	0.0	0.0
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	6.1	0.0	0.0	0.0	0.0
34	51	829.4	829.4	0.0	0.0	30.3	30.3	3.60	3.60	1.05	1.05	1.1	1.1	5.8	5.8	0.0	0.0	0.0	0.0
39	58	797.4	797.4	0.0	0.0	36.7	36.7	2.04	2.04	0.68	0.68	0.8	0.8	5.1	5.1	0.0	0.0	0.0	0.0
41	26	837.0	837.0	0.0	0.0	36.5	36.5	1.00	1.00	0.46	0.46	0.7	0.7	4.2	4.2	0.0	0.0	0.0	0.0
AVG	844	234.3	234.3	3.0	3.0	6.6	6.6	2.72	2.72	0.61	0.61	0.5	0.5	1.9	1.9	0.0	0.0	0.0	0.0
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	4.4E+01	1.1E+00	1.1E+00	4.8E+02	4.8E+02

CCKE CVEN EMISSION REPORT

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

CVEN 3-9
PRI TEST

FIVE SECOND AVERAGE

ENC FIVE
ING SECOND

SEC TOTAL
ND VOLUME

FLOW

ENC ING SEC ND	FIVE SECOND TOTAL VOLUME FLOW	PPM SC2		PPM NC		PPM NOX		% THC		% CO		% CO2		% H2C		% H2		% O2 C	
		MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
49	0	22.3	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.2	0.0	0.0	0.0	19.7	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	0.0	0.0	19.4	19.4
59	0	37.2	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.03	0.00	0.0	0.0	1.4	0.0	0.0	0.0	19.5	19.5
04	0	40.4	C.C	0.0	0.0	0.1	0.0	0.00	0.00	0.04	0.00	0.0	0.0	1.4	0.0	0.0	0.0	19.0	19.0
09	0	31.4	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.4	0.0	0.0	0.0	19.5	19.5
14	1	23.8	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.02	0.00	0.0	0.0	1.4	0.0	0.0	0.0	19.7	19.7
19	0	31.6	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.03	0.00	0.0	0.0	1.4	0.0	0.0	0.0	19.6	19.6
24	2	21.6	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.01	0.00	0.0	0.0	1.3	0.0	0.0	0.0	19.6	19.6
29	0	20.6	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.01	0.00	0.0	0.0	1.3	0.0	0.0	0.0	19.6	19.6
34	1	26.5	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.3	0.0	0.0	0.0	19.4	19.4
39	1	19.5	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.3	0.0	0.0	0.0	19.4	19.4
44	10	25.4	C.C	0.0	0.0	0.3	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.3	0.0	0.0	0.0	19.4	19.4
49	0	15.4	C.C	0.0	0.0	1.4	0.0	0.00	0.00	0.01	0.00	0.0	0.0	1.4	0.0	0.0	0.0	19.4	19.4
54	6	28.2	C.C	0.0	0.0	2.5	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.3	0.0	0.0	0.0	19.3	19.3
59	0	25.4	C.C	0.0	0.0	3.5	0.0	0.00	0.00	0.00	0.00	0.0	0.0	1.2	0.0	0.0	0.0	19.2	19.2
04	2	34.4	C.C	0.0	0.0	4.3	0.0	0.00	0.00	0.04	0.00	0.0	0.0	1.2	0.0	0.0	0.0	18.9	18.9
09	0	68.4	C.C	0.0	0.0	4.6	0.0	0.00	0.00	0.40	0.00	0.0	0.0	1.6	0.0	0.0	0.0	18.3	18.3
14	3	72.2	C.C	0.0	0.0	3.8	0.0	0.00	0.00	0.51	0.00	0.0	0.0	1.7	0.0	0.0	0.0	18.4	18.4
19	0	75.8	C.C	0.0	0.0	3.8	0.0	0.00	0.00	0.70	0.00	0.0	0.0	1.6	0.0	0.0	0.0	18.4	18.4
24	0	91.8	C.C	0.0	0.0	3.3	0.0	0.00	0.00	0.53	0.00	0.0	0.0	1.6	0.0	0.0	0.0	18.4	18.4
29	0	247.5	C.C	0.0	0.0	1.9	0.0	0.00	0.00	0.70	0.00	0.0	0.0	2.1	0.0	0.0	0.0	18.7	18.7
34	0	445.6	C.C	0.0	0.0	0.0	0.0	0.00	0.00	0.50	0.00	0.0	0.0	4.0	0.0	0.0	0.0	17.8	17.8
39	0	573.7	C.C	0.0	0.0	1.2	0.0	0.00	0.00	1.82	0.00	0.0	0.0	6.8	0.0	0.0	0.0	16.6	16.6
44	0	561.4	C.C	0.0	0.0	2.0	0.0	0.00	0.00	1.87	0.00	0.0	0.0	7.3	0.0	0.0	0.0	16.8	16.8
49	0	507.0	C.C	0.0	0.0	2.0	0.0	0.00	0.00	1.64	0.00	0.0	0.0	5.6	0.0	0.0	0.0	17.8	17.8
54	0	456.6	C.C	0.0	0.0	4.6	0.0	0.00	0.00	0.52	0.00	0.0	0.0	3.9	0.0	0.0	0.0	18.5	18.5
59	0	420.5	C.C	0.0	0.0	6.1	0.0	0.00	0.00	0.29	0.00	0.0	0.0	3.0	0.0	0.0	0.0	19.0	19.0
04	0	426.8	C.C	0.0	0.0	7.2	0.0	0.00	0.00	0.17	0.00	0.0	0.0	2.5	0.0	0.0	0.0	19.3	19.3
09	0	495.6	C.C	0.0	0.0	7.8	0.0	0.00	0.00	0.18	0.00	0.0	0.0	3.0	0.0	0.0	0.0	18.5	18.5
14	4	525.0	C.C	0.0	0.0	5.5	0.0	0.00	0.00	0.66	0.00	0.0	0.0	3.9	0.0	0.0	0.0	18.5	18.5
19	1	451.5	C.C	0.0	0.0	8.2	0.0	0.00	0.00	0.79	0.00	0.0	0.0	3.4	0.0	0.0	0.0	18.7	18.7
24	0	457.3	C.C	0.0	0.0	16.0	0.0	0.00	0.00	0.44	0.00	0.0	0.0	2.5	0.0	0.0	0.0	19.1	19.1
29	0	423.1	C.C	0.0	0.0	24.4	0.0	0.00	0.00	0.22	0.00	0.0	0.0	2.8	0.0	0.0	0.0	19.0	19.0
34	0	485.5	C.C	0.0	0.0	25.0	0.0	0.00	0.00	0.17	0.00	0.0	0.0	2.8	0.0	0.0	0.0	19.0	19.0
39	3	659.2	C.C	0.0	0.0	27.1	0.0	0.00	0.00	0.49	0.00	0.0	0.0	4.0	0.0	0.0	0.0	16.2	16.2
		546.4				22.7	17.7	10.74	9.04	1.32	1.12	0.4	0.3						
AVG	12	226.5	C.C	0.0	0.0	5.6	0.9	2.38	0.38	0.46	0.06	0.2	0.0	2.5	0.0	0.0	0.0	18.9	18.9
TOT	35																		

C.0E+00 0.0E+00 1.8E-04 6.6E-01 1.2E-01 3.9E-02 6.9E-01 6.2E-03 6.6E+00

CCKE EVEN EMISSION REPORT

TEST 27
DATE AUGUST 22, 1977
START TIME 11:35:12C

EVEN 2-23
PRI TEST

FIVE SECOND AVERAGE

ENC	FIVE	TOTAL		PPM HC		PPM CO		PPM CO2		PPM H2O		PPM H2		PPM H2O	
SEC	SECOND	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
NO	FLOW	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
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	1.5
35	14	24.2	25.2	0.0	0.0	45.1	45.1	0.00	0.00	0.03	0.03	0.0	0.0	1.7	1.7
44	14	14.5	14.5	0.0	0.0	46.8	46.8	0.00	0.00	0.04	0.04	0.0	0.0	1.5	1.5
45	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	1.7
54	15	5.5	5.5	0.0	0.0	55.9	55.9	0.00	0.00	0.01	0.01	0.0	0.0	1.7	1.7
55	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	1.5
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	1.6	1.6
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	1.4
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	1.7	1.7
19	15	2.2	2.2	0.0	0.0	27.6	27.6	0.00	0.00	0.00	0.00	0.0	0.0	1.7	1.7
24	16	12.0	12.0	0.0	0.0	22.6	22.6	0.00	0.00	0.00	0.00	0.0	0.0	1.1	1.1
25	16	11.4	11.4	0.0	0.0	16.7	16.7	0.00	0.00	0.00	0.00	0.0	0.0	1.5	1.5
34	15	15.2	15.2	0.0	0.0	12.1	12.1	0.00	0.00	0.00	0.00	0.0	0.0	1.1	1.1
39	15	15.3	15.3	0.0	0.0	5.6	5.6	0.00	0.00	0.00	0.00	0.0	0.0	1.2	1.2
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	1.2
45	15	25.2	25.2	0.0	0.0	6.0	6.0	0.00	0.00	0.05	0.05	0.0	0.0	1.6	1.6
54	14	50.5	50.5	0.0	0.0	4.4	4.4	0.00	0.00	0.07	0.07	0.0	0.0	1.6	1.6
55	15	45.3	45.3	0.0	0.0	3.5	3.5	0.00	0.00	0.00	0.00	0.0	0.0	1.5	1.5
04	15	4.6	4.6	0.0	0.0	2.2	2.2	0.00	0.00	0.00	0.00	0.0	0.0	1.6	1.6
09	14	62.3	62.3	0.0	0.0	3.6	3.6	0.00	0.00	0.07	0.07	0.0	0.0	1.7	1.7
14	15	62.3	62.3	0.0	0.0	3.5	3.5	0.00	0.00	0.00	0.00	0.0	0.0	1.7	1.7
17	15	60.6	60.6	0.0	0.0	4.3	4.3	0.00	0.00	0.00	0.00	0.0	0.0	1.6	1.6
24	16	70.2	70.2	0.0	0.0	5.3	5.3	0.00	0.00	0.00	0.00	0.0	0.0	2.1	2.1
25	16	61.2	61.2	0.0	0.0	6.8	6.8	0.00	0.00	0.08	0.08	0.0	0.0	1.4	1.4
34	15	44.5	44.5	0.0	0.0	7.5	7.5	0.00	0.00	0.11	0.11	0.0	0.0	1.4	1.4
39	14	81.2	81.2	0.0	0.0	8.3	8.3	0.00	0.00	0.11	0.11	0.0	0.0	1.8	1.8
44	15	63.3	63.3	0.0	0.0	8.6	8.6	0.00	0.00	0.12	0.12	0.0	0.0	1.8	1.8
45	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	1.6	1.6
54	15	75.2	75.2	0.0	0.0	10.5	10.5	0.02	0.02	0.12	0.12	0.0	0.0	1.6	1.6
55	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	1.6
04	16	81.1	81.1	0.0	0.0	13.7	13.7	0.10	0.10	0.12	0.12	0.0	0.0	1.6	1.6
09	16	89.8	89.8	0.0	0.0	14.6	14.6	0.10	0.10	0.12	0.12	0.0	0.0	1.4	1.4
14	16	54.5	54.5	0.0	0.0	15.5	15.5	0.16	0.16	0.12	0.12	0.0	0.0	1.4	1.4
19	17	35.3	35.3	0.0	0.0	17.6	17.6	0.18	0.18	0.16	0.16	0.0	0.0	1.5	1.5
24	16	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	2.6
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	2.2
34	16	104.4	104.4	0.0	0.0	20.7	20.7	0.20	0.20	0.14	0.14	0.0	0.0	1.6	1.6
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	1.5
44	17	124.7	124.7	0.0	0.0	20.5	20.5	0.14	0.14	0.12	0.12	0.0	0.0	1.2	1.2
45	17	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	1.4
54	18	121.4	121.4	0.0	0.0	15.5	15.5	0.08	0.08	0.09	0.09	0.0	0.0	1.8	1.8
55	18	107.2	107.2	0.0	0.0	15.8	15.8	0.00	0.00	0.04	0.04	0.0	0.0	2.4	2.4
04	18	117.4	117.4	0.0	0.0	15.6	15.6	0.04	0.04	0.07	0.07	0.0	0.0	2.0	2.0
09	18	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	2.2
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	2.1
19	18	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	1.4
24	18	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	1.5
29	18	127.8	127.8	0.0	0.0	18.6	18.6	0.30	0.30	0.03	0.03	0.0	0.0	1.6	1.6
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	1.7	1.7
39	18	192.0	192.0	0.0	0.0	15.3	15.3	2.78	2.78	0.35	0.35	0.0	0.0	1.5	1.5
44	18	246.0	246.0	0.0	0.0	14.0	14.0	4.98	4.98	0.71	0.71	0.0	0.0	0.5	0.5
49	18	296.6	296.6	0.0	0.0	12.8	12.8	5.76	5.76	0.59	0.59	0.0	0.0	2.0	2.0
54	19	335.2	335.2	0.0	0.0	12.0	12.0	4.84	4.84	0.87	0.87	0.0	0.0	2.6	2.6
59	19	333.4	333.4	0.0	0.0	11.9	11.9	4.22	4.22	0.70	0.70	0.0	0.0	2.2	2.2
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	2.2
09	19	335.1	335.1	0.0	0.0	10.7	10.7	3.70	3.70	0.55	0.55	0.0	0.0	2.2	2.2
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	2.5
19	18	327.6	327.6	0.0	0.0	11.0	11.0	2.00	2.00	0.21	0.21	0.0	0.0	2.7	2.7
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	2.8
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	2.2	2.2
34	18	324.6	324.6	0.0	0.0	19.3	19.3	0.70	0.70	0.08	0.08	0.0	0.0	2.0	2.0
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	2.0
44	19	276.6	276.6	0.0	0.0	20.1	20.1	0.40	0.40	0.02	0.02	0.0	0.0	1.4	1.4
49	19	304.4	304.4	0.0	0.0	16.9	16.9	0.38	0.38	0.01	0.01	0.0	0.0	1.2	1.2
54	19	304.3	304.3	0.0	0.0	18.5	18.5	0.34	0.34	0.01	0.01	0.0	0.0	1.7	1.7
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	2.6
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	1.7
09	20	279.7	279.7	0.0	0.0	14.3	14.3	0.12	0.12	0.01	0.01	0.0	0.0	2.0	2.0
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	1.4
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	1.7	1.7
22	11	268.0	268.0	0.0	0.0	10.3	10.3	0.03	0.03	0.00	0.00	0.0	0.0	1.0	1.0
AVG	157	135.6	135.6	0.0	0.0	16.4	16.4	0.63	0.63	0.14	0.14	0.0	0.0	1.7	1.7
TOT	1150	C.CE+CC C.CE+CC 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 2.0E+01 2.0E+02 2.0E+02													

CCKE CVEN EMISSION REPORT

CVEN 3-4
PRI TEST

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

FIVE SECOND AVERAGE

ENC FIVE
ING SECOND
TOTAL
SEC VOLUME
ND FLOW

SEC ND	VOLUME FLOW	FPM SC2		FPM NC		FPM NCX		TFC		CC		CO2		H2C		H2	
		MEAS	CCRR	MEAS	CORR	MEAS	CORR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR	MEAS	CCRR
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	0.1	0.0	0.0
54	4	76.4	51.2	0.0	0.0	0.2	0.2	0.00	0.00	0.00	0.00	0.1	0.1	2.0	0.1	0.0	0.0
59	0	74.4	C.C	0.0	0.0	0.1	0.0	0.00	0.00	0.00	0.00	0.1	0.0	2.0	0.0	0.0	0.0
04	1	72.1	36.5	0.0	0.0	0.2	0.0	0.00	0.00	0.01	0.01	0.1	0.0	2.3	0.0	0.0	0.0
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	0.1	0.0	0.0
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	0.1	0.0	0.0
19	4	64.6	64.6	0.0	0.0	3.4	3.4	0.00	0.00	0.01	0.01	0.1	0.1	3.1	0.1	0.0	0.0
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	0.1	0.0	0.0
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	3.1	0.1	0.0	0.0
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	2.7	0.1	0.0	0.0
39	6	68.3	68.3	0.0	0.0	1.5	1.5	0.00	0.00	0.00	0.00	0.1	0.1	2.3	0.1	0.0	0.0
44	6	73.7	73.7	0.0	0.0	2.1	2.1	0.00	0.00	0.00	0.00	0.1	0.1	3.5	0.1	0.0	0.0
49	10	73.6	62.8	0.0	0.0	2.4	1.6	0.00	0.00	0.01	0.01	0.1	0.1	2.8	0.1	0.0	0.0
54	8	91.1	51.1	0.0	0.0	2.7	2.7	0.12	0.12	0.00	0.00	0.1	0.1	3.0	0.1	0.0	0.0
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	2.3	0.2	0.0	0.0
04	10	181.4	181.4	0.0	0.0	3.2	3.2	0.90	0.90	0.76	0.76	0.2	0.2	2.6	0.2	0.0	0.0
09	8	205.4	205.4	0.0	0.0	2.6	2.6	1.30	1.30	0.80	0.80	0.2	0.2	3.2	0.2	0.0	0.0
14	7	224.5	224.5	0.0	0.0	3.1	3.1	2.54	2.54	1.32	1.32	0.4	0.4	4.5	0.4	0.0	0.0
15	30	284.4	284.4	0.0	0.0	2.5	2.5	4.68	4.68	1.57	1.57	0.6	0.6	4.3	0.6	0.0	0.0
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	4.2	1.0	0.0	0.0
29	5	447.1	447.1	0.0	0.0	1.0	1.0	5.54	5.54	2.72	2.72	1.0	1.0	4.4	1.0	0.0	0.0
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	0.7	0.0	0.0
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	4.8	0.7	0.0	0.0
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	0.8	0.0	0.0
45	7	414.5	414.5	0.0	0.0	15.6	15.6	6.52	6.52	2.00	2.00	0.8	0.8	4.7	0.8	0.0	0.0
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	0.6	0.0	0.0
59	7	333.0	333.0	0.0	0.0	24.5	24.5	3.04	3.04	0.52	0.52	0.4	0.4	4.0	0.4	0.0	0.0
04	6	295.8	295.8	0.0	0.0	25.7	25.7	2.38	2.38	0.63	0.63	0.3	0.3	5.7	0.3	0.0	0.0
09	5	265.1	265.1	0.0	0.0	33.5	33.5	1.86	1.86	0.49	0.49	0.3	0.3	5.7	0.3	0.0	0.0
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	0.2	0.0	0.0
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	0.2	0.0	0.0
AVG	82	205.7	206.2	0.0	0.0	7.5	7.8	2.00	2.00	0.74	0.74	0.3	0.3	3.6	0.3	0.0	0.0
TOT	210			C.0E+00	C.0E+00	1.6E-03	1.6E-03	5.5E+00	5.5E+00	2.1E+00	2.1E+00	8.5E-01	8.5E-01	8.0E+00	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		66.5x10 ⁻⁴ 66.5x10 ⁻⁴			24.7x10 ⁻⁴ 24.7x10 ⁻⁴	
6	Measured corrected		136x10 ⁻⁴				63.4 x 10 ⁻⁴
7	Measured corrected	133.3x10 ⁻⁴ 134.5x10 ⁻⁴	168.5x10 ⁻⁴ 169.9x10 ⁻⁴	170.7x10 ⁻⁴ 172.2x10 ⁻⁴			
8	Measured corrected	200.6x10 ⁻⁴ 208.9x10 ⁻⁴	112.2x10 ⁻⁴ 116.8x10 ⁻⁴	122.0x10 ⁻⁴ 127.1x10 ⁻⁴			
9	Measured corrected	.354x10 ⁻⁴ .483x10 ⁻⁴	4.72x10 ⁻⁴ 6.44x10 ⁻⁴	2.72x10 ⁻⁴ 3.71x10 ⁻⁴			
10	Measured corrected				68.8x10 ⁻⁴ 71.9x10 ⁻⁴	61.6x10 ⁻⁴ 64.4x10 ⁻⁴	82.8x10 ⁻⁴ 86.6x10 ⁻⁴
11	Measured corrected				138.8x10 ⁻⁴ 140.2x10 ⁻⁴	130.3x10 ⁻⁴ 131.7x10 ⁻⁴	125.2x10 ⁻⁴ 126.6x10 ⁻⁴
12	Measured corrected				81.5x10 ⁻⁴ 85.5x10 ⁻⁴	44.4x10 ⁻⁴ 46.6x10 ⁻⁴	53.9x10 ⁻⁴ 56.6x10 ⁻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		84.4x10 ⁻⁴ 90.7x10 ⁻⁴			30.2x10 ⁻⁴ 32.5x10 ⁻⁴	
14	Measured corrected	1.34x10 ⁻⁴ 2.29x10 ⁻⁴			9.82x10 ⁻⁴ 16.76x10 ⁻⁴		
22	Measured corrected		74.5x10 ⁻⁴ 74.5x10 ⁻⁴				
23	Measured corrected		33.69x10 ⁻⁴ 33.69x10 ⁻⁴				
26	Measured corrected		.617x10 ⁻⁴ .617x10 ⁻⁴				
28	Measured corrected		6.14x10 ⁻⁴ 6.14x10 ⁻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 corrected				1.50x10 ⁻⁴ 1.51x10 ⁻⁴	.69x10 ⁻⁴ .70x10 ⁻⁴	
16	Measured corrected				35.1x10 ⁻⁴ 35.2x10 ⁻⁴		40.4x10 ⁻⁴ 40.5x10 ⁻⁴
17	Measured corrected				30.9x10 ⁻⁴ 31.3x10 ⁻⁴	28.8x10 ⁻⁴ 29.1x10 ⁻⁴	56.1x10 ⁻⁴ 56.9x10 ⁻⁴
18	Measured corrected				47.6x10 ⁻⁴ 71.5x10 ⁻⁴	6.88x10 ⁻⁴ 10.3x10 ⁻⁴	8.88x10 ⁻⁴ 13.4x10 ⁻⁴
19	Measured corrected				.23x10 ⁻⁴ .61x10 ⁻⁴	0 0	3.65x10 ⁻⁴ 9.85x10 ⁻⁴
20	Measured corrected				0 0	.18x10 ⁻⁴ .44x10 ⁻⁴	22.99x10 ⁻⁴ 68.67x10 ⁻⁴
21	Measured corrected				0 0	233.9x10 ⁻⁴ 358.2x10 ⁻⁴	197.5x10 ⁻⁴ 302.5x10 ⁻⁴
24	Measured corrected				.035x10 ⁻⁴ .08x10 ⁻⁴	.003x10 ⁻⁴ .008x10 ⁻⁴	.41x10 ⁻⁴ .912x10 ⁻⁴
25	Measured corrected				18.9x10 ⁻⁴ 19.1x10 ⁻⁴	16.9x10 ⁻⁴ 17.1x10 ⁻⁴	13.3x10 ⁻⁴ 13.4x10 ⁻⁴
27	Measured corrected					35.7x10 ⁻⁴ 35.7x10 ⁻⁴	

TABLE C-3
WILPUTTE VOLUME FLOW/LOCATION, CO₂
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, CO₂
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, CO₂
 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		BDI*				
26	Measured		BDI*				
	Corrected		BDI*				
28	Measured		BDI*				
	Corrected		BDI*				

* 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
WILPUTE VOLUME FLOW/LOCATION, CO
SCFM

TEST NO.		STACK 1	STACK 2	STACK 3	GUIDE 1	GUIDE 2	GUIDE 3
2	Measured corrected				0 0	.0243 .0568	.1606 .3743
5	Measured corrected		2.2650 2.2656			.8428 .8430	
6	Measured corrected			.0323 .0323			.0150 .0150
7	Measured corrected	1.9531 1.9705	2.4682 2.4901	2.5097 2.5230			
8	Measured corrected	4.2815 4.4136	2.3951 2.4690	2.6049 2.6853			
9	Measured corrected	.0093 .0125	.1244 .1676	.0717 .0966			
10	Measured corrected				1.1072 1.1399	.9634 .9918	1.3326 1.3719
11	Measured corrected				1.3194 1.3322	1.2391 1.2512	1.1900 1.2016
12	Measured corrected				1.0331 1.0797	.5625 .5878	.6833 .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:

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

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 (ft²)

$\overline{Q_{ik\ell}}$ = average anisokinetic correction factor

$\overline{\%W\ell}$ = average isokinetic weight % (a fraction)

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

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

$$\alpha_{ikl}(t) = \frac{1 - e}{4.5} \left(\lambda_{ikl}(t) \right)^{[-4.5/\lambda_{ikl}(t)]} \quad (C-5)$$

$$\lambda_{ikl}(t) = (.508) F_{ik}(t) \gamma_l(t) / A_{ik} g \quad (C-6)$$

T_i = time period for test

t = time variable

$Q_{ikl}(t)$ = anisokinetic correction factor

$F_{ik}(t)$ = volume flow (ft³/min.)

V_{ik} = samplings velocity (ft./min.)

$\alpha_{ikl}(t)$ = inertial parameter

γ_l = free fall particle velocity (ft./min.)

g = 980 cm/sec²

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."

$$\overline{\%W_l} = \sum_{i=1}^n \%W_{il} / n \quad (C-7)$$

$$\%W_{il} \begin{cases} = 0 ; \overline{Q_{jl}} = 0 \end{cases} \quad (C-8)$$

$$\%W_{il} \begin{cases} = \frac{\%W'_{il} Q_{jl}}{\sum_j \%W'_{jl} Q_{jl}} ; Q_{jl} > 0 \end{cases} \quad (C-9)$$

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'_{jl} has been given)
 W_{jl} = isokinetic weight % (a fraction)
 W'_{jl} = 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:

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

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

<u>Columns</u>	<u>Contents</u>
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)

<u>Columns</u>	<u>Contents</u>
1 - 2	i
3 - 4	k_1
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)

<u>Columns</u>	<u>Contents</u>
1 - 2	i (i=99 for termination)
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)

<u>Columns</u>	<u>Contents</u>
1 - 2	k
3 - 10	A_k
11 - 20	k, A_k as above
21 - 30	
31 - 40	↓
41 - 50	↓
51 - 60	↓
61 - 70	↓
71 - 80	↓

} cannot be
 used on
 the third
 card

TABLE C-15
FREE FALL VELOCITY CARD
(up to 2 cards)

<u>Columns</u>	<u>Contents</u>
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)

<u>Columns</u>	<u>Contents</u>
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)

<u>Columns</u>	<u>Contents</u>
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
61 - 80	i, k, V_{ik} , M_{ik} as above

} cannot
be used
on 23rd
card

TABLE C-18

INPUT TAPE
FORMAT

<u>Character Positions</u>	<u>Contents</u>
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:

$$Q_{ik} = \sum_e Q_{ik\ell} \cdot \%W_{\ell} \quad (C-10)$$

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

<u>Relative Character Position</u>	<u>Contents</u>
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 PLILFCLG
//PLIL.SYSIN DD *
MASS: PROCEDURE OPTIONS(MAIN) ;
/*
COKE GIVEN DATA REDUCTION
PARTICULATE MASS LOADING
*/
DCL 1 IZREC UNALIGNED BASED(P) ;
  2 JD CHAR(3) ;
  2 HR CHAR(2) ;
  2 MIN CHAR(2) ;
  2 QUART CHAR(1) ;
  2 SECREC(15) ;
  3 QUM1 CHAR(116) ;
  3 FLOW(14) ;
  4 AF FLOAT DEC(6) ;
  4 SF FLOAT DEC(6) ;
  3 SEC CHAR(2) ;
  3 DUM2 CHAR(10) ;
DCL (TEST,INDUCT,RANGE) FIXED BIN(31) ;
DCL LITTLE_A FLOAT DEC(6) ;
DCL 1 DATA(90) ;
  2 TEST CHAR(2) ;
  2 DUCT CHAR(2) ;
  2 EH FLOAT DEC(6) ;
  2 V FLOAT DEC(6) ;
  2 W(15) FLOAT DEC(6) ;
  2 W(15) FLOAT DEC(6) ;
  2 Q(15) FLOAT DEC(6) ;
  2 Q(15) FLOAT DEC(6) ;
DCL NDATA FIXED BIN(31) ;
DCL W_AVG(15) FLOAT DEC(6) ;
DCL FPV(15) FLOAT DEC(6) ;
DCL FPV_LIMIT FLOAT DEC(6) ;
DCL A(20) FLOAT DEC(6) ;
DCL 1 INDEX(30) ;
  2 TEST CHAR(2) ;
  2 DUCT(3) CHAR(2) ;
  2 BGN ;
  3 HR CHAR(2) ;
  3 MIN CHAR(2) ;
  3 SEC CHAR(2) ;
  2 END ;
  3 HR CHAR(2) ;
  3 MIN CHAR(2) ;
  3 SEC CHAR(2) ;
DCL (TIME,DUCT) FIXED BIN(31) ;
DCL (I,J,K,L,I,T,IP) FIXED BIN(31) ;
DCL DCT FIXED BIN(31) ;
DCL (O,T) CHAR(2) ;
DCL 1 TIME(5) ;
  2 TEST CHAR(2) ;
  2 BGN '3 (HR,MIN,SEC) CHAR(2) ;
  2 END '3 (HR,MIN,SEC) CHAR(2) ;
DCL (TIME_LIMIT,T1,T11,MH(15)) FIXED BIN(31) ;
DCL DUMVM CHAR(16) ;
DCL DUMWP CHAR(15) ;
DCL DUMTM CHAR(10) ;
DCL LAMBDA FLOAT DEC(6) ;
00000020
00000030
00000040
00000050
00000060
00000070
00000080
00000090
00000100
00000110
00000120
00000130
00000140
00000150
00000160
00000170
00000180
00000190
00000200
00000210
00000220
00000230
00000240
00000250
00000260
00000270
00000280
00000290
00000300
00000310
00000320
00000330
00000340
00000350
00000360
00000370
00000380
00000390
00000400
00000410
00000420
00000430
00000440
00000450
00000460
00000470
00000480
00000490
00000500
00000510
00000520
00000530
00000540
00000550
00000560
00000570
00000580
00000590

```

```

DCL SUM FLOAT DEC(13) ;
/*
*/ INITIALIZE
EMI(*),V(*),M(*) = 0.0E+0 ;
WPI(*),* = -1.0 ;
Q(*),W(*),* = 0.0E+0 ;
W-AVG(*),FEV(*) = 0.0E+0 ;
A(*) = 0.0E+0 ;
INDEX-BGN-HR(*),INDEX-BGN-MIN(*),INDEX-BGN-SEC(*),
INDEX-END-HR(*),INDEX-END-MIN(*),INDEX-END-SEC(*) = , , ;
MM(*) = 0 ;

/* READ AND PRINT INPUT CARDS
*/ GET EDIT(NTST,NDUCT,NRANGE,LITTLE_A,FFV_LIMIT,
( INDEX_TEST(J) , INDEX_DUCT(J,1) ,INDEX_DUCT(J,2) ,
INDEX_DUCT(J,3) DO J = 1 TO NTEST ) ,
(COL(1),3 F(2), F(9),F(10),
3 ( COL(1) ,40-A(2) ) ) ;
PUT PAGE EDIT(NTST,NDUCT,NRANGE,LITTLE_A,FFV_LIMIT,
( INDEX_TEST(J) , INDEX_DUCT(J,1) ,INDEX_DUCT(J,2) ,
INDEX_DUCT(J,3) DO J = 1 TO NTEST ) ,
(COL(1),3 F(2), F(10,7) , F(11,3) ,
3 (COL(1), 40 A(2)) ) ;

/**/
A1: GET EDIT( (TIME_TEST(I),TIME-BGN-HR(I),TIME-BGN-MIN(I),
TIME-BGN-SEC(I) ,TIME-END-HR(I),TIME-END-MIN(I),
TIME-END-SEC(I) DO I = 1 TO 5 ) )
(COL(1), 35 A(2)) ;
PUT EDIT( (TIME_TEST(I),TIME-BGN-HR(I),TIME-BGN-MIN(I),
TIME-BGN-SEC(I),TIME-END-HR(I),TIME-END-MIN(I),
TIME-END-SEC(I) DO I = 1 TO 5 ) )
(COL(1),35 A(2)) ;
DO I = 1 TO 5 ;
IF TIME_TEST(I) = '99' THEN GO TO A3 ;
DO J = 1 TO NTEST ;
IF TIME_TEST(I) = INDEX_TEST(J) THEN DO ;
INDEX-BGN(J) = TIME-BGN(I) ;
INDEX-END(J) = TIME-END(I) ;
GO TO A2 ;
END ;
END ;

A2: END ;
GO TO A1 ;

A3: GET EDIT(DUMTH) (A(10)) ;
/**/
J = 9999 ;
DO K = 1 TO NDUCT ;
J = J + 1 ;
GET EDIT(DCT,A(DCT)) (F(2),F(8)) ;
IF J > 8 THEN DO ;
J = 1 ;
PUT EDIT(DCT,A(DCT)) (COL(1),F(2),F(8,2)) ;
END ;
ELSE PUT EDIT(DCT,A(DCT)) (F(2),F(8,2)) ;

```

```

END ;
/**/ GET EDIT ((FEV(L) DO L=1 TO NRANGE)) (COL(1),8 F(10)) ;
PUT EDIT ((FEV(L) DO L=1 TO NRANGE)) (COL(1),8 F(10,3)) ;
/**/ I = 0 ;
DO J = 1 TO NTEST ;
  IF INDEX*TEST(I) = ' ' THEN GO TO A4 ;
  DO K = 1 TO 3 ;
    IF INDEX*DUCT(J,K) = ' ' THEN GO TO A4 ;
    I = I + 1 ;
  DATA*TEST(I) = INDEX*TEST(J) ;
  DATA*DUCT(I) = INDEX*DUCT(J,K) ;
END ;
A4: END ;
DATA = I ;
/**/
A5: GET EDIT(T,D) (COL(1),2 A(2)) ;
PUT EDIT(T,D) (COL(1),2 A(2)) ;
IF T = '99' THEN GO TO A6 ;
DO I = 1 TO NDATA ;
  IF T = DATA*TEST(I) THEN IF D = DATA*DUCT(I) THEN DO ;
    GET EDIT ( COL(6), 15 F(5) ) ;
    PUT EDIT ( 'MP(I,L) DO L = 1 TO NRANGE' )
      (COL(6) , 15 F(5,3)) ;
    GO TO A5 ;
  END ;
END ;
GO TO A5 ;
A6: GET_EDIT(DUMWP) (COL(6),A(75)) ;
/**/
A7: J = 9999 ;
J = J+1 ;
GET EDIT(T,D) (2 A(2)) ;
IF J > 4 THEN DO ;
  J = 1 ;
  PUT EDIT (T,D) (COL(1),2 A(2)) ;
  END ;
ELSE PUT EDIT(T,D) (2 A(2)) ;
IF T = '99' THEN GO TO A8 ;
DO I = 1 TO NDATA ;
  IF T = DATA*TEST(I) THEN IF D = DATA*DUCT(I) THEN DO ;
    GET EDIT ( V(I),M(I)) ( F(6),F(10)) ;
    PUT EDIT ( V(I),M(I)) ( F(6,1),F(10,2)) ;
    GO TO A7 ;
  END ;
END ;
GET EDIT ( DUMWP) (A(16)) ;
GO TO A7 ;
/* READ TAPE AND COMPUTE Q AND W
*/
A8: READ FILE(INPUT) SET(P) ;
ON ENDFILE(INPUT) GO TO DONE ;
/* */

```

```

00001180
00001190
00001200
00001210
00001220
00001230
00001240
00001250
00001260
00001270
00001280
00001290
00001300
00001310
00001320
00001330
00001340
00001350
00001360
00001370
00001380
00001390
00001400
00001410
00001420
00001430
00001440
00001450
00001460
00001470
00001480
00001490
00001500
00001510
00001520
00001530
00001540
00001550
00001560
00001570
00001580
00001590
00001610
00001620
00001630
00001640
00001650
00001660
00001670
00001680
00001690
00001700
00001710
00001720
00001750

```

```

A9: DO J = 1 TO NTEST ;
/* LOCATE TEST
*/
RDI: IF JD = 'KEY' THEN GO TO RD1A ;
READ FILE(INPUT) SET(P) ;
GO TO RDI ;
RD1A: READ FILE(INPUT) SET(P) ;
IF INDEX.TEST(J) = ' ' THEN GO TO NEXT_TEST ;
ITIME = 1 ;
GO TO RD2A ;
/* LOCATE HOUR AND MINUTE
*/
RD2: READ FILE(INPUT) SET(P) ;
RD2A: IF INREC.JD = 'KEY' THEN GO TO NEXT_TEST ;
IF INREC.HR < INDEX.BGN.HR(J) THEN GO TO RD2 ;
IF INREC.HR > INDEX.BGN.HR(J) THEN GO TO FND ;
IF INREC.MIN < INDEX.BGN.MIN(J) THEN GO TO RD2 ;
IF INREC.MIN > INDEX.BGN.MIN(J) THEN GO TO FND ;
/* LOCATE SEC
*/
DO ITIME = 1 TO 15 ;
IF INREC.SEC(ITIME) >= INDEX.BGN.SEC(J) THEN GO TO FND ;
END ;
GO TO RD2 ;
/* LOCATE TEST-DUCT AND NO. DUCTS FOR THIS TEST
*/
FND: DO I = 1 TO NDATA ;
IF INDEX.TEST(I) = CATA.TEST(I) THEN GO TO FND1 ;
END ;
GO TO NEXT_TEST ;
FND1: DO IDUCT = 1 TO 3 ;
IF INDEX.DUCT(J, IDUCT) = ' ' THEN GO TO FND2 ;
END ;
IDUCT = 4 ;
FND2: IDUCT = IDUCT - 1 ;
IF IDUCT <= 0 THEN GO TO NEXT_TEST ;
IP = 0 ;
TIME LIMIT = 15 ;
PUT EDIT('PROCESSING FOR TEST ', INDEX.TEST(J), ' (', IDUCT,
' DUCTS ', ') (COL(1),3 A,F(2),A) ;
/* PROCESS FLOW DATA FROM TAPE TO COMPUTE Q AND W
*/
MORE: IF INREC.JD = 'KEY' THEN GO TO COMPUTE ;
/* LOCATE END HR AND MIN
*/
IF INREC.HR > INDEX.END.HR(J) THEN GO TO COMPUTE ;
IF INREC.HR < INDEX.END.HR(J) THEN GO TO DOIT ;
IF INREC.MIN > INDEX.END.MIN(J) THEN GO TO COMPUTE ;
IF INREC.MIN < INDEX.END.MIN(J) THEN GO TO DOIT ;

```

```

/* LOCATE END SEC
*/
DO TIME_LIMIT = 1 TO 15 ;
IF INREC_SEC(TIME_LIMIT) = INDEX.END.SEC(1) THEN GO TO DOIT ;
IF INREC_SEC(TIME_LIMIT) > INDEX.END.SEC(1) THEN
GO TO COMPLETE ;
END ;
TIME_LIMIT = 15 ;

/**/
DOIT: IP = IP + TIME_LIMIT - ITIME + 1 ;
/**/
DO L = 1 TO NRANGE ;
III = 0 ;
DO II = 1 TO I+IDUCT-1 ;
III = III + 1 ; K = DATA.DUCT(II) ;
SUM = 0.0E+0 ;
DO IT = ITIME TO TIME_LIMIT ;
/**/
IF INREC_SEC(IT).FLOW(III).AF <= 0.E+0 THEN DO ;
IF FFV(1) < FFV_LIMIT THEN GO TO SKP ;
SUM = SUM + 1.E+0 ;
GO TO SKP ;
END ;
LAMBDA = 0.508E+0 * INREC_SEC(IT).FLOW(III).AF
* FFV(1) / (980.E+0 * A(K)) ;
LAMBDA = 4.5E+0 / LAMBDA ;
LAMBDA = (1.E+0 - EXP(-LAMBDA)) / -LAMBDA ;
SUM = SUM + 1.E+0 / ((1.E+0 - LAMBDA) * V(III) * A(K)
+ INREC_SEC(IT).FLOW(III).AF
+ LAMBDA) ;
/**/
SKP: END ;
DATA.Q(II,L) = DATA.Q(II,L) + SUM ;
END ;
END ;

/**/
ITIME = 1 ;
READ FILE(INPUT) SET(P) ;
GO TO MORE ;

/**/
COMPUTE4
PUT EDIT( ('IP', FLOW_POINTS * ) (A,F(4),A) ;
IF IP <= 0 THEN GO TO NEXT_TEST ;
DO II = 1 TO I+IDUCT-1 ;
SUM = 0.0E+0 ;
DO L = 1 TO NRANGE ;
DATA.Q(II,L) = DATA.Q(II,L) / IP ;
SUM = SUM + DATA.WP(II,L) * DATA.Q(II,L) ;
END ;
DO L = 1 TO NRANGE ;
IF DATA.WP(II,L) > 0.E+0 THEN IF DATA.Q(II,L) > 0.E+0 THEN DO ;
MM(L) = MM(L) + 1 ;
DATA.W(II,L) = DATA.WP(II,L) * DATA.Q(II,L) / SUM ;
W_AVG(L) = W_AVG(L) + DATA.W(II,L) ;
END ;
END ;
END ;

/**/

```

```

00002380
00002390
00002400
00002410
00002420
00002430
00002440
00002450
00002460
00002470
00002480
00002490
00002500
00002510
00002520
00002530
00002540

```

```

00002580
00002590
00002600
00002610
00002620
00002630
00002640
00002650
00002660
00002670
00002680
00002690
00002700
00002710
00002720
00002730
00002740
00002750

```

```

00002780
00002800
00002840
00002870
00002890
00002900
00002910
00002920
00002940
00002950

```

```

NEXT_TEST:
  END A9 ;
/*
  COMPUTE MASS LOADING
  */
DONE:
  DO L = 1 TO NRANGE ;
  IF MH(L) > 0 THEN W_AVG(L) = W_AVG(L) / MH(L) ;
  END ;
  DO I = 1 TO NDATA ;
  SUM = 0.0E+0 ; K = DATA.DUCT(I) ;
  DO L = 1 TO NRANGE ;
  SUM = SUM + Q(I,L)* W_AVG(L) ;
  END ;
  DATA.EMI(I) = A(K) * DATA.M(I) * SUM / LITTLE_A ;
  END ;
/*
  PRINT RESULTS
  */
  PUT PAGE EDIT('MASS LOADING COMPUTATIONS','TEST DUCT ISOKINETIC',
  'NO. NO. WEIGHT', 'L =', (L DO L = 1 TO NRANGE) ,
  ' ; )
  (COL(20),A,SKIP(3),COL(1),A,COL(1),A,COL(28),A,
  COL(31), (NRANGE) F(6),SKIP,COL(100),A) ;
  DO I = 1 TO NDATA ;
  DO L = 1 TO NRANGE ; IF DATA.M(I,L) < 0 THEN DATA.M(I,L) = 0;END;
  PUT EDIT(ATA,TEST(I),DATA.DUCT(I),DATA.EMI(I),Q(I,L) ,
  (DATA.Q(I,L) DO L = 1 TO NRANGE) , *W(I,L) ,
  (DATA.M(I,L) DO L = 1 TO NRANGE) ) (SKIP(2) ,
  COL(2),A(2) , COL(7),A(2) ,COL(10),E(12,5) , COL(24),A ,
  COL(31), (NRANGE) F(6,2) , COL(24),A ,
  COL(31), (NRANGE) F(6,1,2) ) ;
  IF I = 1 THEN PUT EDIT('W(L) ',(W_AVG(L) DO L = 1 TO NRANGE) )
  (COL(24),A,COL(31), (NRANGE) F(6,1,2) ) ;
  END ;
  END MASS ;
  //GO.INPUT DD OSM=ANDYDATA,UNIT=2400,DISP=(OLD,KEEP),LABEL=(1,SL),
  // DCB=(RECFM=FB,LRECL=3608,BLKSIZE=3608),
  // VOL=SER=00C190
  //GO.SYSIN DD *
  270613.00085720 1
  02040506030502 040401 050502 060603 0701020308010203090102031004050611040506
  190102032001020321010203
  2302 24010203
  0216370016385903114845115011041018151020100516081116105806110748110909
  071522541524308113425113627091143511146221015260915282511151904152105
  1214021214075013091151091658141516301519231512431712462816110403110742
  171112551115081815213115240019111041115152011080611104521105815110308
  22153708153920231515501518092414190814213599
  01 .8502 .8503 .8504 .8505 .6906 .6907 .07 .15 .29
  .001 .001 .002 .006 .025 .07 .15
  .73 6.60 40.9 246.5 1597.4
  0701 .1276.0626.1228.1628.0646.0198.0167.0387.1031.0236.0790.1139.0760
  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

```


0305 159.6	52.10401 172.2	19.80404 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 526.3	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 604.0	3.02001 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) %W(I, L) %W(L)	0.18 0.0 14.7	0.18 0.0 4.3	0.18 0.0 6.2	0.18 0.0 12.4	0.18 0.0 5.9	0.18 0.0 1.9	0.18 0.0 1.2	0.18 0.0 1.7	0.17 0.0 4.5	0.93 0.0 3.3	0.96 0.0 11.0	0.99 0.0 18.7	1.00 0.0 14.1
8A	02	5.25198E+04	Q(I, L) %W(I, L) %W(L)	.39 0.0	.39 0.0	.39 0.0	.39 0.0	.39 0.0	.39 0.0	.39 0.0	.39 0.0	.39 0.0	.73 0.0	.83 0.0	.95 0.0	.99 0.0
8A	03	1.02817E+06	Q(I, L) %W(I, L) %W(L)	1.11 14.7	1.11 4.3	1.11 6.2	1.11 12.4	1.11 5.9	1.10 1.4	1.09 1.2	1.07 1.7	1.01 4.5	1.11 3.3	1.00 11.0	0.99 18.7	1.00 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 either 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

<u>FIELD DESCRIPTION</u>	<u>FIELD TYPE</u>	<u>LENGTH IN BYTES</u>
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 corresponding 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 <u>#1</u> (MITRE TAPE 190)

DATA SET #4:

Source:	Film Analysis <u>#2</u> (MITRE TAPE PR4)

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

FIGURE C-11
DATA TRANSFER DETAIL

PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) :

SOURCE LISTING

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1 0 LIGHT: PROCEDURE OPTIONS(MAIN) ;
2 0 DCL TOTAS FIXED BIN (31) INIT (0) ;
3 0 DCL (COC,OID,LOC,WID) (0:4) FIXED BIN (31,6) INIT (5) (0) ;
4 0 DCL TABIN,BHTOLT FIXED BINARY (31) INIT (4) ;
5 0 DCL (HIT,SKIPBEE,TA,CORR) FIXED BIN (15) INIT (0) ;
6 0 DCL (PHAS,WIDTH,INDEX) FIXED BIN (31,6) INIT (0) ;
7 0 DCL FLAS (539) CHAR (1) INIT (1539) (' ') ;
8 0 DCL TPCHAR CHAR (1) DEFINED TH POSITION (2) ;
9 0 DCL A2CHAR CHAR (1) DEFINED ABIN POSITION (4) ;
10 0 BCL ENOISE FIXED BIN (15) INIT (6) ; /* FL > BL BIN NOISE TOL */
11 0 DCL ONCISE FIXEC BIN (15) INIT (7) ; /* DL > DD BIN NOISE TOL */
12 0 DCL (MAXMASS) DECIMAL FLOAT (6) INIT (0) ;
13 0 DCL F1 (15) CHAR (1) BASED (Q1) ;
14 0 DCL (IUP,EPS,TOPI,IDO,SCAN) FIXED BIN (15) INIT (0) ;
15 0 DCL (CF1,CF2,CF3,CF4,CF5,CF6) FIXED BIN (15) INIT (0) ;
16 0 DCL (CASOURCE,ONCHAR,ONLOC,ONCODE) BUILTIN ;
17 0 DCL BASS (539) FIXED BIN (15) INIT (1539) (0) ;
18 0 DCL S2Z2 FIXED BIN (31) INIT (1) ; DCL IND FIXED BIN (15) ;
19 0 DCL (BUG,BUGGY) FIXED BIN (15) INIT (0) ;
20 0 DCL RCUT DECIMAL FLOAT (6) INIT (10) ;
21 0 DCL DELTA DECIMAL FLOAT (6) INIT (14.5) ;
22 0 DCL HASD DECIMAL FLOAT (6) INIT (1.2) ;
23 0 DCL KCCP DECIMAL FLOAT (6) INIT (1.33) ;
24 0 DCL DLEG DECIMAL FLOAT (6) INIT (0.02714) ;
25 0 DCL (B0,FL,FD,FC,R,RIN,ME) (015) FLOAT DECIMAL (6) ;
26 0 DCL BL (015) DECIMAL FLOAT (6) BASED (S) ;
27 0 DCL B1 (15) FIXED BIN (15) BASED (SS) ;
28 0 DCL INREC CHAR (0600) VAR ; /* LARGER ? */
29 0 DCL (AVG2,THRESH,TEMP,CON,MASS) DECIMAL FLOAT (6) INIT (0) ;
30 0 DCL (11,J,LEN,INT,TH,NRO,NR1,STOP,CNT,REP) FIXED BIN (15) INIT (Q1) ;
31 0 DCL A2 FIXED BIN (31) INIT (0) ;
32 0 DCL INBIT (-1:539) BIT (8) BASED (Q) ; /* REF P94 TWO BYTE CON */
33 0 DCL 1 CARD BASED (T) ;
34 0 5 SN CHAR (5) ;
5 B1 CHAR (1) ;
5 TEST CHAR (2) ;
5 B2 CHAR (7) ;
5 HR CHAR (2) ;
5 MIN CHAR (2) ;
5 SEC CHAR (2) ;
5 B3 CHAR (4) ;
5 ROLL CHAR (2) ;
5 B5 CHAR (12) ;
5 REC_TYPE CHAR (1) ;
5 REC_SCAN CHAR (1) ;
5 B6 CHAR (4) ;

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BEE00470 5 SEQ CHAR (1) ,
BEE00480 5 B7 CHAR (14) ,
BEE00490 5 BEES FLOAT DECIMAL (6) ,
BEE00500 5 B7A CHAR (8) ,
BEE00510 5 TAPE CHAR (3) ,
BEE00520 5 B8 CHAR (5) ;
BEE00530 DCL TABLE (0:299) DECIMAL FLOAT (6) ;
BEE00540 DCL 1 NUREC ,
BEE00550 5 SN FIXED BIN (15) ,
BEE00560 5 TEST CHAR (2) ,
BEE00570 5 HR CHAR (2) ,
BEE00580 5 MIN CHAR (2) ,
BEE00590 5 SEC CHAR (2) ,
BEE00600 5 ROLL CHAR (2) ,
BEE00610 5 REC_TYPE CHAR (1) ,
BEE00620 5 REC_SCAN CHAR (1) ,
BEE00630 5 SEQ CHAR (1) ,
BEE00640 5 VAL (539) CHAR (1) ;
BEE00650 DCL 1 RECREC BASED (Q) ,
BEE00660 5 LONG FIXED BIN (15) ,
BEE00670 5 VAL (539) CHAR (1) ;
BEE00680 DCL ONEBIT (15) BIT (8) BASED (Y) ,
BEE00690 TWCBIT (15) BIT (8) BASED (Z) ;
BEE00700 DCL BASE (539) FLOAT DECIMAL (6) ;
BEE00710 DCL (F5,F0) (15) CHAR (2) INIT ((15)(2) ' ' ) ;
BEE00720 DCL (F2,F3,F4) (15) CHAR (1) INIT ((15)(1) ' ' ) ;
BEE00730 DCL AVG-ELEM (539) FLOAT DECIMAL (6) INIT ((539) 0) ;
BEE00740 DCL INPUT FILE INPUT RECORD SEQUENTIAL BUFFERED ;
BEE00750 DCL TELE FILE OUTPUT STREAM PRINT ;
BEE00760 DCL FARMS FILE INPUT STREAM ;
BEE00770 DCL TABVAL FILE INPUT RECORD SEQUENTIAL ;
BEE00780 DCL CART CHAR (80) BASED (1) ;
BEE00790 DCL RECKEY FILE INPUT SEQUENTIAL BUFFERED ;
BEE00800 OPEN FILE (REPC) OUTPUT STREAM PRINT PAGESIZE (64) LINESIZE (132) ,
BEE00810 FILE (TELE) OUTPUT STREAM PRINT LINESIZE (80) PAGESIZE (200) ,
BEE00820 FILE (SYSPRINT) OUTPUT STREAM PRINT LINESIZE (132) ,
BEE00830 FILE (PARMS) INPUT STREAM ,
BEE00840 FILE (TELE) ,
BEE00850 FILE (TABVAL) ;
BEE00860 ON ENPAGE (REPO) BEGIN : REP = 0 ; CNT = CNT + 1 ;
BEE00870 PUT FILE (REPO) EDIT (1,1CT THERE BE LIGHT AND DARK','PAGE',CNT,
BEE00880 *TEST',NUREC,TEST',ZERO PAL =',AVG2',HR:MIN:SEC',NUREC,HR,',',
BEE00890 NUREC',MIN,',',NUREC,SEC',',',BASE',SKIPBEE',SCAN',SCAN)
BEE00900 (PAGE',CCL(60),A,COL(120),A,F(6),COL(10),A,F(4),COL(20),A,F(15,3),
BEE00910 COL(64),A,X(2),3(p*99',A),COL(105),A,F(6),COL(120),A,F(6)) ;
BEE00920 PUT FILE (REPO) EDIT
BEE00930 (* LIGHT BAR GAP',+ PAL > BL',+ BL > BL',+ DL > DD (NOISE) ,
BEE00940 * ? DL < DD (INVALID10)',% 1/T > RCUT',+ BL < AVG BD (INVALID10)',(SKIP,
BEE00950 10 (A,X(1))) ; END ;

```

PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN);

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56 1 0 ON ENDFILE (INPUT) BEGIN : GO TO FINI : END ;
59 1 0 ON ENDFILE (RECKEY) BEGIN : GO TO FINI : END ;
62 1 0 ON CCVERSION BEGIN : PUT FILE (SYSPRINT) EDIT ('CONVERSION ERROR',
64 2 0 'ERROR CODE =',ONCODE,ONSOURCE,ONCHAR,ONLOC) (SKIP(3),A,A,F(6),
66 1 0 3(SKIP,A)) : GO TO GOOF : END ;
INIT:
0 = ADDR (INREC) ;
67 1 0 PUT FILE (TELE)EDIT ('ENTER MASD,KOOP,DLEG,RCUT,SZZZ,DELTA,ENOISE,
ONNOISE,BHTOL,SKIPBEE') (SKIP,A) ;
68 1 0 GET FILE (PARMS) DATA (MASD,KOOP,DLEG, /* DATA LIST OPTIONAL */
69 1 0 SZZZ,DELTA,RCUT,ENOISE,DNOISE,BHTOL,SKIPBEE):CON=MASD * KOOP * DLEG;
70 1 0 MAXMASS = CON * LOG (RCUT) ;
71 1 0 PUT FILE (SYSPRINT) DATA (MASD,KOOP,DLEG,RCUT,CON,BHTOL,
SZZZ,DELTA,ENOISE,DNOISE,MAXMASS,BHTOL,SKIPBEE) PAGE ;
72 1 0 PUT FILE (TELE) DATA (MASD,KOOP,DLEG,RCUT,CON,
SZZZ,DELTA,ENOISE,DNOISE,MAXMASS,SKIPBEE) ;
DC 1 = 0 TO 49 ;
73 1 0 READ FILE (TABVAL) SET (T) ;
74 1 1 GET STRING (CART) EDIT ((TABLE (J) DO J = 1 * 6 TO I * 6 + 5))
75 1 1 ((6(P'9V,999999E-99))) ;
ENC :
76 1 1 PUT FILE (SYSPRINT) EDIT ('FUNCTIONAL VALUES',TABLE (J) DO J =
77 1 0 0 TO 299)) (SKIP(3),COL(60),A,SKIP,50(SKIP,10(F(13,6)))) ;
78 1 0 CLOSE FILE (PARMS) , FILE (TABVAL) ;
79 1 0 OPEN FILE (INPUT) RECORD INPUT SEQUENTIAL BUFFERED ,
FILE (RECKEY) RECORD INPUT SEQUENTIAL BUFFERED ;
80 1 0 MO: READ FILE (RECKEY) SET (T) ;
81 1 0 IF CARD_REC_TYPE = 'B' I CARD_REC_SCAN = '1' THEN DO ;
82 1 1 READ FILE (INPUT) INTO (INREC) : GO TO MO : END ;
85 1 0 DO WHILE (SKIPBEE > IUP) : READ FILE (INPUT) INTO (INREC) ;
87 1 1 NRI = NRI + 1 : IF CARD_REC_TYPE = '*' THEN DO ;
89 1 2 LEN = LENGTH (INREC) ;
90 1 2 NUREC = CARD, BY NAME : NUREC = RECREC, BY NAME ;
92 1 2 END: REAC FILE (RECKEY) SET (T) ;
94 1 1 IF CARD_REC_TYPE = 'B' & CARD_REC_SCAN = '1' THEN IUP = IUP + 1 ;
95 1 1 PUT FILE (TELE) DATA (CART,NRI,NRO) SKIP : END ;
97 1 0 BASES:
98 1 0 READ FILE (INPUT) INTO (INREC) : ARI = NRI + 1 ;
99 1 0 LEN = LENGTH (INREC) ;
100 1 0 IF CARD_REC_SCAN = '3' I CARD_REC_TYPE = '*' THEN LEN = 999 ;
101 1 0 IF LEN = 539 I LEN = 540 THEN DO ; /* GOOD BASE RECORD */
102 1 1 NUREC = CARD, BY NAME ;
103 1 1 NUREC = RECREC, BY NAME ;
104 1 1 IF NUREC_REC_SCAN = '1' THEN DO : TH = 0 ;
106 1 2 DO I = 1 TO 539 ;
107 1 3 INT = INBIT (I) : BASS (I) = INT ;
109 1 3 BASE (I) = TABLE (INT) ;
110 1 3 IF (I > 20 & I < 51) I (I > 489 & I < 520) THEN DO ;
/* DETERMINE THRESHOLD VALUES */

```

PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) ;

```

111 1 4          TH = TH + INT ; END ;
112 1 3          END ;
113 1 3          PUT FILE (SYSPRINT) DATA (BASE,BASSI PAGE ;
114 1 2          IF NRI = NUREC.SN THEN GO TO GOOF ;
115 1 2          READ FILE (RECKEY) SET (I) ;
116 1 2          THRESH = TH ;
117 1 2          TH = (THRESH / 60) - DELTA ;
118 1 2          THRESH = TABLE (TH) ;
119 1 2          PUT FILE (SYSPRINT) DATA (THRESH,TH) ;
120 1 2          PUT FILE (TELE) DATA (THRESH,TH) ;
121 1 2          IF CARD.REC_TYPE = '8' I CARD.REC_SCAN = '2' THEN GO TO GOOF ;
122 1 2          ELSE GO TO BASES ; END ;
123 1 2          ELSE DO ; SKIPBEE = SKIPBEE + 1;SCAN,TA = 0;
124 1 1          S8: BHAS,CF1,A2 = 0; /* BASE 2 SUM OF INT VALUES */
125 1 1          DO I = 1 TO 539 ;
126 1 2          INT = INBIT (I) ;
127 1 2          IF BASE (I) < THRESH THEN DO :FLAS (I) = '*' ;
128 1 2          CF1 = CF1 + 1 ; IF I > 39 & I < 500 THEN BHAS = BHAS
129 1 2          + 1 ; END ; ELSE FLAS (I) = '*' ;
130 1 3          A2 = A2 + INT ; END ;
131 1 3          AVG2 = A2 ;
132 1 2          A2 = (AVG2 / 539.0) + 0.5 ;
133 1 2          AVG2 = TABLE (A2) ; ABIN = A2 + BHTOL ;
134 1 2          TOTOS = 0 ; INDEX = 40 ; TOPIN = 120 ;
135 1 4          DO I = 0 TO 4 ; MID(I),LOC(I),WIDTH = 0 ;
136 1 3          DO J = INDEX TO TOPIN ;
137 1 3          IF FLAS (J) = '*' THEN DO : LOC (I) = J ;
138 1 4          WIDTH = 1 ; TOPIN = J + 15 ; GO TO WHOLCHK ; END ;
139 1 2          ENCL:
140 1 2          PUT FILE (TELE) EDIT ('NO BASE B.H. ERROR ***) (SKIP,A) ;
141 1 2          GO TO SHIFTER ;
142 1 3          WHOLCHK:
143 1 3          DO J = J + 1 TO TOPIN ;
144 1 4          IF FLAS (J) = '*' THEN WIDTH = WIDTH + 1 ; ELSE GO TO ENHOLE ; END ;
145 1 3          ENHOLE: DO J = J + 1 TO TOPIN ;
146 1 4          IF FLAS (J) = '*' THEN GO TO SHIFTER ; END ;
147 1 3          IF WIDTH > 9 I WIDTH < 4 THEN GO TO SHIFTER ; ELSE GO TO BHOLE ;
148 1 3          SHIFTER: PUT FILE (TELE) EDIT ('BASE THRESHOLD ADJUSTMENT ***)
149 1 3          (SKIP,A) ; PUT FILE (TELE) DATA (I,J,WIDTH,TA,TH,THRESH,LOC,MID,A2,
150 1 3          AVG2) SKIP ;
151 1 3          GET FILE (PARMS) DATA (TH): THRESH = TABLE (TH) ; TA = TA + 1 ;
152 1 3          PUT FILE (TELE) DATA (TH,THRESH,TA): GO TO S8 ;
153 1 3          BHOLE: INDEX = LOC (I) + 80 ; TOPIN = INDEX + 15 ; MID (I) = WIDTH ;
154 1 3          TOTOS = TOTOS + WIDTH ; END ;
155 1 2          IF TOTOS = BHAS THEN DO : PUT FILE (TELE) EDIT ('EXTRA * PROBLEM')
156 1 3          (SKIP,A) ; PUT FILE (TELE) DATA (TOTOS,BHAS) SKIP ; END ;
157 1 2          PUT FILE (TELE) DATA (LOC,MID) SKIP ; TEMP = TABLE (ABIN) ;
158 1 2          PUT FILE (SYSPRINT) DATA (A2,AVG2,FLAS) SKIP ;
159 1 2          PUT FILE (TELE) DATA (A2,ABIN,CF1,BHAS,AVG2,TEMP) SKIP ;
160 1 2
161 1 3
162 1 3
163 1 3
164 1 3
165 1 3
166 1 3
167 1 3
168 1 3
169 1 3
170 1 3
171 1 3
172 1 3
173 1 3
174 1 3
175 1 3
176 1 3
177 1 3
178 1 3
179 1 3
180 1 3
181 1 3
182 1 3
183 1 3
184 1 3
185 1 3
186 1 3

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PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) ;

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187 1 2      READ FILE (RECKEY) SET (I) ;
188 1 2      IF CARD.REC_TYPE = '8' THEN GO TO BASES;
189 1 2      END ; END ;
191 1 0      ELSE DO ;
192 1 1      IF CARD.REC_TYPE = '*' THEN DO ;
193 1 2      READ FILE (RECKEY) SET (I) ;
194 1 2      GO TO BASES ; END ;
196 1 1      ELSE IF CARD.REC_SCAN = '3' & LENGTH (INREC) = 539
      THEN DC ;
      NUREC = CARD, BY NAME; NUREC = RECREC, BY NAME; READ FILE (RECKEY)
      SET (I) ;
      ENCL: ELSE GO TO GOOF; END;
      DATA: /* DATA REC #1 */
      READ FILE (INPUT) INTO (INREC) ; NRI = NRI + 1 ;
      LEN = LENGTH (INREC) ; IF CARD.REC_TYPE = '*' | CARD.REC_SCAN
      = '3' THEN DO ; LEN = 999 ; END;
      IF LEN = 539 THEN DO ; /* GOOD DATA RECORD # 1 */
      IF CARD.REC_TYPE = 'D' | CARD.REC_SCAN = '1' THEN GO TO GOOF ;
      NUREC = CARD, BY NAME ;
      NUREC = RECREC, BY NAME ;
      END ; ELSE IF CARD.REC_TYPE = '*' THEN DO ;
      READ FILE (RECKEY) SET (I) ; GO TO DATA ; END ;
      ELSE GO TO GOOF ;
      READ FILE (RECKEY) SET (I) ;
      DATMC:
      READ FILE (INPUT) INTO (INREC) ; NRI = NRI + 1 ;
      LEN = LENGTH (INREC) ;
      IF LEN = 539 THEN DO ; /*GOOD DATA RECORD # 2 */
      IF (CARD.REC_TYPE = 'D' | CARD.REC_SCAN = '2') THEN GO TO GOOF ;
      /* DATA FRAME_SHIFT */
      EPS = 20 ; SCAN = SCAN + 1 ;
      SHIFT: HIT = 0 ;
      DO I = 0 TO 4 ; DOC (I) = 0 ; DID (I) = 0 ; WIDTH = 0 ;
      INDEX = LOC (I) - EPS; IF INDEX < 20 THEN INDEX = 20 ;
      TOPIN = INDEX + 2 * EPS; IF TOPIN > 520 THEN TOPIN = 520 ;
      DC J = INDEX TO TOPIN;
      IF NUREC.VAL (J) < THCHAR & RECREC.VAL (J) < A2CHAR THEN
      CO ; DOC (I) = J ; WIDTH = 1 ;
      TOPIN = J + EPS ; GO TO HOLECHK ; END ;
      HOLECHK: DO J = J + 1 TO TOPIN ;
      IF NUREC.VAL (J) < THCHAR & RECREC.VAL (J) < A2CHAR
      THEN WIDTH = WIDTH + 1 ; ELSE GO TO ENDMOLD ;
      ENCL HOLECHK ;
      ENDMOLD:
      IF WIDTH > 3 & WIDTH < 9 THEN DO ; DID (I) = WIDTH ;
      HIT = HIT + 1 ; END ;
      ENCL ;
      IF HIT < 2 THEN GO TO NOSHIPT ;
225 1 1
227 1 1      SHIFT: HIT = 0 ;
228 1 1      DO I = 0 TO 4 ; DOC (I) = 0 ; DID (I) = 0 ; WIDTH = 0 ;
232 1 2      INDEX = LOC (I) - EPS; IF INDEX < 20 THEN INDEX = 20 ;
234 1 2      TOPIN = INDEX + 2 * EPS; IF TOPIN > 520 THEN TOPIN = 520 ;
236 1 2      DC J = INDEX TO TOPIN;
237 1 3      IF NUREC.VAL (J) < THCHAR & RECREC.VAL (J) < A2CHAR THEN
238 1 4      CO ; DOC (I) = J ; WIDTH = 1 ;
240 1 4      TOPIN = J + EPS ; GO TO HOLECHK ; END ;
244 1 2      HOLECHK: DO J = J + 1 TO TOPIN ;
245 1 3      IF NUREC.VAL (J) < THCHAR & RECREC.VAL (J) < A2CHAR
246 1 3      THEN WIDTH = WIDTH + 1 ; ELSE GO TO ENDMOLD ;
247 1 3      ENCL HOLECHK ;
248 1 2      ENDMOLD:
249 1 3      IF WIDTH > 3 & WIDTH < 9 THEN DO ; DID (I) = WIDTH ;
250 1 3      HIT = HIT + 1 ; END ;
252 1 2      ENCL ;
253 1 1      IF HIT < 2 THEN GO TO NOSHIPT ;

```

PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) ;

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254 1 1 BHAS,INDEX = 0 ;
255 1 1 PUT FILE (TELE) DATA (HIT,EPS,DCC,DID) ;
256 1 1 DO I = 0 TO 4 ; IF DID (I) > 0 THEN DO ;
257 1 1 WIDTH = DCC (I) + (DID (I) / 2) - (LOC (I) + (WID (I) / 2)) ;
258 1 3 IF INDEX = 0 THEN DO ; BHAS,INDEX = WIDTH ;
259 1 3 /* SET SHIFT BASED ON FIRST BH ***** */
260 1 4 END ; ELSE DO ;
261 1 4 IF ABS (INDEX - WIDTH) < 5 THEN BHAS = BHAS + WIDTH ;
262 1 4 ELSE DO ;
263 1 4 /* SHIFT SHOULD NOT DIFFER BY MORE THAN 5 CHAR */
264 1 4 PUT FILE (TELE) EDIT
265 1 5 ('VARIABLE SHIFT ERROR **** PROCESSING CONTINUES') (SKIP(3),A) ;
266 1 5 PUT FILE (TELE) DATA (I,INDEX,WIDTH,DCC,DID,LOC,WID,BHAS) ;
267 1 5 GO TO NOSHIFT ; END;
268 1 5 END; END;
269 1 5 INDEX = DIVIDE (BHAS,HIT,31,5) ; INDEX = ROUND (INDEX,1) ;
270 1 5 WIDTH = INDEX / 15 ; WIDTH = ROUND (WIDTH,1) ;
271 1 5 IF INDEX = 0 THEN GO TO NOSHIFT;
272 1 1 IF INDEX > 0 THEN DO ; IUP = 35 - WIDTH ; IDO = 0 ;
273 1 1 STOP = 539 - IUP * 15 ; END ; ELSE DO ; IUP = 35 ; STOP = 14 ;
274 1 1 ICC = 0 - WIDTH ; END ;
275 1 2 PUT FILE (TELE) DATA (INDEX,WIDTH,IUP,IDO,STOP,BHAS,HIT) SKIP;
276 1 2 GO TO LOOP ;
277 1 1 NCSHIFT: STOP = 14 ; IUP = 35 ; INDEX,WIDTH,IDO = 0 ;
278 1 1 LOOP: REP = 20 ; MASS = 0 ;
279 1 1 DO I = IUP TO IDO BY -1 ;
280 1 1 DO J = 1 TO 15 ; F2(J),F3(J),F4(J),F5(J),F6(J) = ' ' ; END ;
281 1 2 IF I = IDO THEN DO ; IF INDEX < 0 THEN DO ; STOP = 15 + INDEX
282 1 2 + WIDTH * 15 ; IND = (I * 15) + 16 - STOP ;
283 1 2 PUT FILE (TELE) DATA (I,IDO,STOP,IND) ;
284 1 2 END; END; ELSE INC = (I * 15) + 1 ;
285 1 2 S = ADDR (BASE (IND)) ; /* ONEBIT - FRAME LIGHT */
286 1 2 SS = ADDR (BASE (IND)) ; /* TWOBIT - FRAME DARK */
287 1 2 CL = ADDR (FLAS (IND)) ;
288 1 2 IND = IND + INDEX ; IF IND < 1 THEN DO ; IND = 1 ;
289 1 2 PUT FILE (TELE) EDIT ('IND < 1 **** ERROR') (SKIP,A) ;
290 1 2 PUT FILE (TELE) DATA (I,IDO,INDEX,STOP,WIDTH) ; END;
291 1 2 ELSE IF IND + STOP > 540 THEN DO ; IND = 540 - STOP ;
292 1 2 PUT FILE (TELE) EDIT ('IND > 540 **** ERROR') (SKIP,A) ;
293 1 2 PUT FILE (TELE) DATA (I,IUP,INDEX,STOP,WIDTH) ; END;
294 1 2 Y = ADDR (NUREC,VAL (IND)) ; Z = ADDR (RECREC,VAL (IND)) ;
295 1 2 DO J = 1 TO STOP ;
296 1 2 IF FL (J) = '*' THEN DO ;
297 1 2 FL(J) = TABLE (ONEBIT (J)) ; F0(J) = TABLE (TWOBIT (J)) ;
298 1 2 IF F0(J) > BL(J) THEN DO ; F2(J) = '*' ; CF2 = CF2 + 1 ; END;
299 1 2 /* REE'S LAW
300 1 2 IF FL(J) > BL(J) THEN DO ; INT = ONEBIT (J) ;
301 1 2 INT = INT - BI (J) ; IF INT > ENOISE THEN DO ;
302 1 2 BUGGY = BUGGY + 1 ;
303 1 2
304 1 2
305 1 2
306 1 2
307 1 2
308 1 2
309 1 2
310 1 2
311 1 2
312 1 2
313 1 2
314 1 2
315 1 2
316 1 2
317 1 2
318 1 2
319 1 2
320 1 2
321 1 2
322 1 2
323 1 2
324 1 2
325 1 2
326 1 2
327 1 2
328 1 2
329 1 2
330 1 2
331 1 2
332 1 2
333 1 2
334 1 2

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PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) ;

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335 1 6      ..F3 (J) = 'S' ; IF INT < 100 THEN PUT
337 1 6      STRING (F0 (J)) EDIT (INT) (P'Z9') ; ELSE F0 (J) = 'I' ;
338 1 6      END ; ELSE DO ;BUG = BUG + 1 ;F3(J) = 'S' ;
342 1 6      END ; END ;
344 1 4      TEMP = FL(J) - FO(J) ;
345 1 4      IF TEMP <= 0 THEN DO ;
/* 8EE'S SECOND LAW */
346 1 5      INT = ONEBIT (J) ; INT = TWOBIT (J) - INT ;
348 1 5      IF INT < DNOISE THEN DO ;
349 1 6      F4 (J) = 'M' ; CF5 = CF5 + 1 ; MASS = MASS + MAXMASS ;
352 1 6      ME(J) = MAXMASS ; R(J) = 1.0 ; RIN (J) = 0 ; END ;
356 1 5      ELSE DO ;
357 1 6      F4(J) = 'I' ;
358 1 6      IF INT < 100 THEN
PUT STRING (F5 (J)) EDIT (INT) (P'Z9') ;
ELSE F5 (J) = 'I' ;
R(J),RIN(J),ME(J) = 0 ; CF3 = CF3 + 1 ;
END ; END ;
ELSE DO ;
R(J) = (BL(J) - AVG2) / TEMP ;
IF R(J) > RCUT THEN DO ; F3(J) = 'I' ;CF4 = CF4 + 1 ;
MASS = MASS + MAXMASS ;
ME (J) = MAXMASS ; RIN (J) = LOG (R (J)) ; END ; ELSE DO ;
IF R(J) >= 1 THEN DO ;
RIN (J) = LOG (R(J)) ; ME(J) = CON * RIN(J) ;
MASS = MASS + ME (J) ;
END ; ELSE DO ; RIN (J) = 0 ;
F4 (J) = 'I' ; ME(J) = 0 ; CF6 = CF6 + 1 ;
END ; END ; END ; ELSE RIN(J),ME(J),R(J) = 0 ; END ;
IF REP > 6 THEN SIGNAL ENDPAGE (REPO) ;
PUT FILE (REPO) EDIT ('DATA D',(FD(J)) DO J = STOP TO 1 BY -1),REPO3220
'BASE L',(BL(J)) DO J = STOP TO 1 BY -1),REPO3230
'DATA L',(FL(J)) DO J = STOP TO 1 BY -1),REPO3240
'1/T',(R(J)) DO J = STOP TO 1 BY -1),REPO3250
'EL MASS',(ME(J)) DO J = STOP TO 1 BY -1),REPO3260
'LN1/T',(RIN(J)) DO J = STOP TO 1 BY -1),REPO3270
'FLAGS',IND,(F1(J),F2(J),F3(J),F4(J),F5(J)) DO REPO3280
J = STOP TO 1 BY -1) (SKIP,4(SKIP,A,COL(11),REPO3290
(STOP) (F(8,3)),SKIP,A,COL(11),(STOP) (F(8,5)),SKIP,A,COL(11),REPO3300
(STOP) (F(8,3)),SKIP,A,F(4),COL(11),(STOP) (6 (A))) ;
REP = REP + 1 ;
IF STOP < 15 THEN STOP = 15 ;
END ; END ;
ELSE IF CARD.REC_TYPE = '*' THEN DO ;
READ FILE (RECKEY) SET (I) ; GO TO DATMO ; END ;
ELSE GO TO GOGF ;
PUT FILE (REPO) EDIT ('ZERO PAL =',AVG2,'TOTAL FRAME MASS RATE',REPO3390
',MASS) (SKIP(3),COL(11),A,F(12,3),COL(61),A,F(12,3)) ;

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PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) ;

STMT LEV NT

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402 1 0 PUT FILE (REPO) EDIT ('FLAG SUMMARIES',**,'CF1','**,'CF2','**',BUG,
    '$',BUGGY,'**,'CF5','7','CF3','8','CF4','9','CF6') (SKIP(2),COL(50),A,
    SKIP(2),10 (COL(50),A,F(6))) ;
403 1 0 BEES = MASS ;
404 1 0 PUT FILE (REPO) EDIT ('ALIGNMENT SHIFT ='',INDEX,
    'NUMBER CF HOLES MATCHED',HIT) (SKIP (3),2 (COL(40),A,COL(65),
    F(5))) ;
405 1 0 BUG,BUGGY = 0 ;
406 1 0 CF2,CF3,CF4,CF5,CF6 = 0 ;
407 1 0 NUREC = CARD, BY NAME ;
408 1 0 NUREC = RECREC, BY NAME ;
409 1 0 CHECK :
    IF SZZZ < SCAN THEN GO TO FINI ;
    READ FILE (RECKEY) SET (T) ;
    IF CARD_REC_SCAN = '3' THEN DO ; READ FILE (INPUT) INTO (INREC) ;
    NRI = NRI + 1 ;
    GO TO CHECK ; END ;
    IF CARD_REC_TYPE = 'D' THEN GO TO DATA ;
    ELSE IF CARD_REC_TYPE = '*' THEN DO ;
    - READ FILE (INPUT) INTO (INREC) ; NRI = NRI + 1 ;
    GO TO CHECK ; END ;
    ELSE IF CARD_REC_TYPE = 'B' & CARD_REC_SCAN = '1' THEN GO TO BASES ;
    ELSE GO TO FINI ;
    GOOF: /* SYN PROBLEMS */
    PUT FILE (TELE) EDIT ('ERROR *** OUT OF SYNCHRONIZATION')
    (PAGE,A) ;
    PUT FILE (TELE) DATA (NRI,LEN,CARD,SN,CARD,TEST,CARD,HR,
    CARD,MIN,CARD,SEC,CARD,ROLL,CARD_REC_TYPE,CARD_REC_SCAN,CARD,TAPE,
    I,J,STCP) ;
    FINI:
    PUT FILE (TELE) EDIT ('FINI *****',REC IN',NRI,
    'REC OUT',NRDI (SKIP,A,SKIP,2(A,F(6),X(2))) ;
    PUT FILE (SYSPRINT) EDIT ('REC IN',NRI,'REC OUT',NRDI (SKIP(2),
    2(A,F(6),SKIP)) : RETURN ;
    FLEAR: PUT FILE (TELE) EDIT
    ('BASE LIGHT * FLAG ERROR ***') (SKIP(2),A) ;
    PUT FILE (SYSPRINT) DATA (FLAS,I,J,INDEX,WIDTH,MID,LOG,TOTAS,BHAS) ;
    GO TC FINI ;
    END LIGHT ;

```

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BEE03410
BEE03420
BEE03430
BEE03440
BEE03450
BEE03460
BEE03470
BEE03480
BEE03490
BEE03500
BEE03510
BEE03520
BEE03530
BEE03540
BEE03550
BEE03560
BEE03570
BEE03580
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BEE03650
BEE03660
BEE03670
BEE03680
BEE03690
BEE03700
BEE03710
BEE03720
BEE03730
BEE03740
BEE03750
BEE03760
BEE03770
BEE03780
BEE03790

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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) 1,128,137,139,140,141,142,168,185,186
9	AZCHAR	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) 1,128,134,134,179,181,186,254,260,263,266,272,287,430
174	BHOLE	/* STATEMENT LABEL CONSTANT */ 166
4	BHTOL	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,0)

PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) ;

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
28	BI	1,68,71,71,142 (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	UNDOISE	AUTOMATIC ALIGNED INITIAL BINARY FIXED (15,0) 1,68,71,72,348
3	DDC	(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)

LIGHT: PROCEDURE OPTIONS(MAIN) :

PL/I OPTIMIZING COMPILER

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
26	FC	1,225,232,234,240,255 (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	F0	(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) 1,296,345,357,381,391
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) 1,227,250,253,255,272,287,404
244	HOLECHK	/* STATEMENT LABEL CONSTANT */ 241
34	HR	/* IN CARD */ BASED UNALIGNED CHARACTER (2) 90,102,197,211,407,425

PL/I OPTIMIZING COMPILER

LIGHT: PROCEDURE OPTIONS(MAIN) :

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) 1,73,75,75,106,106,107,108,109,110,110,110,110,129,129,130,131,132,134, 134,136,146,146,147,147,150,168,174,176,228,228,229,230,232,238,249,256,256, 257,258,258,258,266,266,294,294,301,302,305,313,318,425,430
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) 301,302,305,306,307,308,309,310,311,315,316,320,321,391
6	INDEX	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,61) 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) 1,75,75,75,77,77,77,148,148,149,150,152,158,158,159,162,162,162,163,168, 236,236,237,237,238,240,244,244,245,245,295,295,296,296,296,296,296,322, 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, 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)

PL/I OPTIMIZING COMPILER LIGHT: PROCEDURE OPTIONS(MAIN) :

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
*****	LENGTH	1,89,99,100,101,101,205,207,209,222,223,425
1	LIGHT	BUILTIN 89,99,196,205,222
3	LOC	EXTERNAL ENTRY RETURNS(BINARY FIXED (15,0)) (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	MOSHIFT	/* 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

LIGHT: PROCEDURE OPTIONS(MAIN) ;

PL/I OPTIMIZING COMPILER

DCL NO.	IDENTIFIER	ATTRIBUTES AND REFERENCES
36	NUREC	AUTOMATIC /* STRUCTURE */
16	ONCHAR	BUILTIN 63
16	ONCODE	BUILTIN 63
38	ONEBIT	{15} BASED (V) UNALIGNED BIT (8) 324,331,346
16	UNLOC	BUILTIN 63
16	ONSOURCE	BUILTIN 63
45	PARMS	EXTERNAL FILE STREAM INPUT 49,68,78,169
***** 0		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 */

PL/I OPTIMIZING COMPILER		LIGHT: PROCEDURE OPTIONS(MAIN) :	
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	S8	/* 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)	

LIGHT: PROCEDURE OPTIONS(MAIN) :

PL/I OPTIMIZING COMPILER

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) 1,145,148,152,158,162,175,234,235,236,240,244
2	TOTAS	AUTOMATIC ALIGNED INITIAL BINARY FIXED (31,0) 1,143,177,177,179,181,430
38	TWOBIT	(15) BASED (2) 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 RECRC */ 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) 1,147,151,159,165,168,176,177,231,239,245,248,249,258,260, 260,263,266,274,275,278,285,287,291,300,313,318,430
***** 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 then 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.

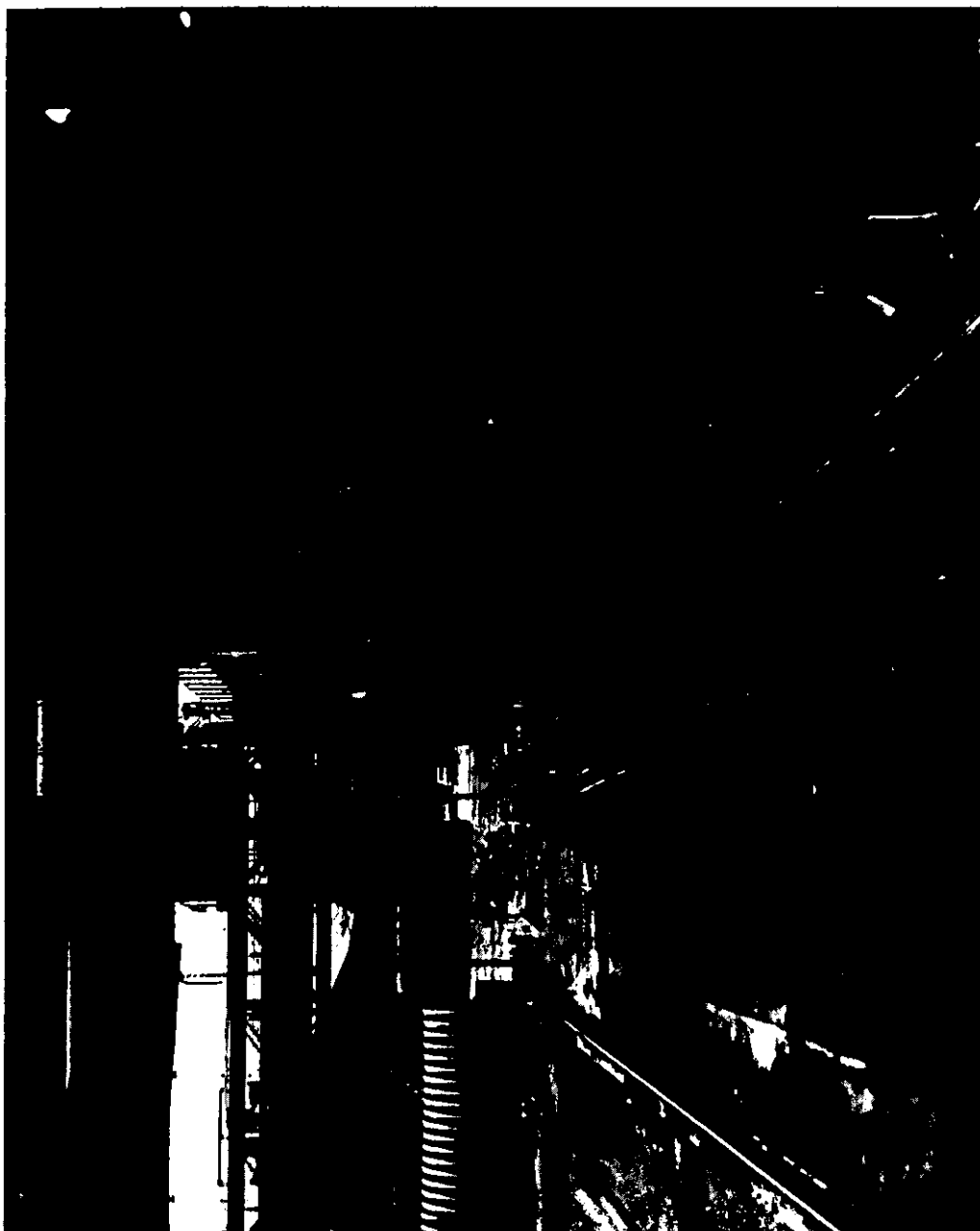


FIGURE D-1
LEAKING COKE OVEN DOORS

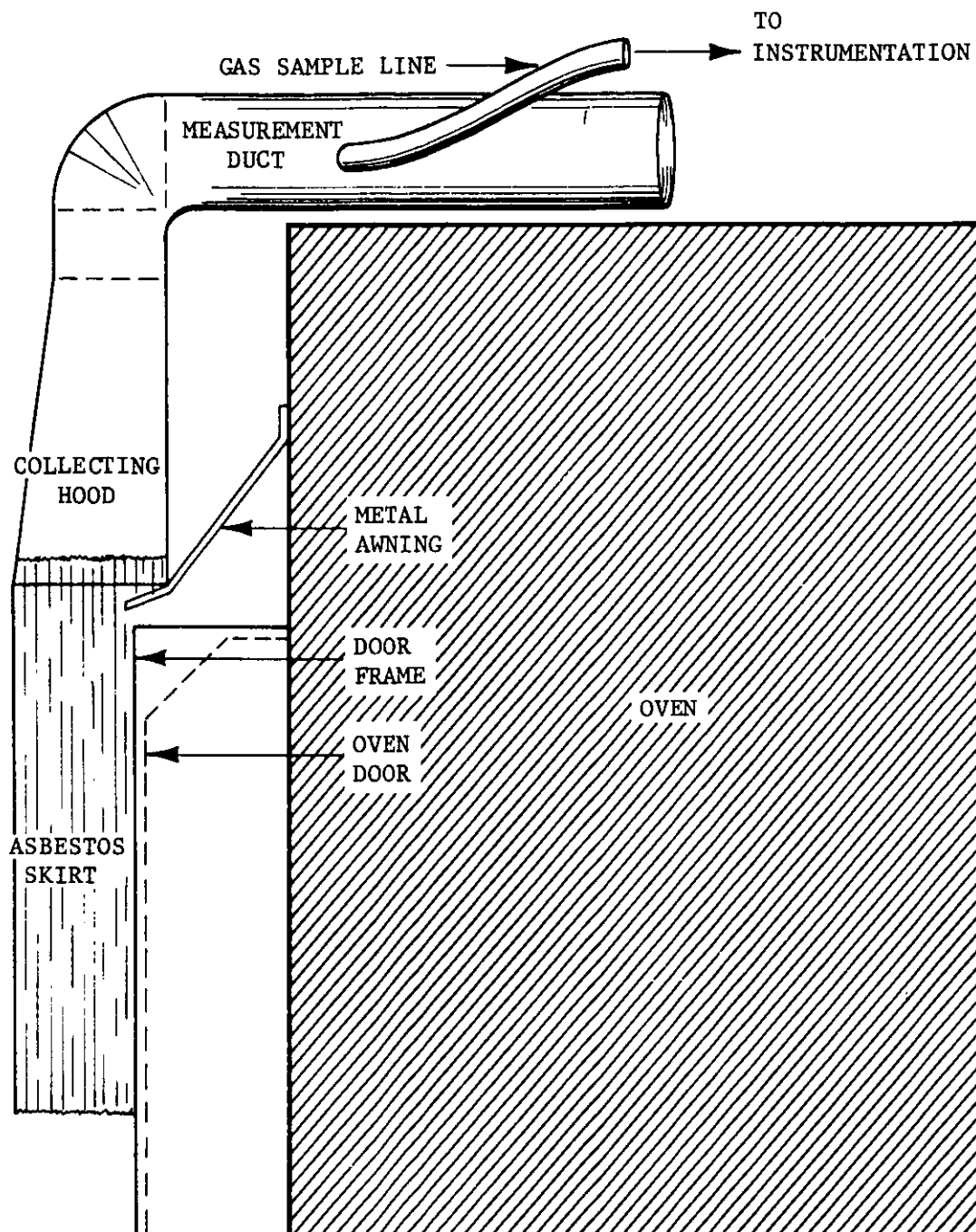


FIGURE D-3
CROSS-SECTIONAL VIEW OF LEAKING COKE OVEN DOOR
COLLECTING & MEASUREMENT EQUIPMENT

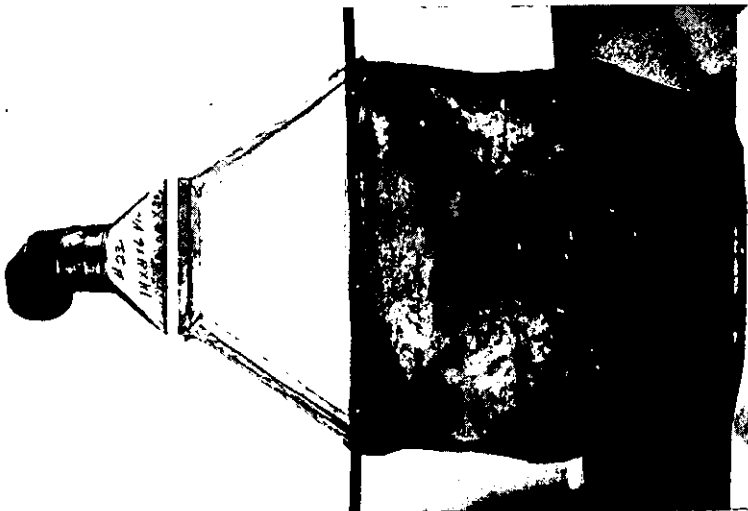


FIGURE D-4
COLLECTING HOOD

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

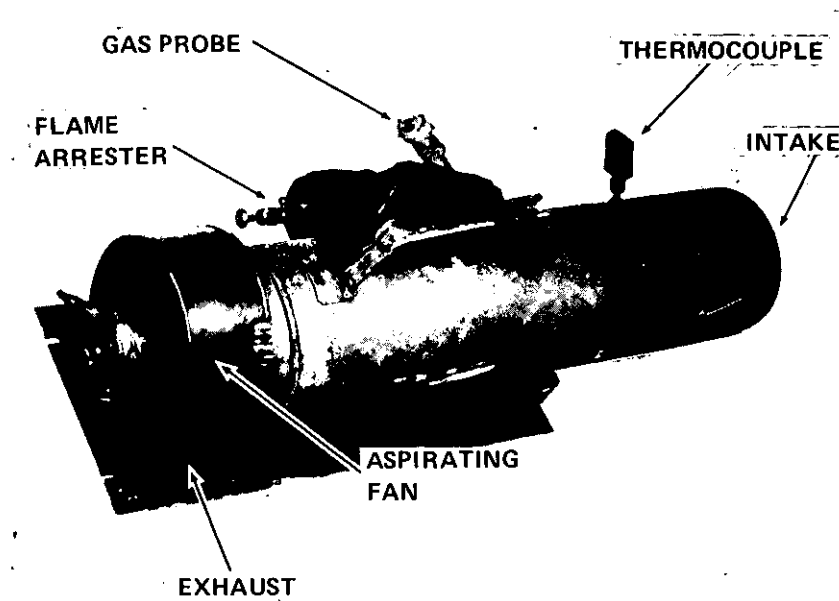


FIGURE D-6
MEASUREMENT DUCT

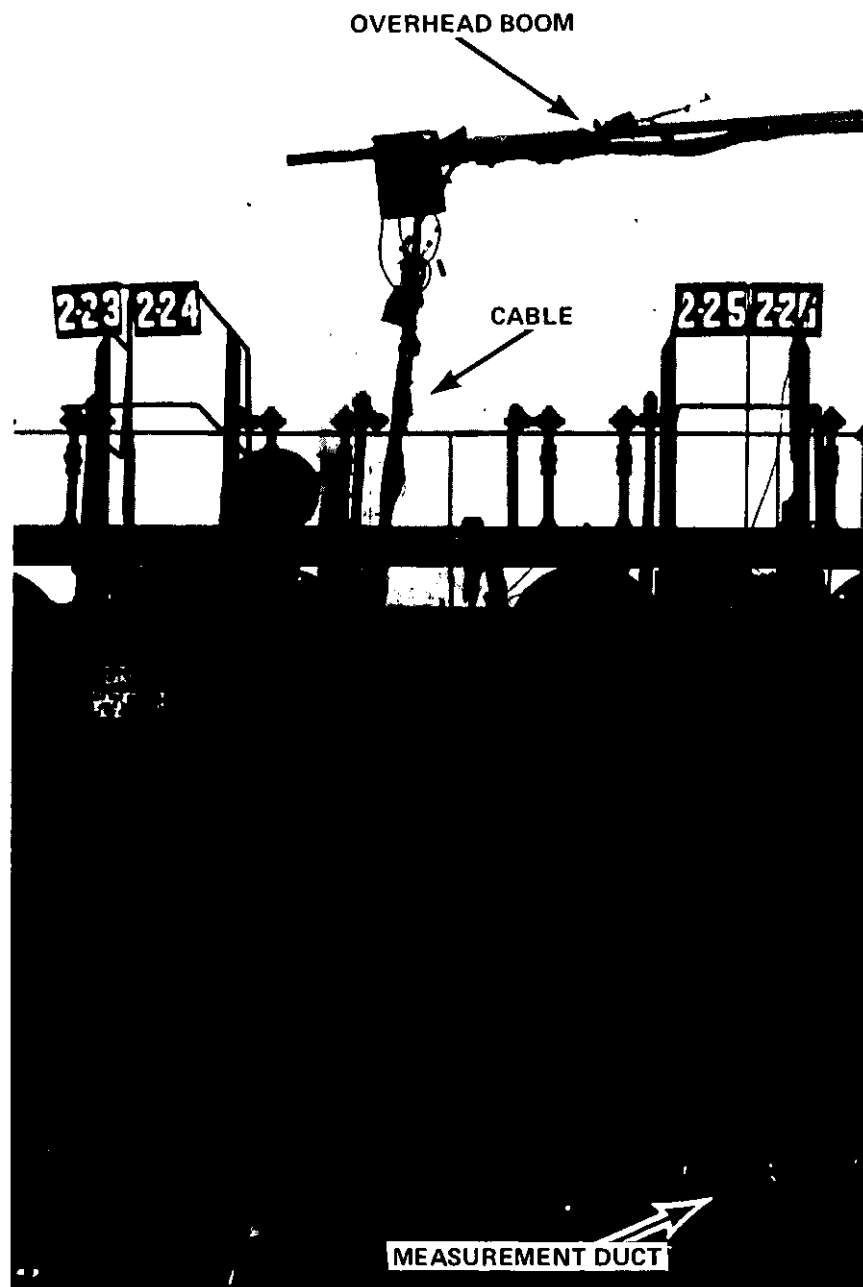


FIGURE D-7
MEASUREMENT DUCT IN PLACE ON OVEN



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:

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

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

TEST # <u>1</u>		DATE <u>8/8/73</u>		OVEN <u>2-27</u>		TEMP <u>101°F</u>		BAROMETRIC PRESSURE <u>29.42</u>						
OVEN CHARGED AT <u>0630</u>														
TIME (EDST)	NO		NO _x		THC	CO		CO ₂		H ₂	O ₂	Temp.		
	ppm	cfm	ppm	cfm		%	cfm	%	cfm				%	cfm
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 # <u>2</u>		DATE <u>8/9/73</u>		OVEN <u>2-27</u>		TEMP <u>109°F</u>		BAROMETRIC PRESSURE <u>29.31</u>	
OVEN CHARGED AT <u>0330</u>									
	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 .35	<.1 -	<.1 -	< 1 -		160	

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

TEST # <u>3</u>		DATE <u>8/13/73</u>		OVEN <u>2-26</u>		TEMP <u>116°F</u>		BAROMETRIC PRESSURE <u>29.58</u>		
OVEN CHARGED AT <u>0840</u>										
	NO	NO _x		THC	CO	CO ₂		H ₂	O ₂	Temp.
TIME (EDST)	ppm cfm	ppm cfm	ppm cfm	ppm cfm	% cfm	% cfm	% cfm	% cfm	% cfm	°F
1415	<.5 -	15 .	.002	1600 .190	<.1 -	<.1 -	<.1 -	<1 -		200*
1445	<.5 -	20 .	.002	2000 .238	<.1 -	<.1 -	<.1 -	<1 -		200
1500	<.5 -	20 .	.002	2100 .250	<.1 -	<.1 -	<.1 -	<1 -		200
1515	<.5 -	20 .	.002	1800 .214	<.1 -	<.1 -	<.1 -	<1 -		200
1535	<.5 -	20 .	.002	2200 .261	<.1 -	<.1 -	<.1 -	<1 -		200
1545	<.5 -	15 .	.002	1100 .131	<.1 -	<.1 -	<.1 -	<1 -		200
										*All Temp. Assumed

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

TEST # <u>4</u>		DATE <u>8/16/73</u>		OVEN <u>3-23</u>		TEMP _____		BAROMETRIC PRESSURE <u>29.58</u>							
OVEN CHARGED AT <u>1130</u>															
TIME (EDST)	NO		NO _x		THC		CO		CO ₂		H ₂		O ₂		Temp.
	ppm	cfm	ppm	cfm	ppm	cfm	%	cfm	%	cfm	%	cfm	%	cfm	
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:

$$F = \frac{F' P' T}{P T'} \quad (D-2)$$

$$F = \frac{150 \text{ CFM} \times P' \text{ in. Hg} \times (460^\circ + 70^\circ\text{F}) ^\circ\text{R}}{29.92 \text{ in. Hg} \times (460 + T^\circ\text{F}) ^\circ\text{R}} \quad (D-3)$$

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:

$$\frac{.0448 \text{ lb}}{\text{cu ft}} \times \frac{.35 \text{ cu ft}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} \times 19 \text{ hr} = \frac{17.9 \text{ lb}}{15 \text{ ton charge}} \quad (D-4)$$
$$= 1.2 \text{ lb/ton}$$

*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.

<u>Weight Grams</u>	<u>Stage Size (μ)</u>	<u>Weight %</u>
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/m³

*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 ungreaed 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
CAROUSEL INTERIOR EXPOSED

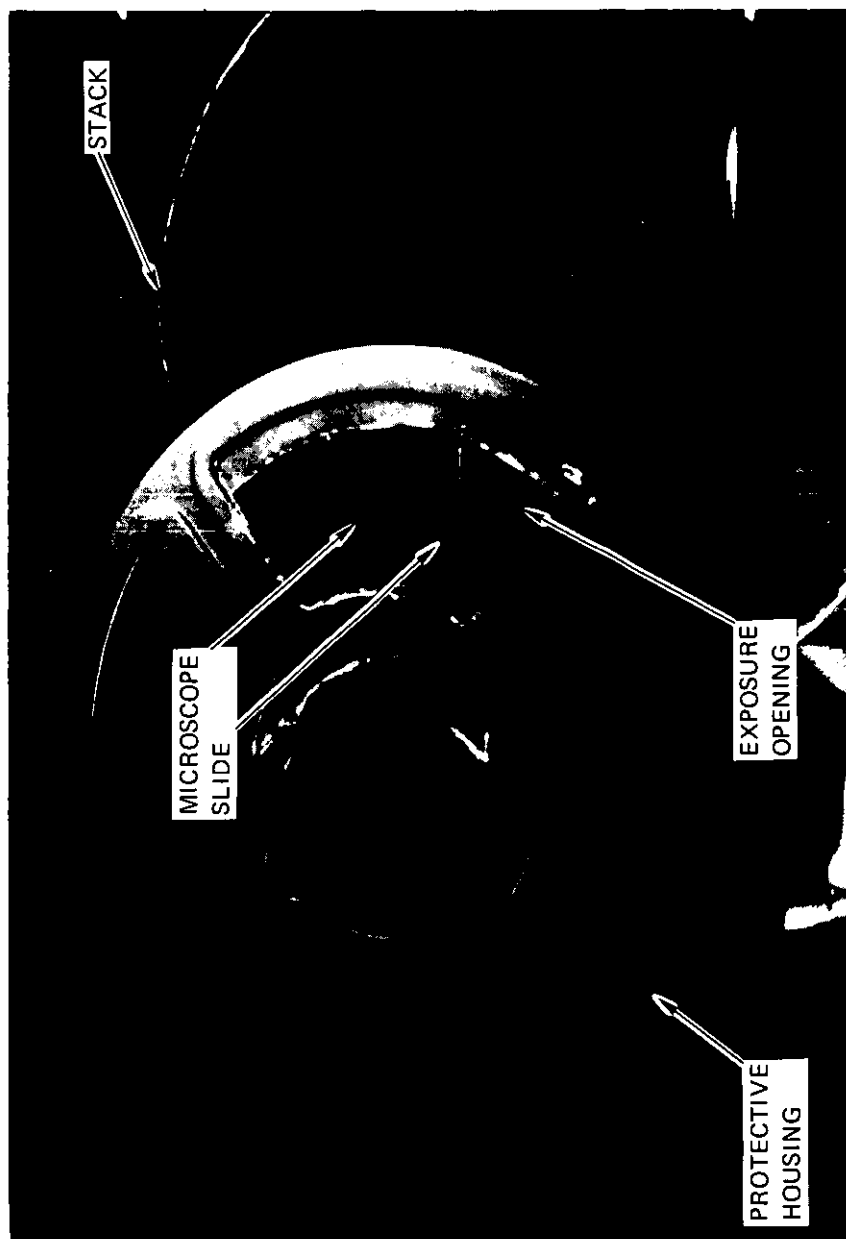


FIGURE E-3
CARROUSEL IN OPERATIONAL CONFIGURATION

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

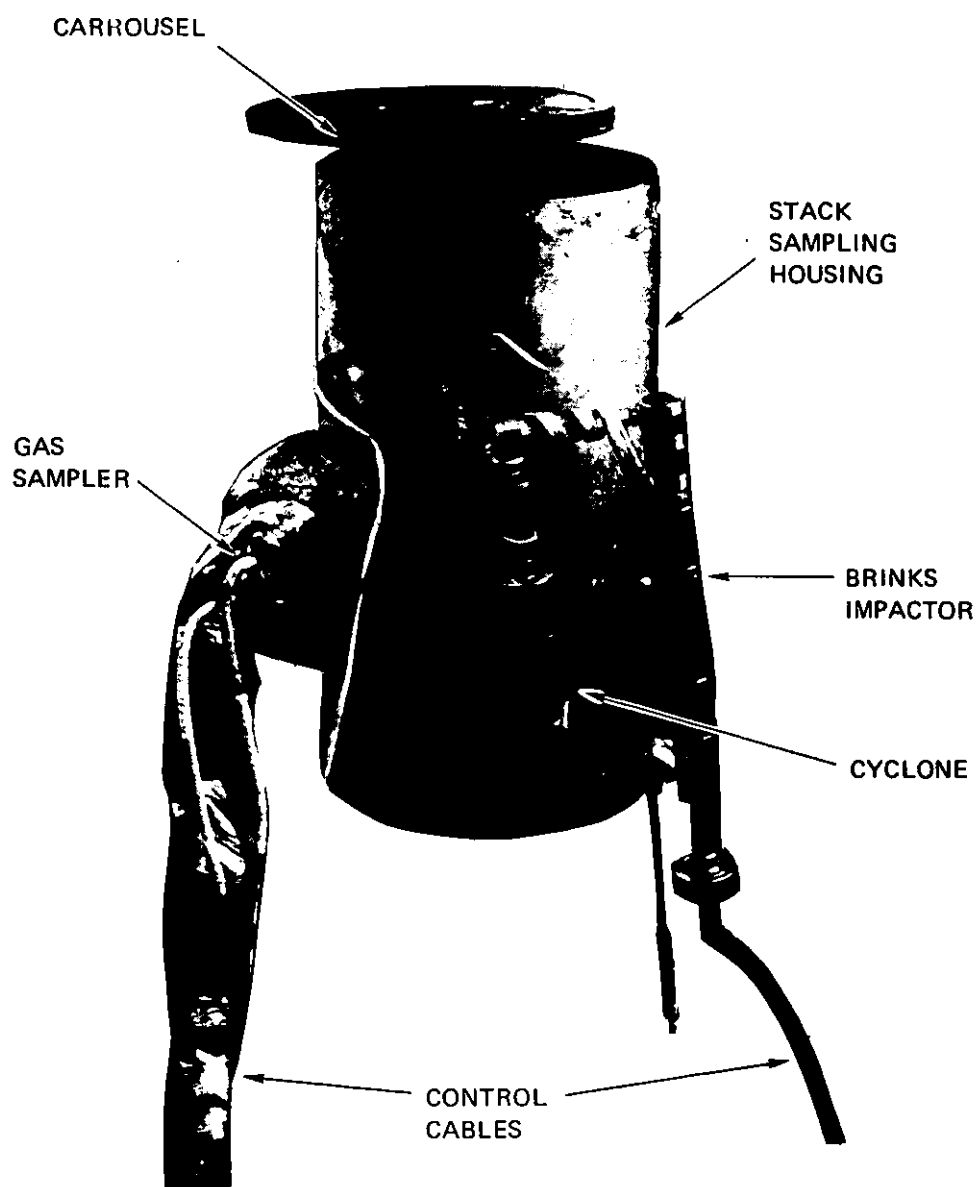


FIGURE E-4
HOUSING WITH TWO PARTICULATE SAMPLERS

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 $965 \mu\text{m}^2$ and $241 \mu\text{m}^2$ 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:

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

*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} $\equiv$ the number of particles in (unmeasured) range 1
of batch 2

N_{11} $\equiv$ the number of particles in range 1 of batch 1

N_{i2} $\equiv$ the number of particles in range i of batch 2

N_{i1} $\equiv$ 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 $> 1000\mu$ 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 4.6 μ m and larger, the data analyzed will include only the size ranges where the particles were larger than 18.4 μ m. 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 20 μ m under the stated operating conditions
- b) the Andersen sampler adequately sized particles up to 20 μ m
- 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 18 μ m (corrected for collection efficiency) the mean number diameter is 35 μ m. 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/cm³ by using the formula:

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

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
10 μ	.12	0	
20 μ	.48	.35	2.86
30 μ	1.08	.62	1.61
40 μ	1.92	.72	1.39
50 μ	4.32	.84	1.19
80 μ	7.68	.9	1.11
100 μ	12.00	.93	1.08
120 μ	17.28	.95	1.05
160 μ	30.72	.97	1.03
200 μ	48.00	.99	1.01
300 μ	108.00	.995	1
400 μ	192.00	1	1

TABLE E-2
TEST 22

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER:			TOTAL PARTICLES
	300	RANGE IN DIVISION*	150	RANGE IN DIVISION**
4.6 to 9.2	245	1 - 2	610	855
9.2 to 18.4	99	2 - 4	260	359
18.4 to 36.8	41	4 - 8	110	151
36.8 to 73.6	34	8 - 16	62	96
73.6 to 147.2	13	16 - 32	38	51
147.2 to 230	7		17	24
>230	3		8	11
TOTAL	442-		1,105	1,547
# of Scans	103	Area/Scan $241 \mu^2$	59	Area/Scan $965 \mu^2$
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

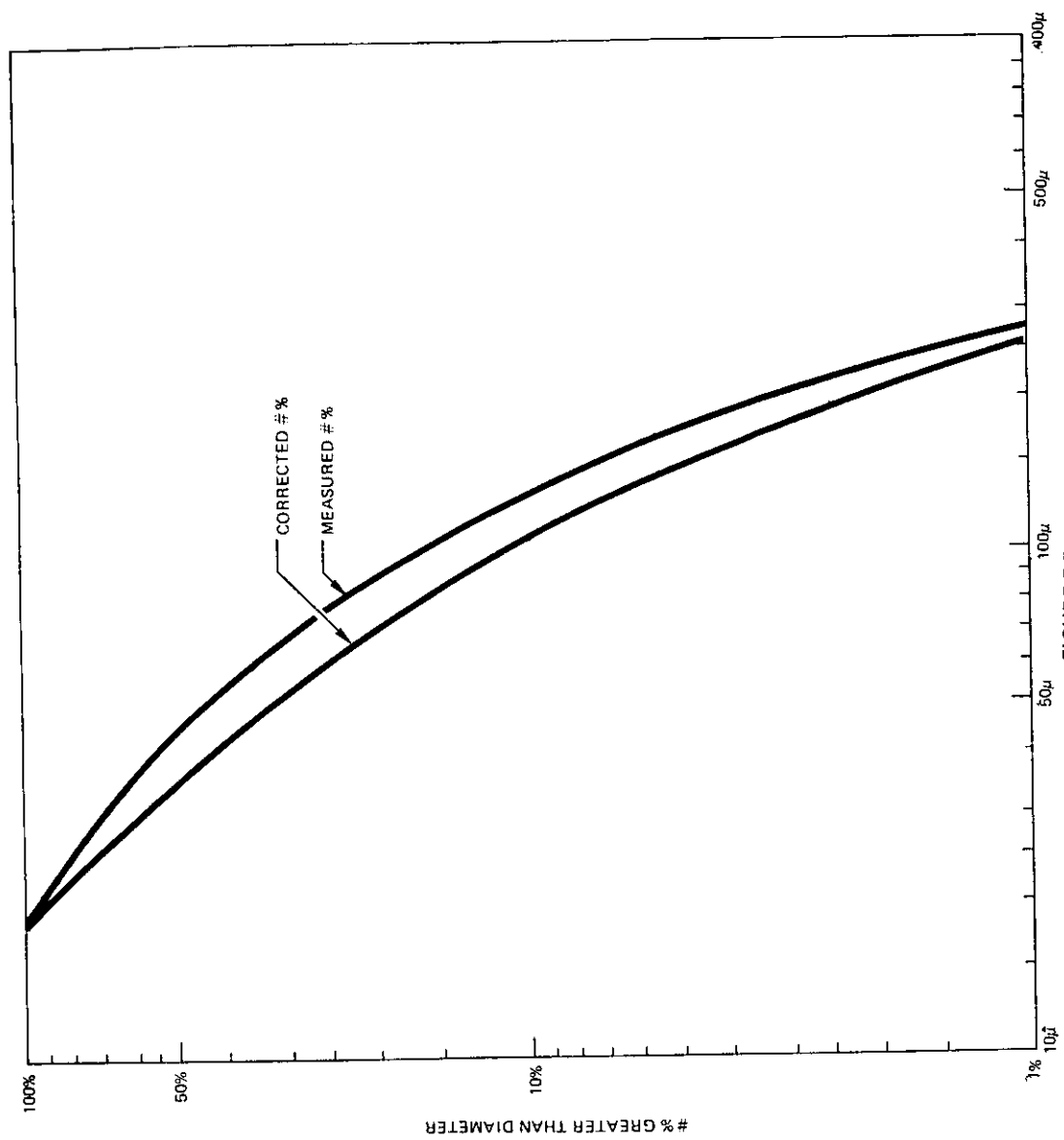


FIGURE E-5
CUMULATIVE SIZE DISTRIBUTION—PARTICLE NUMBER PERCENT

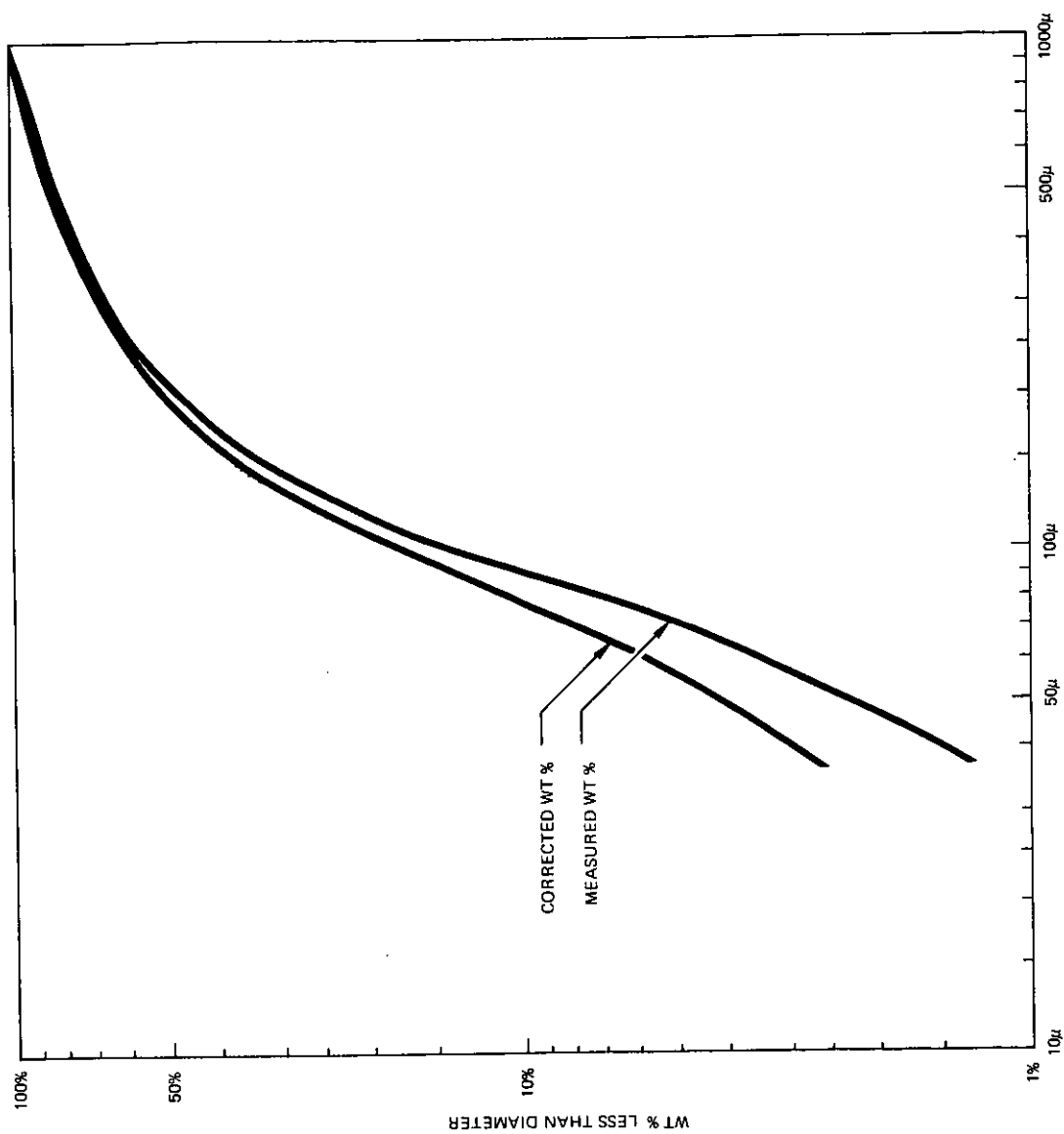


FIGURE E-6
CUMULATIVE SIZE DISTRIBUTION—WEIGHT PERCENT

The mean mass diameter for particles $>18\mu\text{m}$ after corrections are applied was determined to be $200\mu\text{m}$.

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

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

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

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

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

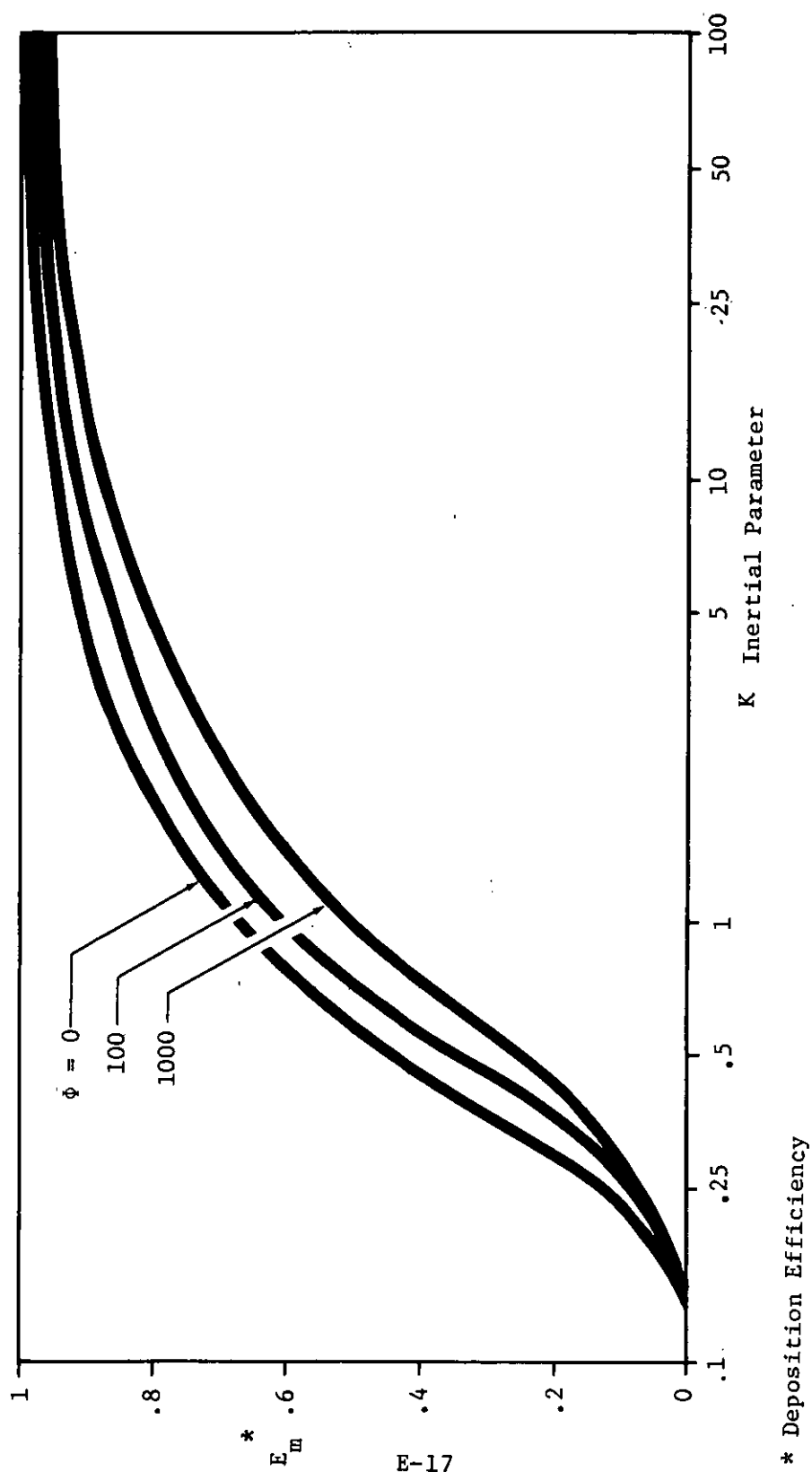


FIGURE E-7
EFFICIENCY CURVES

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:

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

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

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

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

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

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

then

$$\phi = 172.$$

Table E-1 indicates that the collection efficiency of particles smaller than $20\mu\text{m}$ 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 $>18\mu\text{m}$. 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 $>18\mu\text{m}$. 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 Tables 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 $18\mu\text{m}$ and for particles larger than $1000\mu\text{m}$.

TABLE E-3
TEST 24A

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER:				TOTAL PARTICLES
	300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	
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^2 Per/Area 11,400/mm ²
TOTAL AREA SCANNED		17,370 μ^2			Particles > 1,000 μ^2 Per/Area .003/mm ²

* 1 Division of Microscope Reticule equals 4.6 microns

** 1 Division on Microscope Reticule equals 9.2 microns

TABLE E-4
TEST 26A

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER:				TOTAL PARTICLES
	300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	
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 Reticule equals 4.6 microns

** 1 Division on Microscope Reticule equals 9.2 microns

TABLE E-5
TEST 27

SIZE RANGE IN μ	NUMBER OF PARTICLES PER RANGE AT POWER:				TOTAL PARTICLES
	300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	
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		Particles $>18 \mu^2$ Per/Area 7,700/mm ² Particles $>1000 \mu^2$ Per/Area .003/mm ²
	TOTAL AREA SCANNED		46,307		

* 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:				TOTAL PARTICLES
	300	RANGE IN DIVISION*	150	RANGE IN DIVISION**	
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 $>18\mu$ Per/Area $15,200/\text{mm}^2$
Total Area Scanned		$20,021\mu^2$			Particles $>1000\mu^2$ Per/Area $.003/\text{mm}^2$

* 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 $>18\mu$ density to the $>1000\mu$ 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:

<u>Range</u>	<u>Correction Factor</u>
3	2.0
4	1.25
5	1.06
6	1.02
7	1
$>1000\mu$	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

SIZE RANGE in μ m	TEST 22			TEST 24A			TEST 26A			TEST 27			TEST 28		
	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	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	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	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	.6	3.1	5.9
7. > 230	.7	1.5	3.3		.2	.5			2.0	2.9	.2	.4	.2	.8	1.6

TABLE E-8
CUMULATIVE PERCENT FOR PARTICLES > 18 μ - UNCORRECTED

DIAMETER D $\downarrow$ 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

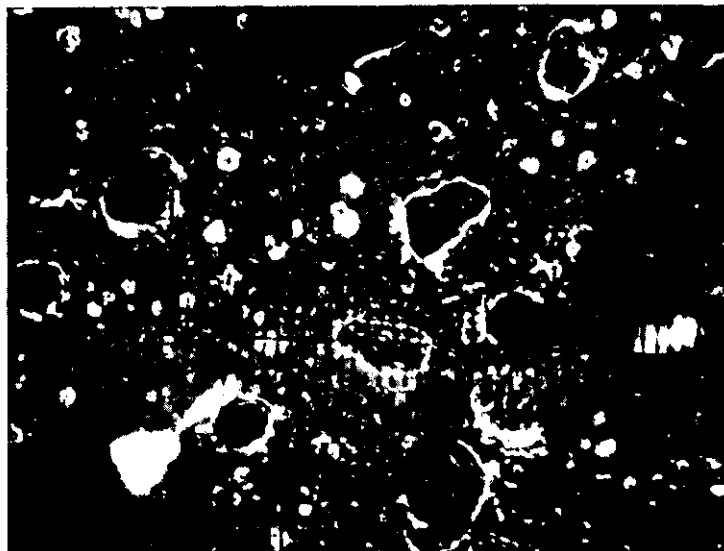


FIGURE E-10
TEST 28, 150 X



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 11.45 scf	Mass Loading 5.9 mg	Volume Sampled (.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 7.24 scf	Mass Loading 35.6 mg	Volume Sampled (.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	Mass Loading	Volume Sampled
	9.4 scf	10.9 mg	(.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	Mass Loading	Volume Sampled (.49 m ³)
	Volume Sampled 17.4 scf		
		60.1 mg	
(2) Cyclone Sizing			
	87%	less than	50 μ
	73%	less than	41 μ
	65%	less than	32 μ
	52%	less than	25.5 μ
	38%	less than	20.5 μ
	31%	less than	16 μ
	25%	less than	12.9 μ
	20%	less than	10 μ
	15%	less than	8 μ
	11%	less than	6.3 μ
	8%	less than	5.1 μ
	5%	less than	4 μ
	3.5%	less than	3.3 μ
	2%	less than	2.6 μ
(3) Brinks			
	87%	less than	3.18 μ
	77%	less than	1.87 μ
	38%	less than	1.27 μ
	20%	less than	.65 μ
	5%	less than	.32 μ

90% Weight in Cyclone

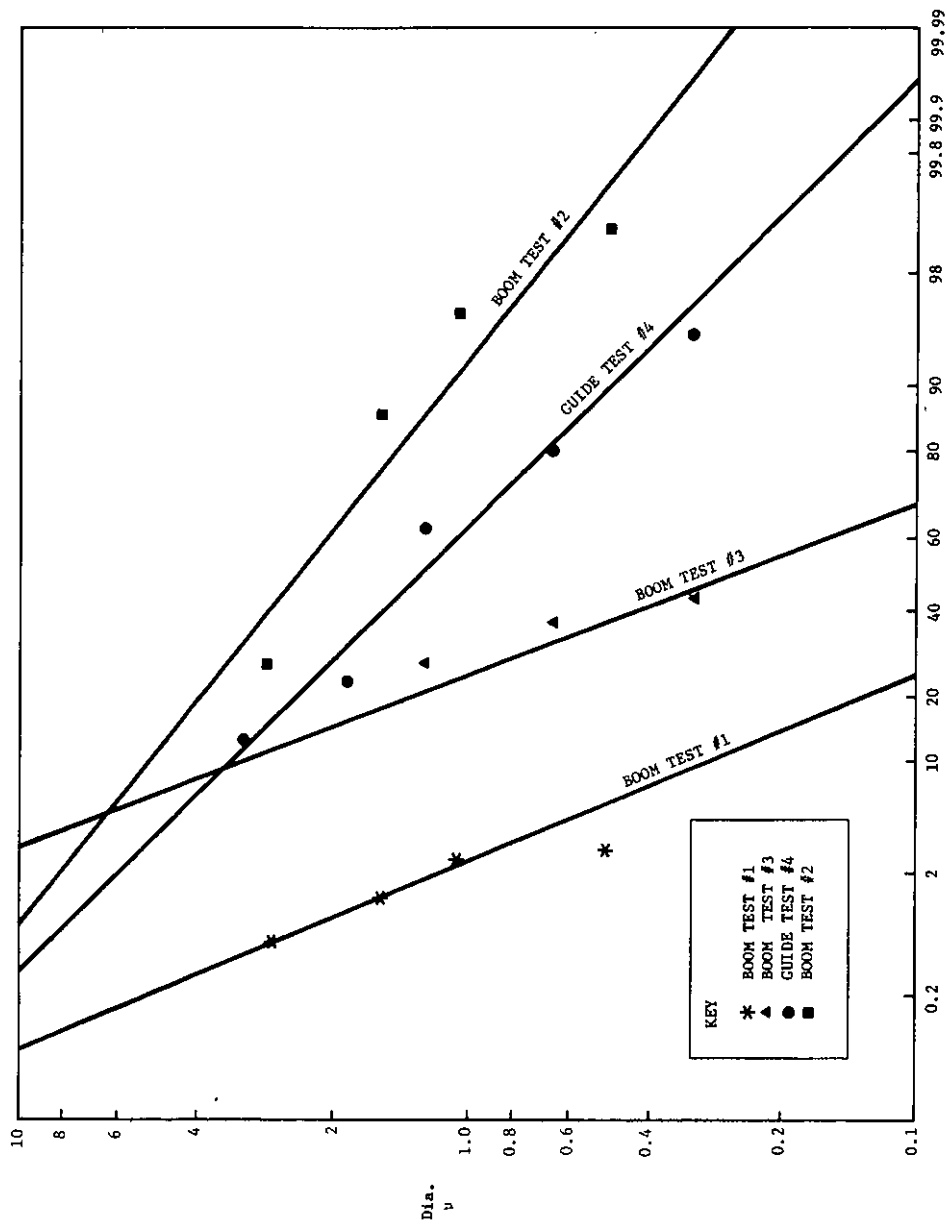


FIGURE E-13
BRINK DATA

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

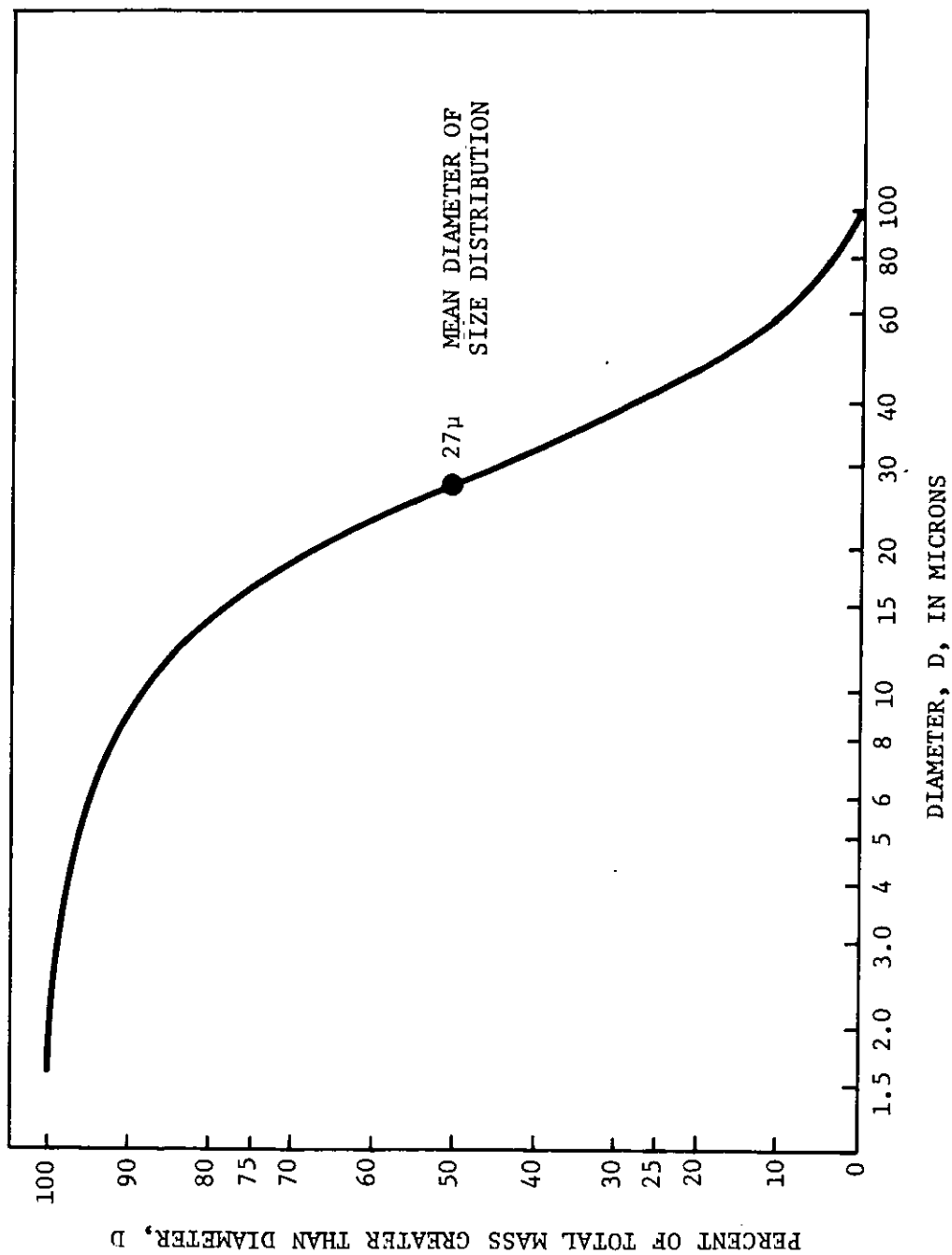


FIGURE E-14
COULTER ANALYSIS