AP-42 Section 9.13.3
Reference 4
Report Sect.
Reference

EMISSION PERFORMANCE TESTING FOR TESTING TWO FRYER LINES

SITE: EAGLE SNACKS, INC.
Visalia, California

DATE: NOVEMBER 19, 20 & 21, 1991

Prepared For:

EAGLE SNACKS, INC.
2000 N. Road 80
Visalia, California 93291

Contact: Don DeHart
(314) 577-4158

Prepared By:

THOMAS ROONEY
(310) 540-4676

WESTERN ENVIRONMENTAL SERVICES
1010 South Pacific Coast Highway
Redondo Beach, California 90277

WESTERN ENVIRONMENTAL SERVICES

December 20, 1991

County of Tulare Department of Health Services
Air Pollution Control District
County Civic Center
Visalia, CA 93291

RE: Report-Kettle Fryer #7 and Continuous Fryer #1

Dear Isam Boulad:

Enclosed are two copies of the final report on emission performance testing of two fryer lines located at Eagle Snacks, Inc., 2000 N. Road 80, Visalia, CA 93291. Please review the report and call Thomas Rooney at (310) 540-4676 if you have any questions.

Sincerely,

Thelma J. Muzik

Thelma J. Muzik
Business Manager

EMISSION PERFORMANCE TESTING
FOR TESTING
TWO FRYER LINES

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1.0 INTRODUCTION

At the request of Anheuser Busch, Inc., St Louis, Missouri, Western Environmental Services (WES) conducted a compliance test at Eagle Snacks, Visalia, California. The testing consisted of collecting and analyzing particulate samples from kettle #7 and continuous fryer #1. The testing was performed on November 19, 20, and 21 to provide compliance test data for Tulare County Air Pollution Control District.

Triplicate particulate tests were performed at two locations, the stack exhaust from kettle fryer #7 and the stack exhaust from continuous fryer #1. The particulate tests were conducted by using EPA Method 5.1.

These units produce potato chips for human consumption.

The following sections will be presented in this report: Summary of Results, Site Description, Sampling and Analytical Procedures, Quality Assurance, and Appendices. The appendices contain the Field and Laboratory data sheets, Gas Calibration Information, Sample Calculations, and Process Data.

2.0 SUMMARY OF RESULTS

2.1 Discussion of Results

Tables 2.1 and 2.2 show the test results. Table 2.1 presents the particulate sampling results while Table 2.2 shows the particulate analytical results.

The results are summarized below.

Test #	Process Input #/Hr	Particulates Concentration Grs/SDCF	Particulates Emission Rate #/Hr
Kettle #7			
1	534	0.0052	0.475
2	534	0.0041	0.376
3	537	0.0037	0.342
Average	535	0.0043	0.398
Continuous Fryer #1			
1	~~11,774~~	~~0.0588~~	~~0.813~~ omit, Iso = 160%
2	12,919	0.0558	0.921
3	12,919	0.0445	0.686
Average	12,537	0.0530	0.806

2.2 Quality Assurance

The particulate sampling train was checked for leaks prior to and after each test. The sampling equipment was calibrated according to the Quality Assurance Handbook for Air Pollution Measurement Systems.

TABLE 2.1 PARTICULATE SAMPLING

SITE: EAGLE SNACKS
UNIT: Kettle Fryer #7
DATE: November 19,1991

STACK PARAMETERS	TEST 1	TEST 2	TEST 3	AVERAGE
Barometric Pressure "Hg	29.50	29.50	29.75	29.58
Static Pressure "H20	-0.20	-0.20	-0.20	-0.20
CO2 %	0.04	0.04	0.04	0.04
O2 %	20.94	20.94	20.90	20.93
N2 %	79.02	79.02	79.06	79.03
CO ppm	0	0	0	0.00
Stack Area Ft^2	4.73	4.73	4.73	4.73
Stack Temperature F	81	77	75	77.67
Stack Pressure "Hg	29.49	29.49	29.74	29.57
TEST CONDITIONS	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**
Sample Volume Ft3	99.233	106.737	103.808	103.259
Meter F	86	100	82	89.33
Nozzle Dia "	0.22	0.22	0.22	0.22
Time Min	180	180	180	180.00
Points	24	24	24	24.00
Pitot Tube Factor cp	0.81	0.81	0.81	0.81
Orifice Press "H2O	1.18	1.31	1.30	1.26
Condensate mls	58	75	54	62.33
Velocity Pressure "H2O	0.520	0.530	0.520	0.523
Meter Calibration	1.068	1.068	1.068	1.068
TEST CALCULATIONS	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**
Water Vapor SDCF	2.730	3.530	2.542	2.93
Gas Sampled SDCF	101.305	106.276	107.692	105.09
Moisture %	2.62	3.21	2.31	2.71
Molecular Weight Dry	28.84	28.84	28.84	28.84
Molecular Weight Wet	28.56	28.50	28.59	28.55
Gas Velocity Ft/Sec	40.02	40.30	39.61	39.98
Flow Rate ACFM	11359	11438	11242	11346
Flow Rate DSCFM	10638	10727	10772	10712
Isokinetics %	94.8	98.7	99.6	97.70

TABLE 2.2 PARTICULATE ANALYSIS

SITE: EAGLE SNACKS
UNIT: Kettle Fryer #7
DATE: November 19,1991

ANALYTICAL DATA	TEST 1	TEST 2	TEST 3	AVERAGE	
FRONT HALF					
Probe mg	35.0	28.3	12.4	25.23	
Filter mg	0.7	0.3	0.0	0.33	
Blanks mg	1.5	1.5	1.5	1.50	
Subtotal mg	34.2	27.1	10.9	24.07	24.06
BACK HALF					
Impingers Inorg mg	0.0	2.6	16.5	6.37	
Impingers Org mg	0.0	0.0	0.0	0.00	
Blank mg	1.5	1.5	1.5	1.50	
Subtotal mg	0.0	1.1	15.0	5.37	4.87
Total Weight Gain mg	34.2	28.2	25.9	29.43	28.93
EMISSION DATA	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**	
FRONT HALF					
Grs/SDCF	0.0052	0.0039	0.0016	0.0036	
Lbs/Hr	0.475	0.361	0.144	0.327	
BACK HALF					
Grs/SDCF	0.0000	0.0002	0.0021	0.0008	
Lbs/Hr	0.000	0.015	0.198	0.071	
TOTAL EMISSIONS	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**	
Grs/SDCF	0.0052	0.0041	0.0037	0.0043	
Lbs/Hrs	0.475	0.376	0.342	0.398	

TABLE 2.3 PARTICULATE SAMPLING

SITE: EAGLE SNACKS
UNIT: Continuous Fryer # 1
DATE: November 20,1991

STACK PARAMETERS	TEST 1	TEST 2	TEST 3	AVERAGE	
Barometric Pressure "Hg	29.75	29.75	29.75	29.75	
Static Pressure "H20	0.02	0.02	0.02	0.02	
CO2 %	0.04	0.04	0.04	0.04	
O2 %	20.95	20.95	20.95	20.95	
N2 %	79.014	79.014	79.015	79.01	
CO ppm	0	0	0	0.00	
Stack Diameter "	29.5	29.5	29.5	29.50	
Stack Temperature F	246	239	236	240.33	
Stack Pressure "Hg	29.75	29.75	29.75	29.75	
TEST CONDITIONS	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**	
Sample Volume Ft3	22.071	25.093	24.239	23.801	24.666
Meter F	75	58	61	64.67	
Nozzle Dia "	0.33	0.405	0.405	0.38	
Time Min	72	72	72	72.00	
Points	24	24	24	24.00	
Pitot Tube Factor cp	0.81	0.81	0.81	0.81	
Orfice Press "H2O	0.34	0.46	0.43	0.41	
Condensate mls	1014	1050	1075	1046.33	
Velocity Pressure "H2O	0.103	0.125	0.117	0.115	
Meter Calibration	1.068	1.068	1.068	1.068	
TEST CALCULATIONS	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**	
Water Vapor SDCF	47.729	49.424	50.600	49.25	26.642
Gas Sampled SDCF	23.141	27.181	26.103	25.48	
Moisture %	67.35	64.52	65.97	65.94	
Molecular Weight Dry	28.84	28.84	28.84	28.84	
Molecular Weight Wet	21.54	21.85	21.69	21.69	
Gas Velocity Ft/Sec	23.33	25.39	24.60	24.44	
Flow Rate ACFM	6643	7230	7005	6960	
Flow Rate DSCFM	1613	1927	1798	1779	1863
Isokinetics %	159.3	104.0	107.0	123.45	

TABLE 2.4 PARTICULATE ANALYSIS

SITE: EAGLE SNACKS
UNIT: Continuous Fryer #1
DATE: November 20,1991

ANALYTICAL DATA	TEST 1	TEST 2	TEST 3	AVERAGE	
FRONT HALF					
Probe mg	36.8	25.4	22.9	28.37	
Filter mg	16.1	20.0	14.3	16.80	
Blanks mg	1.5	1.5	1.5	1.50	
Subtotal mg	51.4	43.9	35.7	43.67	39.8
BACK HALF					
Impingers Inorg mg	31.0	44.8	32.3	36.03	
Impingers Org mg	7.3	11.1	8.8	9.07	
Blank mg	1.5	1.5	1.5	1.50	
Subtotal mg	36.8	54.4	39.6	43.60	47.0
Total Weight Gain mg	88.2	98.3	75.3	87.27	
EMISSION DATA	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**	
FRONT HALF					
Grs/SDCF	0.0343	0.0249	0.0211	0.0268	
Lbs/Hr	0.474	0.411	0.325	0.403	
BACK HALF					
Grs/SDCF	0.0245	0.0309	0.0234	0.0263	
Lbs/Hr	0.339	0.510	0.361	0.403	
TOTAL EMISSIONS	**TEST 1**	**TEST 2**	**TEST 3**	**AVERAGE**	
Grs/SDCF	0.0588	0.0558	0.0445	0.0530	
Lbs/Hre	0.813	0.921	0.686	0.806	.804

Omit Run,
Isokinetic = 159%

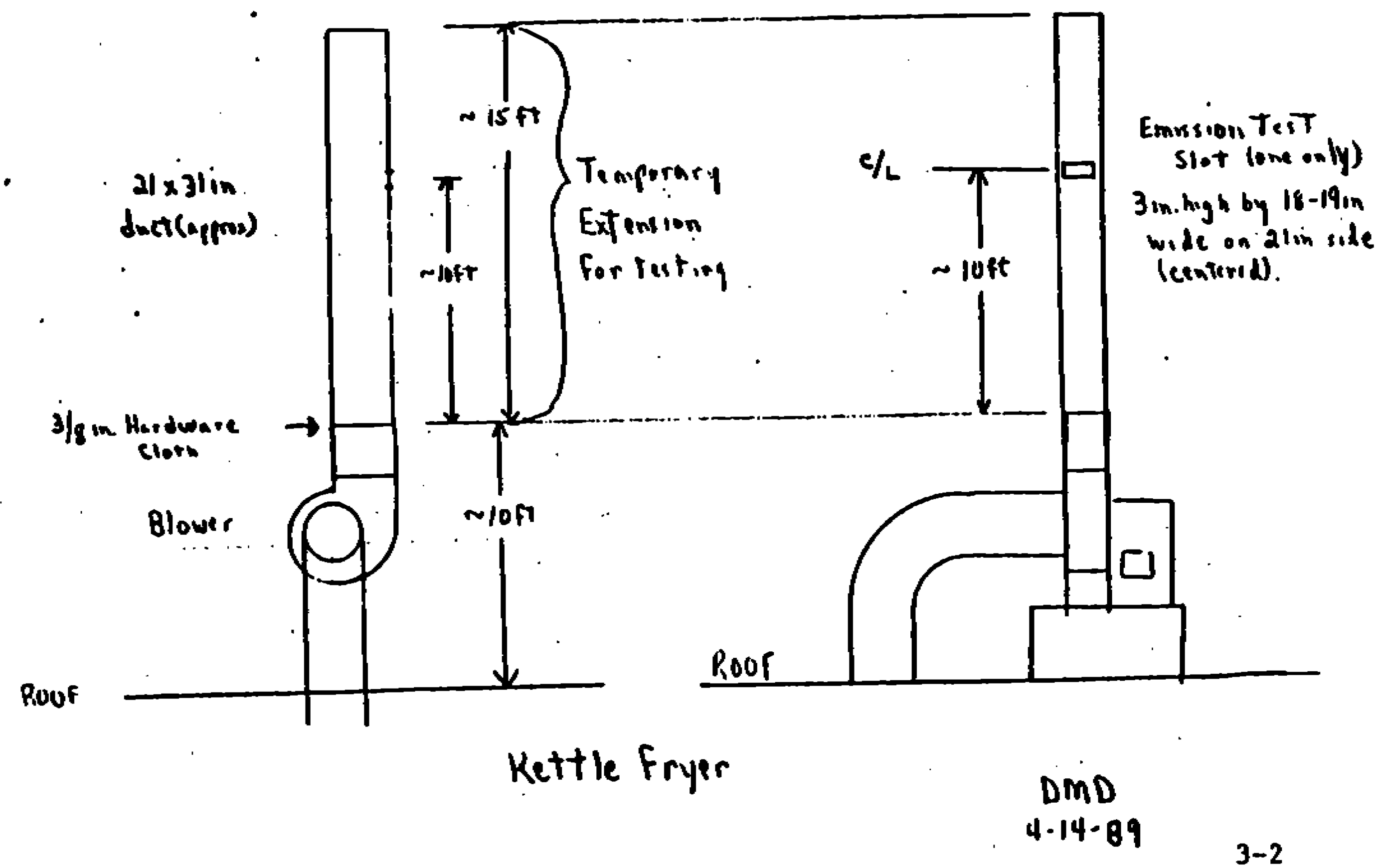
3.0 SITE DESCRIPTION

3.1 Kettle Fryer #7 Stack Exhaust

Samples were collected from a 31.5" x 21.75" rectangular vertical stack located above the roof. The sampling ports are located on a single side of the stack. Figure 3.1 is the site diagram while Figure 3.2 presents the traverse point location.

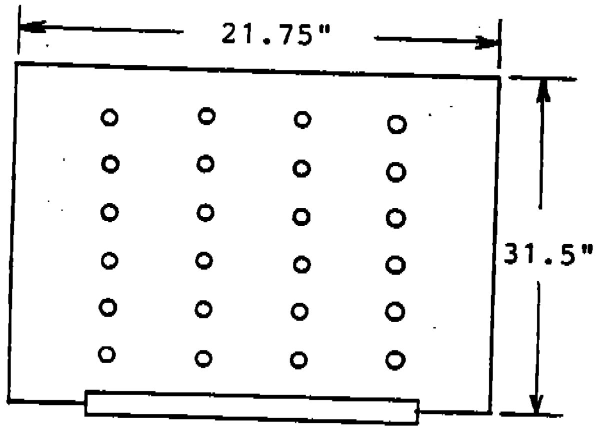
3.2 Continuous Fryer #1 Stack Exhaust

Samples were collected from a 29.5" diameter vertical stack located above the roof. The sampling ports are located at ninety degrees of each other on the same horizontal plane. Figure 3.3 shows the site diagram while Figure 3.4 presents the traverse point location.


21 x 31 in duct (approx)
3/8 in. Hardware Cloth
Blower
ROOF
~15 ft
~10 ft
~10 ft
Temporary Extension For Testing
C/L
~10 ft
Emission Test Slot (one only)
3 in. high by 18-19 in wide on 21 in side (centered).
ROOF
Kettle Fryer
DMD
4-14-89

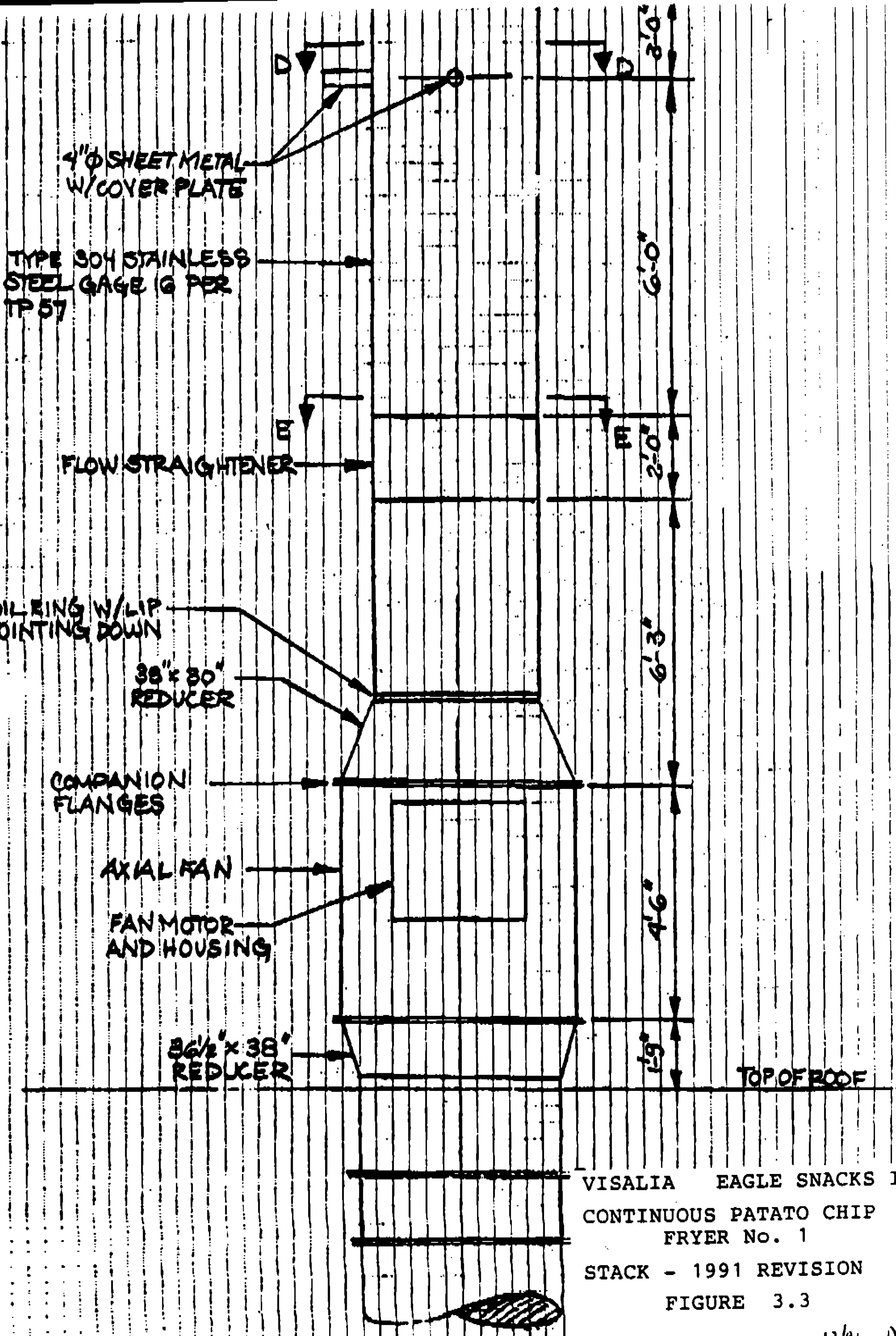
3-2

FIGURE . 3.1



TRAVERSE POINT LOCATION STACK EXHAUST
FIGURE 3.2

TRAVERSE POINT	POINT LOCATION
1	2.6
2	8.0
3	13.2
4	18.5
5	23.8
6	29.1



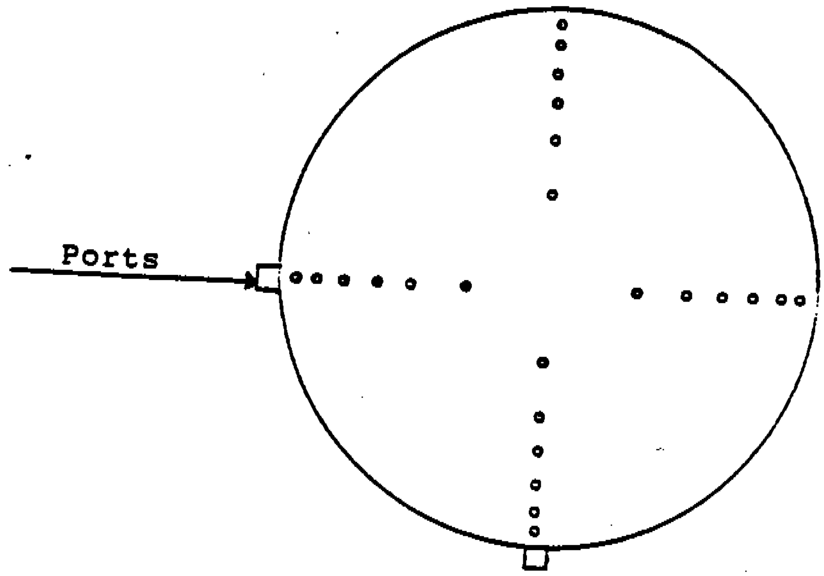
VISALIA EAGLE SNACKS INC.

CONTINUOUS PATATO CHIP
FRYER No. 1

STACK - 1991 REVISION

FIGURE 3.3

12/91 DMD



TRAVERSE POINT LOCATION STACK EXHAUST
FIGURE 3.4

Stack Diameter = 29.5"

TRAVERSE POINT	POINT LOCATION
1	7.00
2	7.97
3	9.48
4	11.22
5	13.38
6	16.50
7	24.99
8	28.12
9	30.28
10	32.02
11	33.52
12	34.81

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Traverse Point Location

Traverse point locations were determined by utilizing EPA Method 1, "Sample and Velocity Traverses for Stationary Sources."

4.2 Particulate Sampling and Analysis

Particulates were collected by EPA Method Five. Triplicate one hour tests were conducted on the continuous fryer stack exhaust. Triplicate three hour tests were conducted on the kettle fryer stack exhaust.

The sampling train consisted of a glass nozzle, glass probe, heated flex line, heated four inch filter, three glass impingers, silica gel impinger, pump, and a calibrated dry gas meter. The first and second impingers each contained 100 milliliters of distilled water. The third impinger was empty. The fourth contained silica gel to protect the pump. Figure 4.1 depicts the sampling train.

After assembling the sampling train, it was checked for leaks and the sampling was not started until a leak rate of less than 0.02 cfm at 15 inches of mercury was achieved.

During the testing, the sampling was performed isokinetically on each traverse. The velocity measurements were made at individual traverse points using a Type "S" pitot tube connected to an inclined manometer with divisions measuring 0.02 inches of water. The stack temperature was measured by using a Type K thermocouple wire attached to a calibrated digital readout.

Upon completion of each test, the sampling train was checked for leaks before disassembling the sampling system. The nozzle and the probe were removed from the train. The probe was rinsed and brushed with a nylon brush on a stainless steel handle. The probe and nozzle were rinsed with acetone. The rinses were placed into a 950 milliliter amber glass bottle. The bottle was labeled and retained for analysis.

The impinger solutions were re-measured and recovered with distilled water. The solutions were placed into 950 milliliter amber glass bottles. The bottles were labeled and retained for analysis. In addition, the impingers were rinsed with acetone, and the solutions were placed into the probe rinse bottle labeled for acetone.

The glass fiber filter was removed from the filter holder and was placed into a petri dish. The front half of the filter holder was rinsed with acetone. The back-half of the filter holder was rinsed with distilled water. The distilled water rinses were placed with the impinger solutions and the acetone rinses were placed with acetone probe rinse.

The analysis was performed by evaporating the acetone probe rinses to dryness in tared beakers. The water solutions were combined and extracted with 50 milliliters of petroleum ether. The inorganic and organic fractions were evaporated in tared beakers. The beakers and filter were placed into a desiccator and were weighed to constant weights.

The data reduction was performed by using EPA Method 5.1 calculations.

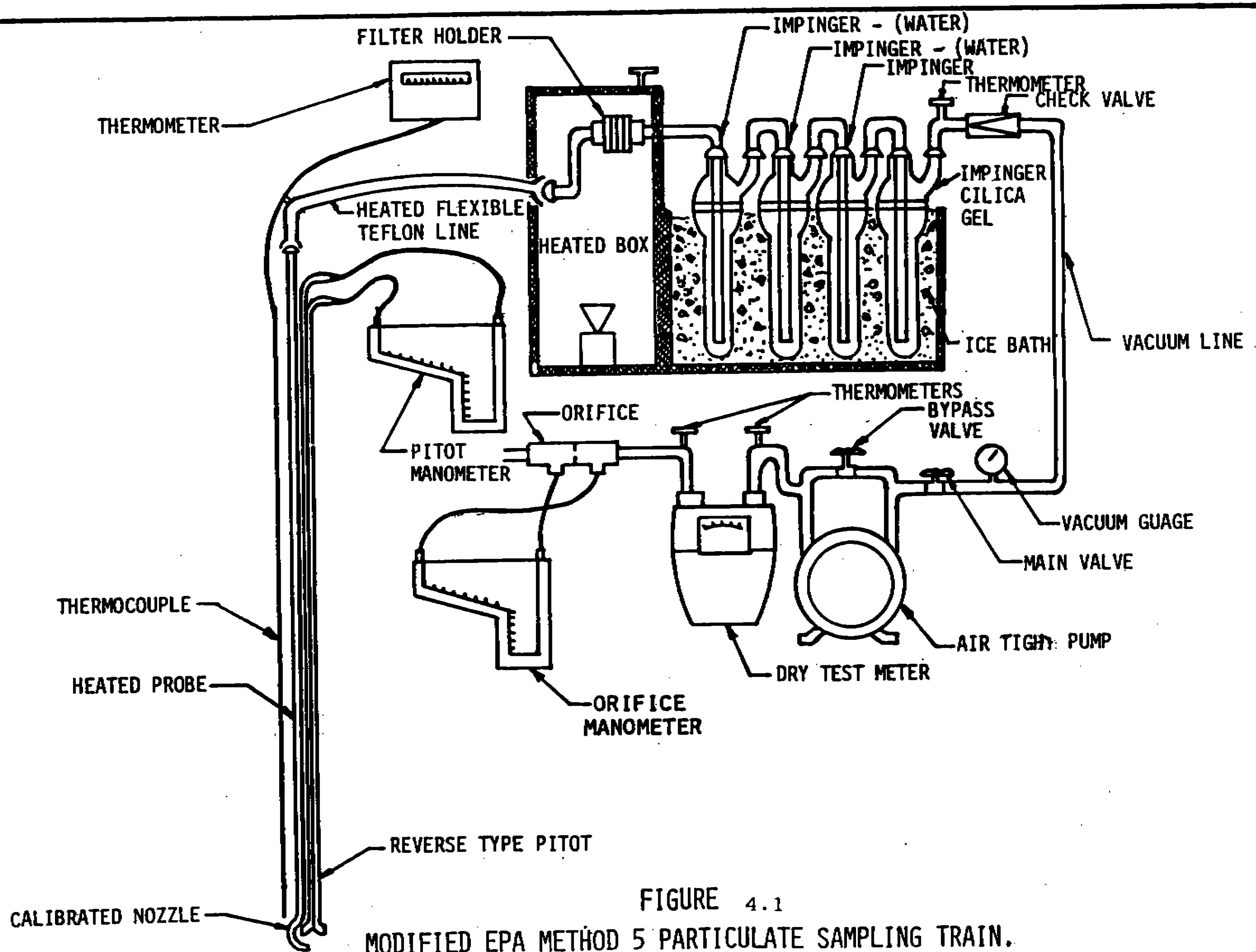


FIGURE 4.1
MODIFIED EPA METHOD 5 PARTICULATE SAMPLING TRAIN.

4.3 Inorganic Gas Determination

During each particulate test, gaseous samples from the stack were sampled and analyzed for carbon dioxide and oxygen. Bag samples were collected and analyzed with a continuous monitoring system. The CEM system consisted of a Horiba PIR 2000 carbon dioxide gas analyzer and a Teledyne electrochemical oxygen analyzer. The results were printed on a Westronics Data Logger.

The instruments were zeroed and spanned prior to and after the sampling period.

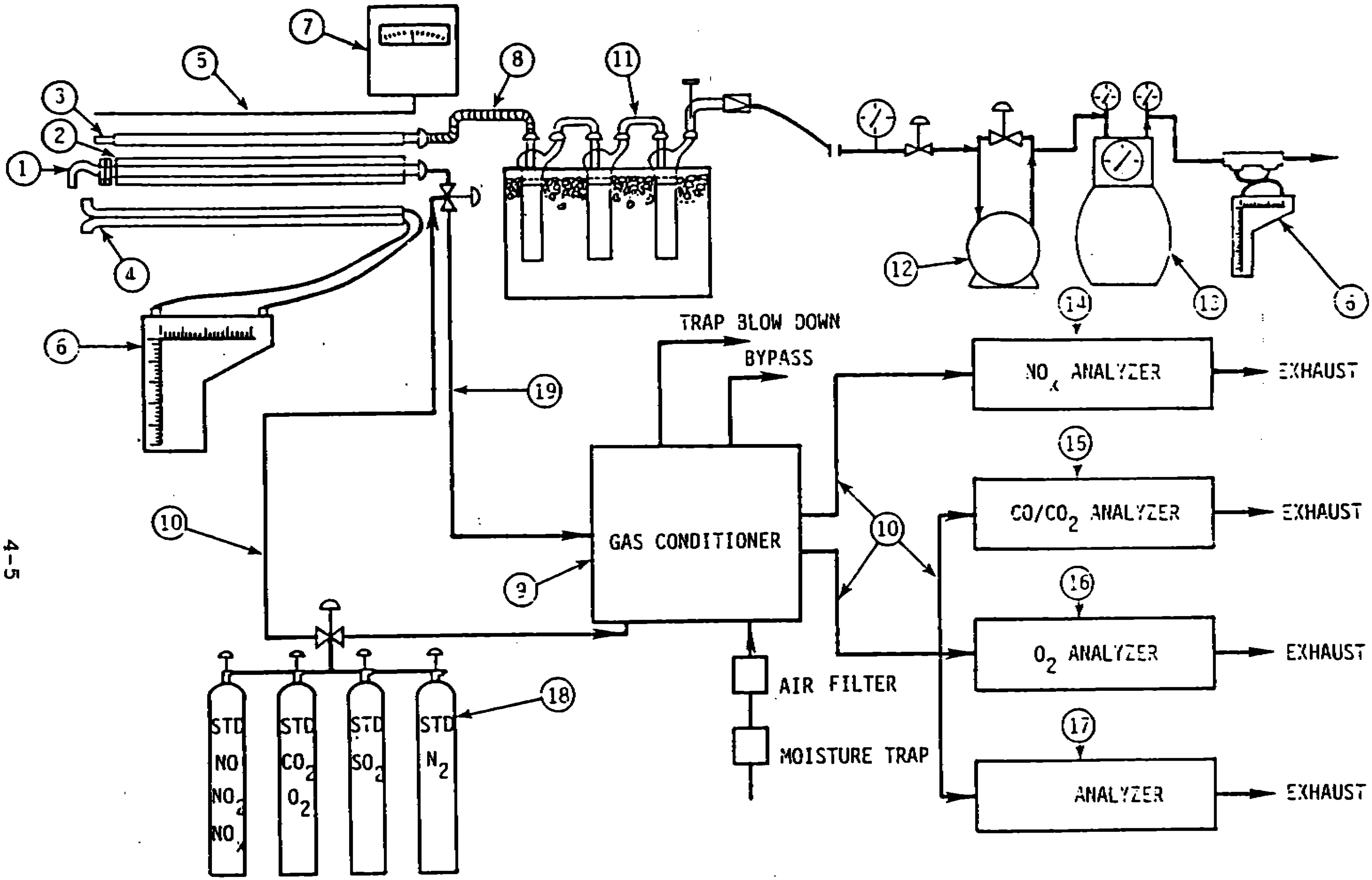


FIGURE 4.2
SAMPLING SYSTEM SCHEMATIC

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SAMPLING TRAIN

1. Calibrated Nozzle
2. Heated Probe
3. Quarter-inch Inconel Tubing
4. Reverse Type-S Pitot Tube
5. Thermocouple Wire
6. Manometer
7. Digital Temperature Readout
8. Heated Teflon Flex Line
9. Gas Conditioner
10. Quarter-inch Teflon Tubing
11. Ice Bath with Three Impingers
12. Air Tight Pump
13. Dry Test Meter
14. NOx Continuous Analyzer
15. CO/CO_2 Continuous Analyzer
16. O_2 Continuous Analyzer
17. Continuous Analyzer
18. Certified Span Gases for Calibration Purposes
19. One-half Inch Heated Teflon Line

5.0 QUALITY ASSURANCE

5.1 Field Equipment Quality Assurance

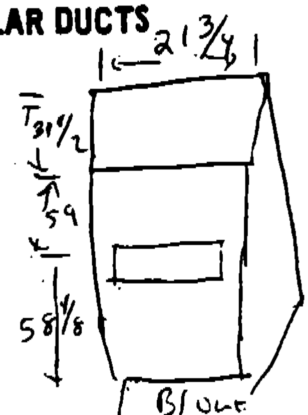
The calibration of the pitot tube, dry gas meter, digital thermometers, and manometers were performed by utilizing standard EPA Methodology, "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods (EPA-600/4-77-0278).

WESTERN ENVIRONMENTAL SERVICES

APPENDIX A

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT Eagle Snacks
ATE 11/18/91
MPLING LOCATION Kettle Fryer
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) ______
SIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) ______
STACK I.D., (DISTANCE A - DISTANCE B) ______
EAREST UPSTREAM DISTURBANCE ______
EAREST DOWNSTREAM DISTURBANCE ______
CALCULATOR ______



SCHEMATIC OF SAMPLING LOCATION

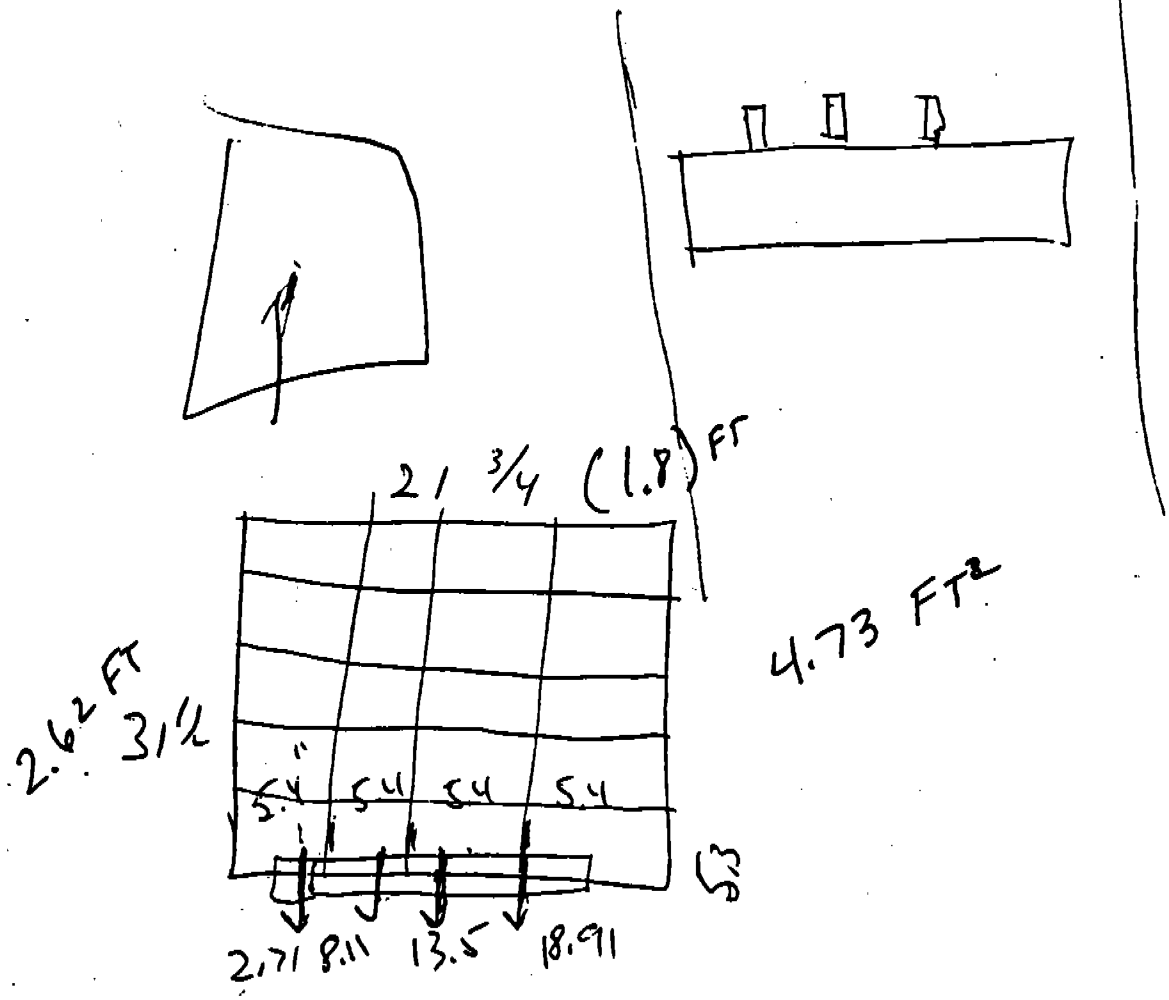
ΔP
1) .70
2) .60
3) .60
4) .60

Nozzle
.22

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	Rectangular Duct				2.64
2		See Reverse Side			7.95
3					13.24
4					18.5
5					23.8
6					29.1

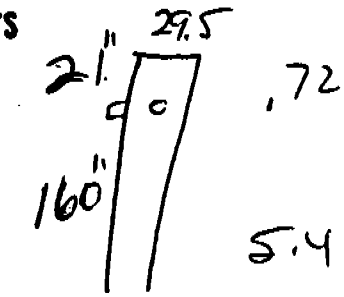
EPA (Dur) 232
4/72

A00001



D.I #1

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS



PLANT EAGLE SNACKS
DATE 11/20/91
SAMPLING LOCATION CONTINUOUS FRYER
INSIDE OF FAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE A) 35.5
INSIDE OF NEAR WALL TO OUTSIDE OF NIPPLE, (DISTANCE B) ~~35.5~~ 6.00
STACK I.D., (DISTANCE A - DISTANCE B) 29.5
NEAREST UPSTREAM DISTURBANCE
NEAREST DOWNSTREAM DISTURBANCE
CALCULATOR

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	2.1	29.5	.62	6	7.00
2	6.7	↓	1.97	↓	7.97
3	11.8		3.48		9.48
4	17.7		5.22		11.22
5	25.0		7.38		13.38
6	35.6		10.50		16.50
7	64.4		18.99		24.99
8	75.0		22.12		28.12
9	82.3		24.28		30.28
10	88.2		26.02		32.02
11	93.3		27.52		33.52
12	97.9		28.81		34.81

EPA (Dur) 232
4/72

A00003

FIELD DATA

PLANT Eagle Snacks
DATE 11-19-91
SAMPLING LOCATION Kettle Fryer
SAMPLE TYPE Particulate
RUN NUMBER #1 - 3hr. run
OPERATOR Ty Hastriter
AMBIENT TEMPERATURE 62°
BAROMETRIC PRESSURE 29.50
STATIC PRESSURE, (P_s) -0.20
FILTER NUMBER (s) 3.162

PROBE LENGTH AND TYPE #26 - 5'
NOZZLE I.D. .220
ASSUMED MOISTURE, % 5%
SAMPLE BOX NUMBER WES # 11
METER BOX NUMBER WES # 10
METER $\Delta H_@$ WES # 10
C FACTOR
PROBE HEATER SETTING 250°
HEATER BOX SETTING 250°
REFERENCE Δp # 9 (0 - 1")

SCHEMATIC OF TRAVERSE POINT LAYOUT
READ AND RECORD ALL DATA EVERY 7½ MINUTES

Preleak ✓ < .013 cfm at 15"
Postleak ✓ < .015 cfm at 6"

Port	Traverse Point Number	Sampling Time, min	Clock Time (24-hr clock)	Gas Meter Reading (V_m), ft³	Velocity Head (Δp_s), in. H_2O	Orifice Pressure Differential (ΔH), in. H_2O Desired	Orifice Pressure Differential Actual	Stack Temperature (T_s), °F	Dry Gas Meter Temperature Inlet ($T_{m\,in}$), °F	Dry Gas Meter Temperature Outlet ($T_{m\,out}$), °F	Pump Vacuum, in. Hg	Sample Box Temperature, °F	Impinger Temperature, °F
		0	0831	700.529									
FAR LEFT	IN 1	7½	0838½	704.725	0.55	1.20	1.20	75	63	59	3	260	65
	2	15	0846	708.500	0.50	1.08	1.08	78	67	61	3	260	53
	3	22½	0853½	711.955	0.38	0.84	0.84	74	75	65	2	261	61
	4	30	0901	715.365	0.36	0.81	0.81	67	79	68	2	261	62
	5	37½	0908½	718.930	0.40	0.88	0.88	80	81	70	2	262	63
	6	45	0916	722.570	0.41	0.91	0.91	81	82	72	2	262	62
MID LEFT	1	52½	0923½	726.075	0.38	0.85	0.85	78	82	74	2	260	62
	2	60	0931	729.520	0.36	0.82	0.82	68	83	74	2	260	62
	3	67½	0938½	733.285	0.44	0.97	0.97	83	84	75	2	261	56
	4	75	0946	737.345	0.52	1.15	1.15	83	86	77	3	262	54
	5	82½	0953½	741.395	0.52	1.14	1.14	92	88	79	3	262	55
	IN 6	90	1001	745.690	0.56	1.24	1.24	86	90	80	3	263	54
MID RIGHT	IN 1	97½	1008½	750.230	0.64	1.43	1.43	85	93	82	4	262	52
	2	105	1016	754.885	0.68	1.52	1.52	86	96	85	4	262	53
	3	112½	1023½	759.620	0.67	1.52	1.52	83	98	86	4	262	52
	4	120	1031	764.200	0.63	1.41	1.41	89	100	89	4	264	53
	5	127½	1038½	768.235	0.48	1.12	1.12	70	102	90	3	264	53
	6	135	1046	772.020	0.42	0.98	0.98	70	103	92	3	263	52
FAR RIGHT	1	142½	1053½	775.500	0.36	0.81	0.81	92	103	93	2	263	52
	2	150	1101	779.190	0.40	0.91	0.91	89	103	94	2	263	53
	3	157½	1108½	784.210	0.74	1.71	1.71	80	105	96	4	263	53
	4	165	1116	789.400	0.78	1.81	1.81	79	107	98	5	265	53
	5	172½	1123½	794.565	0.76	1.75	1.75	84	108	98	4	264	54
	IN 6	180	1131	799.762	0.68	1.55	1.55	88	108	98	4	264	54
		180		99.233	0.53		1.18	81	86				

COMMENTS:

A00004

PORTS

EPA (Dur) 235

FIELD DATA

PLANT Eagle Snacks
DATE 11-19-91
SAMPLING LOCATION Kettle Fryer
SAMPLE TYPE Particulate
RUN NUMBER #2 - 3hr. run
OPERATOR Ty Hastriter
AMBIENT TEMPERATURE 94°
BAROMETRIC PRESSURE 29.50
STATIC PRESSURE, (P_s) -0.20
FILTER NUMBER (s) 3, 180

PROBE LENGTH AND TYPE #26-5'
NOZZLE I.D. 0.220
ASSUMED MOISTURE, % 5% - 3%
SAMPLE BOX NUMBER WES #11
METER BOX NUMBER WES #10
METER $\Delta H_@$ WES #10
C FACTOR
PROBE HEATER SETTING 250°
HEATER BOX SETTING 250°
REFERENCE Δp #9 (0-1")

05328

03754

SCHEMATIC OF TRAVERSE POINT LAYOUT

Preleak < .018 cfm at 15" READ AND RECORD ALL DATA EVERY 7½ MINUTES Postleak < .005 cfm at 6"

PORTS	TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		0	1214	800.764									
FAR RIGHT	1	7½	1221½	804.180	0.36	0.81	0.81	90	96	93	2	253	68
	2	15	1229	808.135	0.44	1.07	1.07	71	98	94	2	252	52
	3	22½	1236½	813.430	0.78	1.89	1.89	72	100	94	3	255	55
	4	30	1244	818.890	0.80	1.95	1.95	72	103	95	3	255	56
	5	37½	1251½	824.325	0.78	1.90	1.90	72	104	95	3	255	56
	6	45	1259	829.340	0.70	1.71	1.71	71	104	95	3	254	57
MID RIGHT	1	52½	1306½	834.110	0.62	1.51	1.51	71	103	95	2	255	56
	2	60	1314	839.020	0.66	1.60	1.60	73	104	95	3	255	56
	3	67½	1321½	843.740	0.60	1.45	1.45	76	105	96	2	255	56
	4	75	1329	848.440	0.58	1.41	1.41	74	105	96	2	255	56
	5	82½	1336½	852.630	0.46	1.12	1.12	76	106	97	2	256	56
	6	90	1344	856.590	0.44	1.05	1.05	85	105	97	2	257	56
MID LEFT	1	97½	1351½	860.355	0.38	0.91	0.91	79	104	97	2	258	57
	2	105	1359	864.075	0.36	0.89	0.89	90	104	97	2	258	55
	3	112½	1406½	868.315	0.46	1.15	1.15	84	105	97	2	257	52
	4	120	1414	872.800	0.52	1.29	1.29	85	104	97	2	257	50
	5	127½	1421½	877.330	0.54	1.32	1.32	94	105	97	2	256	49
	6	135	1429	882.240	0.60	1.53	1.53	71	105	98	2	256	49
FAR LEFT	1	142½	1436½	886.910	0.55	1.40	1.40	71	105	98	2	255	50
	2	150	1444	891.360	0.52	1.32	1.32	71	104	97	2	254	50
	3	157½	1451½	895.555	0.45	1.14	1.14	72	104	97	2	254	50
	4	165	1459	899.615	0.43	1.10	1.10	71	103	97	2	254	49
	5	172½	1506½	903.690	0.41	1.04	1.04	71	101	96	2	252	49
	COMMENTS: 6	180	1514	907.501	0.38	0.94	0.94	83	101	95	2	249	49
		180		106.737	0.53		1.31	77	100				

EPA (Dur) 235
4/72

A00005

FIELD DATA

PLANT Eagle Snacks
DATE 11-20-91
SAMPLING LOCATION Kettle Fryer #7
SAMPLE TYPE Particulate
RUN NUMBER #3 - 3 hr. run
OPERATOR Ty Hastriter
AMBIENT TEMPERATURE 57°
BAROMETRIC PRESSURE 29.75
STATIC PRESSURE, (P_s) -0.20
FILTER NUMBER (s) 3.1

PROBE LENGTH AND TYPE #26 - 5'
NOZZLE I.D. 0.220
ASSUMED MOISTURE, % 3%
SAMPLE BOX NUMBER WES #11
METER BOX NUMBER WES #10
METER $\Delta H_@$ WES #10
C FACTOR
PROBE HEATER SETTING 250°
HEATER BOX SETTING 250°
REFERENCE Δp #9 (0-1")

08508

SCHEMATIC OF TRAVERSE POINT LAYOUT

Preleak < .009 cfm at 15"

READ AND RECORD ALL DATA EVERY 7½ MINUTES

Postleak < .005 cfm at 7"

Port	TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
		0	0749	907.939									
FAR LEFT	1	7½	0756½	912.350	0.54	1.27	1.27	71	58	56	3	279	59
	2	15	0804	916.135	0.44	1.03	1.03	79	62	58	3	277	52
	3	22½	0811½	919.850	0.40	0.94	0.94	80	68	60	3	280	56
	4	30	0819	923.500	0.38	0.92	0.92	68	72	62	3	277	57
	5	37½	0826½	927.270	0.40	0.96	0.96	76	75	65	3	279	55
	6	45	0834	931.000	0.40	0.95	0.95	81	78	67	3	280	56
MID LEFT	1	52½	0841½	934.575	0.37	0.87	0.87	90	79	68	2	277	55
	2	60	0849	938.280	0.38	0.93	0.93	67	81	71	3	277	56
	3	67½	0856½	942.210	0.42	1.04	1.04	66	83	73	3	279	56
	4	75	0904	946.390	0.50	1.24	1.24	67	85	74	3	276	54
	5	82½	0911½	950.735	0.53	1.31	1.31	67	87	76	3	275	50
	6	90	0919	955.350	0.58	1.43	1.43	70	88	77	4	273	49
MID RIGHT	1	97½	0926½	960.155	0.64	1.60	1.60	67	90	79	4	272	50
	2	105	0934	965.015	0.68	1.67	1.67	76	92	80	4	274	49
	3	112½	0941½	969.930	0.66	1.63	1.63	75	93	81	4	274	49
	4	120	0949	974.595	0.62	1.51	1.51	84	95	84	4	277	50
	5	127½	0956½	978.510	0.44	1.06	1.06	92	96	85	3	277	50
	6	135	1004	982.600	0.44	1.07	1.07	88	96	87	3	269	50
FAR RIGHT	1	142½	1011½	986.370	0.42	1.01	1.01	94	97	88	3	270	51
	2	150	1019	990.500	0.46	1.17	1.17	68	98	90	3	270	51
	3	157½	1026½	995.730	0.72	1.82	1.82	69	99	91	5	271	51
	4	165	1034	1001.135	0.80	2.03	2.03	70	100	92	5	269	52
	5	172½	1041½	1006.510	0.78	1.98	1.98	71	102	94	5	269	51
COMMENTS:	6	180	1049	1011.747	0.72	1.83	1.83	70	104	94	5	270	51
		180		103.808	0.53		1.30	75	82				

PORTS

A00006

EPA (Dur) 235
4 72

FIELD DATA

PLANT Eagle Stacks
DATE
SAMPLING LOCATION
SAMPLE TYPE
RUN NUMBER
OPERATOR
AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
STATIC PRESSURE, (P_s)
FILTER NUMBER (s)

Pre Velocity Readings

PROBE LENGTH AND TYPE
NOZZLE I.D.
ASSUMED MOISTURE, %
SAMPLE BOX NUMBER
METER BOX NUMBER
METER $\Delta H_@$
C FACTOR
PROBE HEATER SETTING
HEATER BOX SETTING
REFERENCE Δp

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY ______ MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
				DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
			0.11			205					
			0.10			209					
			0.10			208					
						207					
						210					
						212					
						213					

COMMENTS:

EPA (Dur) 235
4 72

A00007

FIELD DATA

PLANT Eagle Snacks
DATE 11-20-91
SAMPLING LOCATION Cont. P.C. Fryer
SAMPLE TYPE Particulate
RUN NUMBER #1 - 72 min. run
OPERATOR Ty Hastriter
AMBIENT TEMPERATURE 72°
BAROMETRIC PRESSURE 29.75
STATIC PRESSURE, (P_s) 0.02
FILTER NUMBER (s) 3.183

PROBE LENGTH AND TYPE #26-5'
NOZZLE I.D. 0.330
ASSUMED MOISTURE, % 45%
SAMPLE BOX NUMBER WES #10
METER BOX NUMBER WES #10
METER $\Delta H_@$ WES #10
C FACTOR
PROBE HEATER SETTING 270°
HEATER BOX SETTING 375°
REFERENCE Δp WES #10

05531

SCHEMATIC OF TRAVERSE POINT LAYOUT

Preleak < .010 cfm at 15" READ AND RECORD ALL DATA EVERY 3 MINUTES Postleak < .027 cfm at 15"

West

A00008

South

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	1450	016.634									
1	3	1453	017.535	0.100	0.33	0.33	240	72	72	2	275	65
2	6	1456	018.540	0.120	0.40	0.40	245	73	71	3	289	52
3	9	1459	019.500	0.130	0.43	0.43	247	74	72	7	299	54
4	12	1502	020.520	0.130	0.43	0.43	248	75	72	14	301	59
5	15	1505	021.500	0.120	0.40	0.40	248	77	71	12	305	58
6	18	1508	022.480	0.120	0.40	0.40	248	78	72	12	310	54
7	21	1511	023.440	0.110	0.37	0.37	246	79	72	12	311	54
8	24	1514	024.380	0.100	0.33	0.33	245	79	72	11	313	53
9	27	1517	025.260	0.09	0.30	0.30	245	79	73	11	313	56
10	30	1520	026.020	0.09	0.30	0.30	246	79	73	12	319	57
11	33	1523	026.870	0.09	0.30	0.30	245	79	74	12	315	58
12	36	1526	027.750	0.08	0.27	0.27	245	78	74	13	314	58
1	39	1529	028.625	0.09	0.30	0.30	240	79	74	12	315	59
2	42	1532	029.600	0.110	0.36	0.36	250	79	75	13	314	61
3	45	1535	030.525	0.110	0.36	0.36	251	79	75	13	313	60
4	48	1538	031.475	0.110	0.36	0.36	251	79	75	13	316	61
5	51	1541	032.475	0.110	0.36	0.36	251	79	75	13	318	62
6	54	1544	033.385	0.110	0.31	0.31	248	78	76	11	317	63
7	57	1547	034.280	0.100	0.33	0.33	248	76	75	12	310	63
8	60	1550	035.205	0.100	0.33	0.33	245	76	75	13	312	64
9	63	1553	036.100	0.100	0.33	0.33	246	76	75	13	314	64
10	66	1556	036.985	0.090	0.30	0.30	244	75	75	13	314	65
11	69	1559	037.855	0.090	0.30	0.30	243	74	74	13	285	68
COMMENTS:	72	1602	038.705	0.080	0.27	0.27	243	75	74	13	313	68
	72		22.071	0.103		0.34	246	75				

EPA (Dur) 235
4/72

FIELD DATA

PLANT Eagle Snacks
DATE 11-21-91
SAMPLING LOCATION Cont. DC. Fryer
SAMPLE TYPE Particulate
RUN NUMBER # 2 - 72 min. run
OPERATOR T. Hestriter
AMBIENT TEMPERATURE 55°
BAROMETRIC PRESSURE 29.75
STATIC PRESSURE, (P_s) 0.02
FILTER NUMBER (s) 3.184

PROBE LENGTH AND TYPE #26 5'
NOZZLE I.D. .405
ASSUMED MOISTURE, % 62%
SAMPLE BOX NUMBER WES #11
METER BOX NUMBER WES #10
METER $\Delta H_@$ WES #10
C FACTOR
PROBE HEATER SETTING 270°
HEATER BOX SETTING 275°
REFERENCE Δp WES #10

04727

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

Preleak < .015 cfm at 15"   Postleak < .007 cfm at 15"

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	0855	041.013									
1	3	0858	042.105	0.130	0.50	0.50	205	55	54	1	298	53
2	6	0901	043.225	0.150	0.57	0.57	209	55	54	2	297	51
3	9	0904	044.370	0.160	0.58	0.58	241	54	54	7	295	48
4	12	0907	045.540	0.160	0.58	0.58	243	55	54	7	292	49
5	15	0910	046.685	0.160	0.58	0.58	241	55	54	7	297	49
6	18	0913	047.780	0.150	0.54	0.54	242	57	54	8	297	50
7	21	0916	048.860	0.130	0.47	0.47	242	58	54	10	297	51
8	24	0919	049.925	0.130	0.47	0.47	240	59	54	10	302	52
9	27	0922	050.960	0.120	0.44	0.44	239	60	54	10	304	52
10	30	0925	051.975	0.115	0.42	0.42	240	60	55	10	304	53
11	33	0928	052.915	0.105	0.38	0.38	240	61	55	10	304	54
12	36	0931	053.865	0.100	0.37	0.37	239	61	56	10	306	52
1	39	0934	054.915	0.130	0.48	0.48	238	61	56	13	304	51
2	42	0937	055.980	0.130	0.47	0.47	241	62	57	13	304	51
3	45	0940	057.035	0.130	0.47	0.47	243	63	57	13	306	51
4	48	0943	058.095	0.130	0.47	0.47	245	63	57	13	306	52
5	51	0946	059.155	0.130	0.47	0.47	246	64	58	14	306	53
6	54	0949	060.220	0.120	0.44	0.44	243	64	58	14	306	54
7	57	0952	061.235	0.120	0.44	0.44	243	64	58	13	305	56
8	60	0955	062.240	0.110	0.40	0.40	243	64	58	13	304	57
9	63	0958	063.230	0.110	0.40	0.40	242	64	58	13	305	59
10	66	1001	064.195	0.105	0.38	0.38	242	64	58	13	304	62
11	69	1004	065.145	0.100	0.37	0.37	240	65	59	13	305	64
12	72	1007	066.106	0.100	0.37	0.37	239	65	59	13	305	67
	72		25.093	0.125		0.46	239	58				

West

South

COMMENTS:

A00009

EPA (Dur) 235
4 72

...LD Dain

PLANT Eagle Snacks
DATE 11-21-91
SAMPLING LOCATION Cont. P.C. Fryer
SAMPLE TYPE Particulate
RUN NUMBER #3 - mid. out
OPERATOR Ty Hastriter
AMBIENT TEMPERATURE 59°
BAROMETRIC PRESSURE 29.75
STATIC PRESSURE, (P_s) 0.02
FILTER NUMBER (s) 3.185

PROBE LENGTH AND TYPE #26-5'
NOZZLE I.D. 0.405
ASSUMED MOISTURE, % 60%
SAMPLE BOX NUMBER WES #11
METER BOX NUMBER WES #10
METER $\Delta H_@$ WES #10
C FACTOR
PROBE HEATER SETTING 270°
HEATER BOX SETTING 275°
REFERENCE Δp WES #10

04222

Preleak ✓ <.020 cfm at 15"

SCHEMATIC OF TRAVERSE POINT LAYOUT
READ AND RECORD ALL DATA EVERY 3 MINUTES

Postleak ✓ <.018 cfm at 17"

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
	0	1100	066.739									
1	3	1103	067.780	0.130	0.49	0.49	224	59	58	2	275	55
2	6	1106	068.870	0.140	0.52	0.52	224	59	58	9	281	52
3	9	1109	070.005	0.150	0.55	0.55	241	58	58	11	291	52
4	12	1112	071.130	0.150	0.55	0.55	241	59	57	11	299	55
5	15	1115	072.225	0.145	0.53	0.53	240	59	57	11	304	53
6	18	1118	073.245	0.125	0.46	0.46	239	60	58	13	307	52
7	21	1121	074.280	0.120	0.44	0.44	239	61	58	14	307	52
8	24	1124	075.320	0.115	0.42	0.42	236	62	58	13	308	52
9	27	1127	076.300	0.110	0.41	0.41	234	63	58	13	308	53
10	30	1130	077.215	0.100	0.37	0.37	235	63	58	14	308	54
11	33	1133	078.125	0.090	0.33	0.33	233	63	59	15	309	55
12	36	1136	079.065	0.090	0.33	0.33	234	63	59	13	309	56
1	39	1139	080.100	0.120	0.45	0.45	232	63	59	17	309	56
2	42	1142	081.150	0.130	0.48	0.48	236	63	59	17	307	55
3	45	1145	082.195	0.130	0.48	0.48	240	64	59	15	310	55
4	48	1148	083.240	0.125	0.46	0.46	241	65	59	15	310	52
5	51	1151	084.265	0.130	0.48	0.48	240	64	60	15	309	51
6	54	1154	085.335	0.120	0.44	0.44	239	64	60	16	311	52
7	57	1157	086.295	0.110	0.41	0.41	238	65	60	14	309	53
8	60	1200	087.240	0.105	0.39	0.39	238	64	60	14	310	54
9	63	1203	088.205	0.100	0.37	0.37	238	65	60	15	309	54
10	66	1206	089.160	0.100	0.37	0.37	234	65	60	15	310	54
11	69	1209	090.110	0.095	0.35	0.35	236	65	60	14	310	54
12	72	1212	090.978	0.090	0.33	0.33	235	65	61	13	309	54
	72		24.239	0.117	0.43		236	61				

COMMENTS:

West

South

A00010

EPA (Dur) 235
4 72

FIELD DATA REDUCTION

Site: EAGLE SNACKS
Date: November 19, 1991
Unit: Kettle Fryer #7
Test: Part. #1

	GAS METER READING	VELOCITY HEAD	SQUARE ROOT	AVERAGE SQUARED	ORIFICE PRESSURE DELTA H	STACK TEMPERATURE	DRY GAS METER TEMPERATURE	
Left	700.529	0.55	0.741620		1.20	75	63	59
Port	799.762	0.50	0.707107		1.08	78	67	61
	---------	0.38	0.616441		0.84	74	75	65
	99.233	0.36	0.600000		0.81	67	79	68
	=========	0.40	0.632456		0.88	80	81	70
	(DIFFERENCE)	0.41	0.640312		0.91	81	82	72
M.Lft		0.38	0.616441		0.85	78	82	74
Port		0.36	0.600000		0.82	68	83	74
		0.44	0.663325		0.97	83	84	75
		0.52	0.721110		1.15	83	86	77
		0.52	0.721110		1.14	92	88	79
		0.56	0.748331		1.24	86	90	80
M.Rght		0.64	0.800000		1.43	83	93	82
Port		0.68	0.824621		1.52	86	96	85
		0.67	0.818535		1.52	83	98	86
		0.63	0.793725		1.41	89	100	89
		0.48	0.692820		1.12	70	102	90
		0.42	0.648074		0.98	70	103	92
Right		0.36	0.600000		0.81	92	103	93
Port		0.40	0.632456		0.91	89	103	94
		0.74	0.860233		1.71	80	105	96
		0.78	0.883176		1.81	79	107	98
		0.76	0.871780		1.75	84	108	98
		0.68	0.824621		1.55	88	108	98

		AVERAGES	0.719095	0.517	1.18	81		86
			=========	=========	============	=========		=========

FIELD DATA REDUCTION

Site: EAGLE SNACKS
Date: November 19, 1991
Unit: Kettle Fryer #7
Test: Part. #2

	GAS METER READING	VELOCITY HEAD	SQUARE ROOT	ORIFICE PRESSURE DELTA H	STACK TEMPERATURE	DRY GAS METER TEMPERATURE	
Right	800.764	0.36	0.600000	0.81	90	96	93
Port	907.501	0.44	0.663325	1.07	71	98	94
	---------	0.78	0.883176	1.89	72	100	94
	106.737	0.80	0.894427	1.95	72	103	95
	=========	0.78	0.883176	1.90	72	104	95
	(DIFFERENCE)	0.70	0.836660	1.71	71	104	95
M.Rght		0.62	0.787401	1.51	71	103	95
Port		0.66	0.812404	1.60	73	104	95
		0.60	0.774597	1.45	76	105	96
		0.58	0.761577	1.41	74	105	96
		0.46	0.678233	1.12	76	106	97
		0.44	0.663325	1.05	85	105	97
M.Lft		0.38	0.616441	0.91	79	104	97
Port		0.36	0.600000	0.89	90	104	97
		0.46	0.678233	1.15	84	105	97
		0.52	0.721110	1.29	85	104	97
		0.54	0.734847	1.32	94	105	97
		0.60	0.774597	1.53	71	105	98
Left		0.55	0.741620	1.40	71	105	98
Port		0.52	0.721110	1.32	71	104	97
		0.45	0.670820	1.14	72	104	97
		0.43	0.655744	1.10	71	103	97
		0.41	0.640312	1.04	71	101	96
		0.38	0.616441	0.94	83	101	95

	---------	AVERAGE SQUARED			
AVERAGES	0.725399	0.526	1.31	77	100
	=========	=========	============	=========	=========

FIELD DATA REDUCTION

Site: EAGLE SNACKS
Date: November 20, 1991
Unit: Kettle Fryer #7
Test: Part. #3

	GAS METER READING	VELOCITY HEAD	SQUARE ROOT	ORIFICE PRESSURE DELTA H	STACK TEMPERATURE	DRY GAS METER TEMPERATURE	
Left	907.939	0.54	0.734847	1.27	71	58	56
Port	1011.747	0.44	0.663325	1.03	79	62	58
	---------	0.40	0.632456	0.94	80	68	60
	103.808	0.38	0.616441	0.92	68	72	62
	=========	0.40	0.632456	0.96	76	75	65
	(DIFFERENCE)	0.40	0.632456	0.95	81	78	67
M.Lft		0.37	0.608276	0.87	90	79	68
Port		0.38	0.616441	0.93	67	81	71
		0.42	0.648074	1.04	66	83	73
		0.50	0.707107	1.24	67	85	74
		0.53	0.728011	1.31	67	87	76
		0.58	0.761577	1.43	70	88	77
M.Rght		0.64	0.800000	1.60	67	90	79
Port		0.68	0.824621	1.67	76	92	80
		0.66	0.812404	1.63	75	93	81
		0.62	0.787401	1.51	84	95	84
		0.44	0.663325	1.06	92	96	85
		0.44	0.663325	1.07	88	96	87
Right		0.42	0.648074	1.01	94	97	88
Port		0.46	0.678233	1.17	68	98	90
		0.72	0.848528	1.82	69	99	91
		0.80	0.894427	2.03	70	100	92
		0.78	0.883176	1.98	71	102	94
		0.72	0.848528	1.83	70	104	94

		AVERAGE SQUARED			
AVERAGES	0.722229	0.522	1.30	75	82

A00013

FIELD DATA REDUCTION

Site: EAGLE SNACKS
Date: November 20, 1991
Unit: Continuous Fryer
Test: Part. #1

	GAS METER READING	VELOCITY HEAD	SQUARE ROOT	ORIFICE PRESSURE DELTA H	STACK TEMPERATURE	DRY GAS METER TEMPERATURE	
West Port	16.634	0.100	0.316228	0.33	240	72	72
	38.705	0.120	0.346410	0.40	245	73	71
	---------	0.130	0.360555	0.43	247	74	72
	22.071	0.130	0.360555	0.43	248	75	72
	=========	0.120	0.346410	0.40	248	77	71
	(DIFFERENCE)	0.120	0.346410	0.40	248	78	72
		0.110	0.331662	0.37	246	79	72
		0.100	0.316228	0.33	245	79	72
		0.090	0.300000	0.30	245	79	73
		0.090	0.300000	0.30	246	79	73
		0.090	0.300000	0.30	245	79	74
		0.080	0.282843	0.27	245	78	74
South Port	-	0.090	0.300000	0.30	240	79	74
		0.110	0.331662	0.36	250	79	75
		0.110	0.331662	0.36	251	79	75
		0.110	0.331662	0.36	251	79	75
		0.110	0.331662	0.36	251	79	75
		0.110	0.331662	0.37	248	78	76
		0.100	0.316228	0.33	248	76	75
		0.100	0.316228	0.33	245	76	75
		0.100	0.316228	0.33	246	76	75
		0.090	0.300000	0.30	244	75	75
		0.090	0.300000	0.30	243	74	74
		0.080	0.282843	0.27	243	75	74

		AVERAGE SQUARED			
AVERAGES	0.320714	0.103	0.34	246	75

A00014

FIELD DATA REDUCTION

Site: EAGLE SNACKS
Date: November 21, 1991
Unit: Continuous Fryer
Test: Part. #2

	GAS METER READING	VELOCITY HEAD	SQUARE ROOT	ORIFICE PRESSURE DELTA H	STACK TEMPERATURE	DRY GAS METER TEMPERATURE	
West	41.013	0.130	0.360555	0.50	205	55	54
Port	66.106	0.150	0.387298	0.57	209	55	54
	---------	0.160	0.400000	0.58	241	54	54
	25.093	0.160	0.400000	0.58	243	55	54
	=========	0.160	0.400000	0.58	241	55	54
	(DIFFERENCE)	0.150	0.387298	0.54	242	57	54
		0.130	0.360555	0.47	242	58	54
		0.130	0.360555	0.47	240	59	54
		0.120	0.346410	0.44	239	60	54
		0.115	0.339116	0.42	240	60	55
		0.105	0.324037	0.38	240	61	55
		0.100	0.316228	0.37	239	61	56
South		0.130	0.360555	0.48	238	61	56
Port		0.130	0.360555	0.47	241	62	57
		0.130	0.360555	0.47	243	63	57
		0.130	0.360555	0.47	245	63	57
		0.130	0.360555	0.47	246	64	58
		0.120	0.346410	0.44	243	64	58
		0.120	0.346410	0.44	243	64	58
		0.110	0.331662	0.40	243	64	58
		0.110	0.331662	0.40	242	64	58
		0.105	0.324037	0.38	242	64	58
		0.100	0.316228	0.37	240	65	59
		0.100	0.316228	0.37	239	65	59

	---------	AVERAGE SQUARED			
AVERAGES	0.354061	0.125	0.46	239	58
	=========	=========	============	=========	=========

A00015

FIELD DATA REDUCTION

Site: EAGLE SNACKS
Date: November 21, 1991
Unit: Continuous Fryer
Test: Part. #3

	GAS METER READING	VELOCITY HEAD	SQUARE ROOT	ORIFICE PRESSURE DELTA H	STACK TEMPERATURE	DRY GAS METER TEMPERATURE	
West Port	66.739	0.130	0.360555	0.49	224	59	58
	90.978	0.140	0.374166	0.52	224	59	58
	---------	0.150	0.387298	0.55	241	58	58
	24.239	0.150	0.387298	0.55	241	59	57
	=========	0.145	0.380789	0.53	240	59	57
	(DIFFERENCE)	0.125	0.353553	0.46	239	60	58
		0.120	0.346410	0.44	239	61	58
		0.115	0.339116	0.42	236	62	58
		0.110	0.331662	0.41	234	63	58
		0.100	0.316228	0.37	235	63	58
		0.090	0.300000	0.33	233	63	59
		0.090	0.300000	0.33	234	63	59
South Port		0.120	0.346410	0.45	232	63	59
		0.130	0.360555	0.48	236	63	59
		0.130	0.360555	0.48	240	64	59
		0.125	0.353553	0.46	241	65	59
		0.130	0.360555	0.48	240	64	60
		0.120	0.346410	0.44	239	64	60
		0.110	0.331662	0.41	238	65	60
		0.105	0.324037	0.39	238	64	60
		0.100	0.316228	0.37	238	65	60
		0.100	0.316228	0.37	234	65	60
		0.095	0.308221	0.35	236	65	60
		0.090	0.300000	0.33	235	65	61

		AVERAGE SQUARED			
AVERAGES	0.341728	0.117	0.43	236	61

DESICCATION OF SOLID SAMPLES TO CONSTANT WEIGHT

Completion Dates
1. ______ 2. ______
3. ______ 4. ______
Indicate by numbers in box under Sample column.

Eagle Snacks
Kettle Fryer #7
Part #1

Requestor ______
JN ______
Assigned to ______
Date Assigned ______

ALL WEIGHTS IN GRAMS

Tare Weight		Sample Number	Filter or Container #	Filter or Container plus Sample	Filter or Container Tare	Sample	Tare + Sample Weight	
1. 98.1640 2. 98.1645 3. 98.1648 4. 5. 6. 7. 8.	9.–16.	Probe	91.3	98.1994	98.1644	0.0350	1. 98.1991 2. 98.1951 3. 98.1971 4. 98.1996 5. 98.1996 6. 7. 8.	9.–16.
1. 0.3435 2. 0.3436 3. 0.3442 4. 5. 6. 7. 8.	9.–16.	Filter	3.162	0.3445	0.3438	0.0007	1. 0.3446 2. 0.3445 3. 0.3443 4. 5. 6. 7. 8.	9.–16.
1. 97.9513 2. 97.9514 3. 97.9519 4. 5. 6. 7. 8.	9.–16.	Imp I	92.3	97.9515	97.9515	∅	1. 97.9497 2. 97.9502 3. 97.9512 4. 97.9516 5. 97.9517 6. 7. 8.	9.–16.
1. 95.7636 2. 95.7639 3. 95.7644 4. 5. 6. 7. 8.	9.–16.	Imp O	93.3	95.7632	95.7640	-0.0008	1. 95.7631 2. 95.7614 3. 95.7633 4. 95.7632 5. 6. 7. 8.	9.–16.

DESICCATION OF SOLID SAMPLES TO CONSTANT WEIGHT

Completion Dates
1. ______ 2. ______
3. ______ 4. ______
Indicate by numbers in box under Sample column.

Eagle Snacks
Kettle Fryer #7
Part. #2

Requestor ______
JN ______
Assigned to ______
Date Assigned ______

ALL WEIGHTS IN GRAMS

TARE WEIGHT				TARE + SAMPLE WEIGHT	
1. 96.3021	9.	SAMPLE NUMBER	Probe	1. 96.3307	9.
2. 96.3024	10.	FILTER OR CONTAINER #	94.3	2. 96.3277	10.
3. 96.3029	11.	FILTER OR CONTAINER PLUS SAMPLE	96.3308	3. 96.3283	11.
4.	12.	FILTER OR CONTAINER TARE	96.3025	4. 96.3309	12.
5.	13.	SAMPLE	0.0283	5. 96.3309	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

TARE WEIGHT				TARE + SAMPLE WEIGHT	
1. 0.3417	9.	SAMPLE NUMBER	Filter	1. 0.3435	9.
2. 0.3434	10.	FILTER OR CONTAINER #	3.180	2. 0.3437	10.
3. 0.3432	11.	FILTER OR CONTAINER PLUS SAMPLE	0.3436	3. 0.3436	11.
4. 0.3433	12.	FILTER OR CONTAINER TARE	0.3433	4.	12.
5.	13.	SAMPLE	0.0003	5.	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

TARE WEIGHT				TARE + SAMPLE WEIGHT	
1. 97.1632	9.	SAMPLE NUMBER	Imp I	1. 97.1641	9.
2. 97.1634	10.	FILTER OR CONTAINER #	95.3	2. 97.1657	10.
3. 97.1636	11.	FILTER OR CONTAINER PLUS SAMPLE	97.1660	3. 97.1659	11.
4.	12.	FILTER OR CONTAINER TARE	97.1634	4. 97.1665	12.
5.	13.	SAMPLE	0.0026	5.	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

TARE WEIGHT				TARE + SAMPLE WEIGHT	
1. 96.5764	9.	SAMPLE NUMBER	Imp O	1. 96.5760	9.
2. 96.5764	10.	FILTER OR CONTAINER #	96.3	2. 96.5736	10.
3. 96.5770	11.	FILTER OR CONTAINER PLUS SAMPLE	96.5758	3. 96.5745	11.
4.	12.	FILTER OR CONTAINER TARE	96.5766	4. 96.5752	12.
5.	13.	SAMPLE	-0.0008	5. 96.5762	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

DESICCATION OF SOLID SAMPLES TO CONSTANT WEIGHT

Completion Dates
1.______ 2.______
3.______ 4.______
Indicate by numbers in box under Sample column.

Eagle Snacks
Kettle Fryer #7
Part. #3

Requestor ______
JN ______
Assigned to ______
Date Assigned ______

ALL WEIGHTS IN GRAMS

TARE WEIGHT		SAMPLE		TARE + SAMPLE WEIGHT	
1. 102.5528	9.	SAMPLE NUMBER	Probe	1. 102.5657	9.
2. 102.5532	10.	FILTER OR CONTAINER #	97.3	2. 102.5627	10.
3. 102.5536	11.	FILTER OR CONTAINER PLUS SAMPLE	102.5656	3. 102.5641	11.
4.	12.	FILTER OR CONTAINER TARE	102.5532	4. 102.5655	12.
5.	13.	SAMPLE	0.0124	5. 102.5656	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

TARE WEIGHT		SAMPLE		TARE + SAMPLE WEIGHT	
1. 0.3558	9.	SAMPLE NUMBER	Filter	1. 0.3558	9.
2. 0.3556	10.	FILTER OR CONTAINER #	3.181	2. 0.3562	10.
3. 0.3558	11.	FILTER OR CONTAINER PLUS SAMPLE	0.3560	3. 0.3560	11.
4.	12.	FILTER OR CONTAINER TARE	0.3557	4.	12.
5.	13.	SAMPLE	00003	5.	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

TARE WEIGHT		SAMPLE		TARE + SAMPLE WEIGHT	
1. 98.7108	9.	SAMPLE NUMBER	Imp I	1. 98.7256	9.
2. 98.7112	10.	FILTER OR CONTAINER #	98.3	2. 98.7274	10.
3. 98.7116	11.	FILTER OR CONTAINER PLUS SAMPLE	98.7277	3. 98.7277	11.
4.	12.	FILTER OR CONTAINER TARE	98.7112	4. 98.7280	12.
5.	13.	SAMPLE	0.0165	5.	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

TARE WEIGHT		SAMPLE		TARE + SAMPLE WEIGHT	
1. 95.8404	9.	SAMPLE NUMBER	Imp O	1. 95.8400	9.
2. 95.8406	10.	FILTER OR CONTAINER #	99.3	2. 95.8371	10.
3. 95.8410	11.	FILTER OR CONTAINER PLUS SAMPLE	95.8396	3. 95.8387	11.
4.	12.	FILTER OR CONTAINER TARE	95.8407	4. 95.8392	12.
5.	13.	SAMPLE	-0.0011	5. 95.8395	13.
6.	14.			6.	14.
7.	15.			7.	15.
8.	16.			8.	16.

A00019

DESICCATION OF SOLID SAMPLES TO CONSTANT WEIGHT

Completion Dates
1. ______ 2. ______
3. ______ 4. ______
Indicate by numbers in box under Sample column.

Eagle Snacks
Cont. Fryer
Part. #1

Requestor ______
JN ______
Assigned to ______
Date Assigned ______

ALL WEIGHTS IN GRAMS

TARE WEIGHT	SAMPLE NUMBER	FILTER OR CONTAINER #	FILTER OR CONTAINER PLUS SAMPLE	FILTER OR CONTAINER TARE	SAMPLE	TARE + SAMPLE WEIGHT
1. 105.6375 2. 105.6377 3. 105.6376	Probe	100.3	105.6744	105.6376	0.0368	1. 105.6747 2. 105.6712 3. 105.6721 4. 105.6743 5. 105.6741
1. 0.3572 2. 0.3570 3. 0.3572	Filter	3.183	0.3732	0.3571	0.0161	1. 0.3728 2. 0.3734 3. 0.3734
1. 101.9810 2. 101.9790 3. 101.9792 4. 101.9791	Imp I	101.3	102.0101	101.9791	0.0310	1. 102.0100 2. 102.0100 3. 102.0104
1. 97.0250 2. 97.0209 3. 97.0207 4. 97.0207	Imp O	102.3	97.0281	97.0208	0.0073	1. 97.0283 2. 97.0255 3. 97.0265 4. 97.0278 5. 97.0281

A00020

DESICCATION OF SOLID SAMPLES TO CONSTANT WEIGHT

Eagle Snacks
Cont. Fryer
Part. # 2

Completion Dates
1. ______ 2. ______
3. ______ 4. ______
Indicate by numbers in box under Sample column.

Requestor ______
JN ______
Assigned to ______
Date Assigned ______

ALL WEIGHTS IN GRAMS

Sample: Probe — Filter or Container # 103.3

TARE WEIGHT		TARE + SAMPLE WEIGHT	
1. 103.5731	9.	1. 103.5975	9.
2. 103.5723	10.	2. 103.5940	10.
3. 103.5713	11.	3. 103.5955	11.
4. 103.5714	12.	4. 103.5965	12.
5.	13.	5. 103.5972	13.
6.	14.	6.	14.
7.	15.	7.	15.
8.	16.	8.	16.

FILTER OR CONTAINER PLUS SAMPLE 103.5971
FILTER OR CONTAINER TARE 103.5717
SAMPLE 0.0254

Sample: Filter — Filter or Container # 3.184

TARE WEIGHT		TARE + SAMPLE WEIGHT	
1. 0.3518	9.	1. 0.3717	9.
2. 0.3518	10.	2. 0.3718	10.
3. 0.3517	11.	3. 0.3719	11.
4.	12.	4.	12.
5.	13.	5.	13.
6.	14.	6.	14.
7.	15.	7.	15.
8.	16.	8.	16.

FILTER OR CONTAINER PLUS SAMPLE 0.3718
FILTER OR CONTAINER TARE 0.3518
SAMPLE 0.0200

Sample: Imp I — Filter or Container # 104.3

TARE WEIGHT		TARE + SAMPLE WEIGHT	
1. 98.3290	9.	1. 98.3743	9.
2. 98.3288	10.	2. 98.3737	10.
3. 98.3291	11.	3. 98.3733	11.
4.	12.	4.	12.
5.	13.	5.	13.
6.	14.	6.	14.
7.	15.	7.	15.
8.	16.	8.	16.

FILTER OR CONTAINER PLUS SAMPLE 98.3738
FILTER OR CONTAINER TARE 98.3290
SAMPLE 0.0448

Sample: Imp O — Filter or Container # 105.3

TARE WEIGHT		TARE + SAMPLE WEIGHT	
1. 97.9320	9.	1. 97.9433	9.
2. 97.9322	10.	2. 97.9401	10.
3. 97.9313	11.	3. 97.9414	11.
4.	12.	4. 97.9423	12.
5.	13.	5. 97.9431	13.
6.	14.	6.	14.
7.	15.	7.	15.
8.	16.	8.	16.

FILTER OR CONTAINER PLUS SAMPLE 97.9429
FILTER OR CONTAINER TARE 97.9318
SAMPLE 0.0111

DESICCATION OF SOLID SAMPLES TO CONSTANT WEIGHT

Completion Dates
1.______ 2.______
3.______ 4.______
Indicate by numbers in box under Sample column.

Eagle Stacks
Cont. Fryer
Part. #3

Requestor ______
JN ______
Assigned to ______
Date Assigned ______

ALL WEIGHTS IN GRAMS

No.	TARE WEIGHT	TARE + SAMPLE WEIGHT
1	97.5431	97.5627
2	97.5421	97.5640
3	97.5401	97.5650
4	97.5414	97.5649
5	97.5416	

SAMPLE NUMBER: Probe
FILTER OR CONTAINER #: 106.3
FILTER OR CONTAINER PLUS SAMPLE: 97.5646
FILTER OR CONTAINER TARE: 97.5417
SAMPLE: 0.0229

No.	TARE WEIGHT	TARE + SAMPLE WEIGHT
1	0.3562	0.3704
2	0.3560	0.3704
3	0.3562	0.3704

SAMPLE NUMBER: Filter
FILTER OR CONTAINER #: 3.185
FILTER OR CONTAINER PLUS SAMPLE: 0.3704
FILTER OR CONTAINER TARE: 0.3561
SAMPLE: 0.0143

No.	TARE WEIGHT	TARE + SAMPLE WEIGHT
1	104.2955	104.3263
2	104.2957	104.3266
3	104.2940	104.3265
4	104.2944	
5	104.2942	

SAMPLE NUMBER: Imp I
FILTER OR CONTAINER #: 107.3
FILTER OR CONTAINER PLUS SAMPLE: 104.3265
FILTER OR CONTAINER TARE: 104.2942
SAMPLE: 0.0323

No.	TARE WEIGHT	TARE + SAMPLE WEIGHT
1	105.3677	105.3744
2	105.3679	105.3752
3	105.3667	105.3761
4	105.3667	105.3762

SAMPLE NUMBER: Imp O
FILTER OR CONTAINER #: 108.3
FILTER OR CONTAINER PLUS SAMPLE: 105.3758
FILTER OR CONTAINER TARE: 105.3670
SAMPLE: 0.0088

WESTERN ENVIRONMENTAL SERVICES

APPENDIX B

WESTERN ENVIRONMENTAL SERVICES

GAS METER CALIBRATION

Meter Number: WES #10
Barometric Pressure: 30.15
Date: Sept. 4, 1991
Calibrated By: Ty Hastriter

Orifice	Standard Meter Start	Standard Meter Finish	Temp F	Test Meter Start	Test Meter Finish	Temp F	Time Min	V	Delta H
0.50	817.533	821.473	73	551.499	555.200	68	10	1.053	1.82
0.50	821.473	825.420	73	555.200	558.89	71	10	1.064	1.81
1.00	825.737	831.208	73	559.201	564.318	74	10	1.069	1.87
1.00	831.208	836.708	73	564.318	569.477	77	10	1.071	1.84
2.00	837.054	844.808	73	569.805	577.035	81	10	1.083	1.84
2.00	844.808	852.565	74	577.035	584.395	83	10	1.087	1.84
						Average		1.068	1.83

B00001

WESTERN ENVIRONMENTAL SERVICES

PITOT TUBE CALIBRATION

Date: September 3, 1991
Calibrated by: Sean Marcotte
Number: 26
Source: Magnehlic 0-2"

Delta P std	Delta P leg 1	Delta P leg 2	Cp leg 1	Cp leg 2
0.25	0.45	0.40	0.75	0.79
0.75	1.10	1.05	0.83	0.85
1.25	1.85	1.80	0.82	0.83
		Averages	0.80	0.82
		Average	0.81	

WESTERN ENVIRONMENTAL SERVICES

APPENDIX C

NOMENCLATURE

$\%CO$	Percent CO by volume, dry
$\%CO_2$	Percent CO_2 by volume, dry
$\%EA$	Percent excess air in stack gas
$\%I$	Percent Isokinetic
$\%M$	Percent Moisture in Stack Gas, by Volume
$\%N_2$	Percent N_2 by volume, dry
$\%O_2$	Percent O_2 by volume, dry
A_s	Stack Area, ft^2
C_p	Pitot Tube Coefficient
C_{sf}	Particulate concentrations at standard conditions (1), dry, based on probe, cyclone and filter catch, GRS/SDCF
C_{st}	Particulate concentration at standard conditions (1), dry, based on total catch, GRS/SDCF
D_n	Sampling nozzle diameter, in.
E_f	Particulate emission rate, based on probe, cyclone and filter catch, lbs/hr
E_t	Particulate emission rates based on total particulate catch, lbs/hr
I_c	Percent of particulate caught in impingers
M_d	Mole Fraction Dry Stack Gas
M_f	Particulate collected in probe, cyclone and filter, mg.
M_t	Total particulate collected mg.
MW	Molecular Weight of Wet Stack Gas, gm/gm-mole
MW_c	Molecular Weight of Chemical
MW_d	Molecular Weight of Dry Stack Gas, gm/gm-mole
P	Velocity head, in. H_2O
P_b	Barometric Pressure, in. Hg.
PE_f	Particulate emission rate on a process basis, probe, cyclone and filter catch
PE_t	Particulate emission rate on a process basis, Total catch
P_m	Average Orifice Pressure Drop, in. Hg.

WESTERN ENVIRONMENTAL SERVICES

NOMENCLATURE

(CONT)

PPM	Parts per million
P_s	Stack Gas Pressure, in. Hg., absolute
P_u	Unit process rate
Q_a	Stack Gas Flow Rate at Stack Conditions, ft^3/min
Q_s	Stack Gas Flow Rate at Standard Conditions (1), dry ft^3/min
T_m	Average Dry Gas Meter Temperature, ^oF.
T_s	Stack Gas Temperature, ^oF
T_s	Average Stack Gas Temperature, ^oF
T_{std}	Standard Temperature, ^oF
T_t	Net time of test min.
V_m	Volume of Dry Gas Sampled at Meter Conditions, ft^3
$V_{m_{std}}$	Volume of Dry Gas Sampled at Standard Conditions (1), ft^3
V_s	Average Stack Gas Velocity, Stack Conditions, ft/sec
V_w	Total H_2O Collected in Impingers and Silica Gel, ml
$V_{w_{std}}$	Volume of Water Vapor Collected at Standard Conditions (1), ft^3

WESTERN ENVIRONMENTAL SERVICES

CALCULATIONS

1. Volume of water vapor at standard conditions [1]

$$V_{w_{std}} = .00267 * \frac{460 + T_{std}}{29.92} * Vlc$$

2. Volume of dry gas sampled at standard conditions [1]

$$V_{m_{std}} = 17.64 * \frac{V_m (P_b + P_m)}{(T_m + 460)}$$

3. Percent moisture in stack gas by volume.

$$\%M = \frac{100 * V_{w_{std}}}{V_{w_{std}} + V_{m_{std}}}$$

4. Mole fraction dry stack gas.

$$M_s = \frac{100 - \%M}{100}$$

5. Molecular weight of dry stack gas (gm/gm - Mole)

$$MW_d = [(\%\ CO_2 * .44) + (\%\ O_2 * .32) + (\%\ N_2 * .28) + (\%\ CO * .28) + (\%\ \text{Additional Gas} * \text{MW of Additional Gas})]$$

6. Molecular weight of wet stack gas (gm/gm - Mole)

$$MW + (18 * Bwo) + [(1-Bwo) * MW_d]$$

7. Stack gas velocity at stack conditions [2], (ft/sec)

$$V_s = 85.49 * CP * \sqrt{\Delta P} * \sqrt{\frac{(T_s + 460)}{Ms * P_s}}$$

8. Stack gas volumetric flow rate at stack conditions.

$$Q_a = V_s * A_s * 60$$

CALCULATIONS

9. Stack gas volumetric folw rate at standard conditions [1]

$$Q_s = Q_a * \frac{528}{460 + T_s} * \frac{P_s}{29.92} * (1.00 - Bwo)$$

10. Percent isokinetic

$$\%I = [\frac{(T_s + 460) * V_{m\,std}}{P_s * V_s * AN * T_t} * (1 - Bwo)] * .0945$$

11. Particulate Concentrations at standard conditions [1], dry, based on probe, cyclone and filter catch.

$$C_{sf} = \frac{M_f * 15.43}{V_{m\,std} * 1000}$$

12. Particulate concentration at standard conditions [1], dry, based on total catch.

$$C_{st} = \frac{M_t * 15.43}{V_{m\,std} * 1000}$$

13. Particulate emission rate, based on probe, cyclone, and filter catch.

$$E_f = \frac{M_f * 60 * Q_s}{454{,}000 * V_{m\,std}}$$

14. Particulate emission rate, based on total catch.

$$E_t = \frac{M_t * 60 * Q_s}{454{,}000 * V_{m\,std}}$$

CALCULATIONS

15. Particulate emission rate on a process basis, probe, cyclone, and filter catch.

$$PE_f = \frac{E_f}{P_u}$$

16. Particulate emission rate on a process basis, total catch.

$$PE_t = \frac{E_f}{P_u}$$

17. Particulate emission rate, part per million.

$$ppm = \frac{M_t}{V_{m_{std}}} * \frac{863.3}{MW_c}$$

(1) Standard conditions: 68^0, 29.92 "Hg

(2) $\sqrt{\Delta P_s * (T_s + 460)}$ is determined by averaging the square root of the product of the velocity head (ΔP_s) and the absolute stack temperature (T_s + 460) for each indibidual point

WESTERN ENVIRONMENTAL SERVICES

APPENDIX D

ANHEUSER-BUSCH COMPANIES

December 9, 1991

Mr. Thomas L. Rooney
Western Environmental Services
1010 South Pacific Coast Highway
Redondo Beach, CA 90277

**Re: Visalia Eagle Snacks, Inc.
Process Rates During Tests of
Demister (Continuous PC Fryer)
and a Kettle Fryer**

Dear Tom:

Attached is a copy of my field notes and the plant's production records covering the testing that you performed on November 19, 20, and 21, 1991. Please include these enclosures in your pending report for your testing of the improved demister on the Continuous Potato Chip Fryer and of a Kettle Fryer.

For these tests, I am using the production records as a basis for determining the Process Rates. According to Mr. D. G. Davison at ESI, the scales at the kettle fryer batch hopper and the incoming weigh belt to the continuous fryer are no longer calibrated. Thus, the weights noted in my field notes are incorrect.

The batch hopper scale now just gives relative batch sizes, and the weigh belt does not function properly. The plant uses different scale monitors on the raw potato process time to evaluate the process inputs. Thus, for these tests, use the fryer inputs as noted for each test run on the accompanying production records.

If you have additional questions, or need additional information, please call me at my St. Louis office.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INC.
Donald M. DeHart

Donald M. DeHart
Sr. Environmental Engineer
Environmental Affairs Department
Tel: 314-577-4158
Fax: " " -1032

Anheuser-Busch Companies Inc
Executive Offices
One Busch Place
St Louis MO U.S.A 63118-1852
Telex 447 117 ANBUSCH STL

PRODUCTION REPORT FOR WORKSTATION VKET1 - VIS KET FRY PROC 1st SHFT

SUPERVISOR: MR

PRODUCTION MANAGER: RL

DATE: 11/19/91

SHIFT: 1

JOB#: 262248

PRODUCT PRODUCED: 700686 - HAWAIIAN STYLE POT. CHIPS

QUANTITY PRODUCED: 6,125 LBS.

TIME WORKSTATION STARTED UP: 07:30AM

TIME WORKSTATION SHUT DOWN: 03:30PM

	HOURS	
TOTAL MACHINE TIME:	48.00	100.0%
DOWN TIME - PLANNED:	0.00	0.0%
DOWN TIME - UNPLANNED:	0.00	0.0%
PRODUCTIVE RUNNING TIME:	48.00	100.0%

CONFIDENTIAL

	UNIT OF MEAS	ACTUAL USAGE
RAW POTATOES	LBS.	26,000

RAW WASTE: 355 LBS.

FINISHED WASTE: 320 LBS.

COMMENTS

NO COMMENTS

Ave. Fryer output per shift $= \frac{(\text{Quantity Produced} + \text{Finished waste})(1.00 - \text{WT. Fraction seasoning added})}{\text{Productive Running Time} / 6 \text{ fryers}}$

$= \frac{(6125 + 320)(1.00 - 0.02)}{48/6} = 132 \text{ lb/hr per fryer}$

Ave. fryer input per shift $= \frac{\text{Actual Usage} - \text{Raw Waste}}{\text{Prod. Run Time} / 6}$

$= \frac{26,000 - 355}{48/6} = 534 \text{ lb/hr per fryer.}$

For Kettle Fryer Test Runs 1 and 2.

PRODUCTION REPORT FOR WORKSTATION VKET1 - VIS KET FRY PROC 1st SHFT

SUPERVISOR: MR

PRODUCTION MANAGER: RL

DATE: 11/20/91

SHIFT: 1

JOB#: 262690

PRODUCT PRODUCED: 700686 - HAWAIIAN STYLE POT. CHIPS

QUANTITY PRODUCED: 5,657 LBS.

TIME WORKSTATION STARTED UP: 07:30AM

TIME WORKSTATION SHUT DOWN: 03:30PM

	HOURS	
TOTAL MACHINE TIME:	48.00	100.0%
DOWN TIME - PLANNED:	3.00	6.3%
DOWN TIME - UNPLANNED:	0.00	0.0%
PRODUCTIVE RUNNING TIME:	45.00	93.8%

CONFIDENTIAL

	UNIT OF MEAS	ACTUAL USAGE
RAW POTATOES	LBS.	24,500

RAW WASTE: 350 LBS.

FINISHED WASTE: 399 LBS.

COMMENTS

ZEROED AND CANCELLED BY MREQ16

$$\text{Ave. Fryer output per shift} = \frac{(\text{Qty. Prod.} + \text{Finished Waste})(1.00 - \text{Wt. Fraction seasoning added})}{\text{Prod. Running Time}/6}$$

$$= \frac{(5{,}657 + 399)(1.00 - 0.02)}{45/6} = 132 \text{ lb/hr per fryer}$$

$$\text{Ave. fryer input per shift} = \frac{\text{Actual Usage} - \text{Raw Waste}}{\text{Prod. Run Time}/6}$$

$$= \frac{24{,}500 - 350}{45/6} = 537 \text{ lb/hr per fryer.}$$

For Kettle Fryer Test Run No. 3.

PRODUCTION REPORT FOR WORKSTATION V1SE60 - VIS CONT FRY 1st 60% SEAS

SUPERVISOR:	MR	DATE:	11/20/91
PRODUCTION MANAGER:	RL	SHIFT:	1 , p.1
		JOB#:	262768

PRODUCT PRODUCED: 70??723 - BBQ CRISPY THINS

QUANTITY PRODUCED: 13,263 LBS.

			HOURS	
TIME WORKSTATION STARTED UP: 07:30AM		TOTAL MACHINE TIME:	8.00	100.
TIME WORKSTATION SHUT DOWN: 03:30PM		DOWN TIME - PLANNED:		0.0%
		DOWN TIME - UNPLANNED:	0.00	0.0%
		PRODUCTIVE RUNNING TIME:	8.00	100.0%

CONFIDENTIAL

	UNIT OF MEAS	ACTUAL USAGE
RAW POTATOES	LBS.	55,000

RAW WASTE: 420 LBS.

FINISHED WASTE: 625 LBS.

COMMENTS

ZEROED AND CANCELLED BY MREQ16

Note: Two products produced during shift, but time per product not specified. Use average of both products on shift. For BBQ, there is an additional 5% seasoning added after the 2% salt (on all current potato chip types). See p.2 for calculation of process rates.

PRODUCTION REPORT FOR WORKSTATION V1SE60 - VIS CONT FRY 1st 60% SEAS

SUPERVISOR:	MR	DATE:	11/20/91
PRODUCTION MANAGER:	RL	SHIFT:	1, p2
		JOB#:	262757

PRODUCT PRODUCED: 700668 - CR[illegible]PY THIN POTATO CHIPS

QUANTITY PRODUCED: 8,393 LBS.

			HOURS	
TIME WORKSTATION STARTED UP: 07:30AM		TOTAL MACHINE TIME:	8.00	100.0%
TIME WORKSTATION SHUT DOWN: 03:30PM		DOWN TIME - PLANNED:	0.00	0.0%
		DOWN TIME - UNPLANNED:	0.00	0.0%
		PRODUCTIVE RUNNING TIME:	8.00	100.0%

CONFIDENTIAL

	UNIT OF MEAS	ACTUAL USAGE
RAW POTATOES	LBS.	40,000

RAW WASTE: 390 LBS.

FINISHED WASTE: 495 LBS.

COMMENTS

ZEROED AND CANCELLED BY MREQ16

$$\text{Average output per shift} = \frac{\Sigma\,(\text{Quantity Produced} + \text{Finished waste})(1.0 - \text{wt. fract. salt added})(1.0 - \text{wt. seasoning add})}{\text{Productive Running Time}}$$

$$= \frac{[(8393+495) + (13263+625)(1.0-0.05)](1.0-0.02)}{8.0} = 2,705 \text{ lb/hr}$$

$$\text{Average input per shift} = \frac{\Sigma\,(\text{Actual Usage} - \text{Raw Waste})}{8.0}$$

$$= \frac{(40000-390) + (55,000-420)}{8.0} = 11,774 \text{ lb/hr}$$

For Continuous Fryer Emission Test No. 1. Note: Fryer production rate was essentially unchanged during the part of shift 2 included in Test No 1

PRODUCTION REPORT FOR WORKSTATION VPOT1 - VIS CONT PC PROC 1st SHFT

SUPERVISOR: MR

PRODUCTION MANAGER: RL

DATE: 11/21/91

SHIFT: 1

JOB#: 262766

PRODUCT PRODUCED: 700668 - CRISPY THIN POTATO CHIPS

QUANTITY PRODUCED: 20,149 LBS.

TIME WORKSTATION STARTED UP: 07:30AM

TIME WORKSTATION SHUT DOWN: 03:30PM

	HOURS	
TOTAL MACHINE TIME:	8.00	100.0%
DOWN TIME - PLANNED:	1.00	12.5%
DOWN TIME - UNPLANNED:	1.00	12.5%
PRODUCTIVE RUNNING TIME:	6.00	75.0%

CONFIDENTIAL

	UNIT OF MEAS	ACTUAL USAGE
RAW POTATOES	LBS.	78,470

RAW WASTE: 955 LBS.

FINISHED WASTE: 1,250 LBS.

COMMENTS

POTATOES LOT#1544 NORCHIPS 84 GRAVITY MATSURA
POTATOES LOT# 1545 NORCHIPS R&G GRAVITY 86
POTATOES LOT# 1547 GEMCHIPS ROBERT HOLT 82 GRAVITY
UNPLANNED DOWNTIME PROCESSING 1.0 HOURS MECHANICAL REPLACED A CONE IN HOOD FOR CO2 SYSTEM POSSIBLY RUBBING ON PADDLE ALSO POWER TO SLICING SYSTEM SHUT OFF

Note: Only one product for entire shift with only salt added (no extra seasoning)

$$\text{Average output} = \frac{(\text{QTy Prod.} + \text{Finished waste})(1.0 - \text{wT. fraction salt added})}{\text{Productive Running Time}}$$

$$= \frac{(20{,}149 + 1250)(1.0 - 0.02)}{6.00} = 3{,}495 \text{ lb/hr.}$$

$$\text{Average input} = \frac{(\text{Actual Usage} - \text{Raw Waste})}{\text{Prod. Run Time}}$$

$$= \frac{78{,}470 - 955}{6.0} = 12{,}919 \text{ lb/hr.}$$

For Continuous Fryer Emission Tests No. 2 and 3.

ISOKINETIC DATA SHEET*
(continued)

INSTALLATION: DATE:

LOCATION: RUN NO.

STACK GAS MOLECULAR WEIGHT:

$$M_s = (1 - B_{wo})\,[0.44\,(\%CO_2) + 0.32\,(\%O_2) + 0.28\,(\%N_2 + \%CO)] + 18B_{wo}$$

0.0176 6.70 22.12 12.11

$$= (0.327)\,[0.44(0.04) + 0.32(20.95) + 0.28(79)] + 18(0.673)$$

$= \cancel{13.39}$ 21.537 lb/lb mole wet

STACK GAS VELOCITY:

$$V_{s_{avg}} = 85.48\, C_p (\Delta P^{0.5})_{avg} \left(\frac{T_s}{(P_s\, M_s)}\right)^{0.5}$$

1.331

$$= 85.48\,(0.81)\,(0.321)\left(\frac{(706)}{(29.751)\,(\cancel{13.39}\ 21.537)}\right)^{0.5}$$

$= \cancel{29.59}$ 23.33 ft/sec [23.33 @ 21.54 lb/lb mole (wet)]

STACK GAS FLOW RATE:

$$Q_s = \frac{63{,}529\,(1 - B_{wo})\,(V_{s_{avg}})\,(A_s)\,(P_s)}{T_s} = \frac{63{,}529\,(0.327)\,(\cancel{29.59}\ 23.33)\,(4.746)\,(29.751)}{(706)}$$

$= \cancel{122{,}939}$ 96,930 dscf/hr $= \cancel{2049}$ 1615 dscfm [1613 dscfm]

PERCENT ISOKINETIC:

$$I = \frac{0.0945\,(T_s)\,(V_{m_{std}})}{\Theta V_s\, P_s\, A_n\,(1 - B_{wo})}$$

$$= \frac{0.0945\,(706)\,(23.155)}{(72)\,(\cancel{29.59}\ 23.33)\,(29.751)\,(0.00059)\,(0.327)}$$

$= \cancel{126.3}$ %

160.2 vs. 159.3 reported by WES

*Standard Temperature, 68°F (528°R)
*Standard Pressure, 29.92 in. H_g

ISOKINETIC DATA SHEET*

INSTALLATION: Eagle Snacks, Inc

LOCATION: Visalia, CA Continuous Fryer #1

DATE: Nov. 20, 1991

RUN NO. Run 1

FROM FIELD DATA SHEET

C_p = 0.81 T_s = 706 A_s = 4.746 V_m = 22.071 P_{bar} = 29.75 $(\Delta p)^{0.5}_{avg}$ = 0.103

Θ = 72 T_m = 535 A_n = 0.00059 γ_m = 1.068 P_{stat} = 0.02 ΔH = 0.34

FROM PHYSICAL SCIENCE:

V_{lc} = 1014 M_n = N/A $\%CO_2$ = .04 $\%O_2$ = 21.0 $\%N_2$ = 79 $\%CO$ = N/A

PRESSURE CALCULATIONS:

$$P_m = P_{bar} + \frac{\Delta H}{13.6} = (29.75) + \frac{(0.34)}{13.6} = 29.775 \text{ in. } H_g$$

$$P_s = P_{bar} + \frac{P_{stat}}{13.6} = (29.25) + \frac{(0.02)}{13.6} = 29.751 \text{ in. } H_g$$

DRY GAS VOLUME:

$$V_{m_{std}} = \frac{17.65\ V_m\ \gamma_m\ P_m}{T_m} = \frac{17.65\ (22.071)(1.068)(29.725)}{(535)} = 23.155 \text{ scf}$$

MOISTURE CONTENT: $V_{w_{std}} = 0.04707 \times 1014 = 47.73$

$$B_{wo} = \frac{V_{w_{std}}}{V_{m_{std}} + V_{w_{std}}} = \frac{(47.73)}{(23.155) + (47.73)} = 0.673$$

*Standard Temperature, 68°F (528°R)
*Standard Pressure, 29.92 in. H_g

ISOKINETIC DATA SHEET*
(continued)

INSTALLATION:

DATE:

LOCATION:

RUN NO.

STACK GAS MOLECULAR WEIGHT:

$$M_s = (1 - B_{wo})\,[0.44\,(\%CO_2) + 0.32\,(\%O_2) + 0.28\,(\%N_2 + \%CO)] + 18B_{wo}$$

12.11

$= (0.355)\,[0.44(\cancel{0.04}\ 0.0176) + 0.32(\cancel{20.95}\ 6.70) + 0.28(\cancel{79.014}\ 22.12)] + 18(0.645)$

$= \cancel{14.536}$ 22.34 lb/lb mole wet   [.355 (28.83)] + (12.11)

STACK GAS VELOCITY:

$$V_{s_{avg}} = 85.48\ C_p(\Delta P^{0.5})_{avg}\left(\frac{T_s}{(P_s\,M_s)}\right)^{0.5}$$

$$= 85.48\ (0.81)\,(.354)\left(\frac{(699)}{(29.751)\,(\cancel{14.536}\ 22.34)}\right)^{0.5}$$ 1.271

$= \cancel{31.76}$ 25.136 ft/sec

STACK GAS FLOW RATE:

$$Q_s = \frac{63{,}529\ (1 - B_{wo})\,(V_{s_{avg}})\,(A_s)\,(P_s)}{T_s} = \frac{63{,}529\ (0.355)\,(\cancel{31.76}\ 25.136)\,(4.746)\,(29.751)}{(699)}$$

$= \cancel{141{,}959}$ 114,511 dscf/hr = $\cancel{2366}$ 1,909 dscfm

PERCENT ISOKINETIC:

$$I = \frac{0.0945\ (T_s)\,(V_{m_{std}})}{\Theta V_s\,P_s\,A_n\,(1 - B)_{wo}}$$

$$= \frac{0.0945\ (699)\,(27.193)}{(72)\,(29.751)\,(\cancel{0.057}\ 0.00089)\,(\cancel{31.76}\ 25.136)\,(0.355)}$$

1796.247

$\cancel{21.089}$

17.012

$= \cancel{852}$ 105.6 % VS. 104 Reported by WES

*Standard Temperature, 68°F (528°R)
*Standard Pressure, 29.92 in. H_g

ISOKINETIC DATA SHEET*

INSTALLATION: Eagle Snacks, Inc Visalia, CA

LOCATION: Continuous Fryer #1

DATE: 11/20/91

RUN NO. 2

FROM FIELD DATA SHEET

C_p = 0.81 T_s = 699 A_s = 4.746 V_m = 25.093 P_{bar} = 29.75 $(\Delta p)^{0.5}_{avg}$ = 0.354

Θ = 72 T_m = 518 A_n = ~~0.053~~ 0.00089 γ_m = 1.068 P_{stat} = 0.02 ΔH = 0.46

FROM PHYSICAL SCIENCE:

V_{lc} = 1050 M_n = – $\%CO_2$ = 0.04 $\%O_2$ = 20.95 $\%N_2$ = 79.014 $\%CO$ = 0

PRESSURE CALCULATIONS:

$$P_m = P_{bar} + \frac{\Delta H}{13.6} = (29.75) + \frac{(0.46)}{13.6} = 29.78 \text{ in. } H_g$$

$$P_s = P_{bar} + \frac{P_{stat}}{13.6} = (29.75) + \frac{(0.02)}{13.6} = 29.751 \text{ in. } H_g$$

DRY GAS VOLUME:

$$V_{m_{std}} = \frac{17.65\ V_m\ \gamma_m\ P_m}{T_m} = \frac{17.65\ (25.093)(1.068)(29.78)}{(518)} = 27.193 \text{ scf}$$

MOISTURE CONTENT: $V_{w_{std}}$ = 0.04707 x 1050 = 49.42

$$B_{wo} = \frac{V_{w_{std}}}{V_{m_{std}} + V_{w_{std}}} = \frac{(49.42)}{(27.193) + (49.42)} = 0.645$$

*Standard Temperature, 68°F (528°R)

*Standard Pressure, 29.92 in. H_g

Kettle #7 Run 2

Total Part = Probe $0.~~0124~~\ 0.0283$
Filter 0.0003
Imp 1 0.0026
Imp 2 0.0008

0.0312 g $- 0.003$ Blk $= \boxed{0.0282\ g}$

Gas volume sampled = 99.233 dscf

$$\frac{0.\cancel{0312}\,.0282\ g\ PM \times \frac{1\ lb}{454\ g}}{\cancel{99.233}\ 106.737\ dscf} = \cancel{0.00000063}\ 5.82 \times 10^{-7}\ lb\ PM/dscf$$

$$\cancel{6.3 \times 10}\ 5.82 \times 10^{-7}\ lb\ PM/dscf \times 64{,}362\ dscf/hr = 0.\cancel{405}\ 0.374\ lb/hr$$

$$\cancel{.405}\ 0.374\ lb\ PM/hr \times \frac{1\ hr}{\cancel{132}\ 127\ lb\ potatoes} \times \frac{2000\ lb}{ton} = \cancel{5.61}\ 5.89\ lb\ PM/ton\ product$$

Avg. fryer output per shift:

$$= \frac{(\text{Quantity produced } \cancel{+ \text{Finished Waste}})\ \cancel{(1.00 - \text{Wt Fraction of Seasonings})}}{\text{production time}}$$

$$= \frac{(6{,}125\ \cancel{+ 320})\ \cancel{(1.00 - 0.02)}}{48\ hr\ (\text{six fryers})}$$

$= \cancel{132}\ 127$ lb/hr

Visalia, CA Nov 19-21, 1991

Continuous Fryer Run 2

Total Particulate = Probe 0.0254
Filter 0.0200
Imp 1 0.0448
Imp 2 0.0111

0.1013 g

− Blank 0.003 g

0.0983 g

Gas Volume sampled = 27.193 dscf

$$C_s = \frac{.0983\,g\ PM \times \frac{1\,lb}{454\,g}}{27.193\ dscf} = \frac{0.00000796\ \cancel{000.0080}\ lb\ PM}{dscf}$$

$$\frac{0.000008\ \cancel{.0036}\ lb\ PM}{dscf} \times 114{,}511\ dscf/hr = 0.912\ lb\ PM/hr$$

$$0.912\ lb\ PM/hr \times \frac{1\,hr}{3{,}495\ lb\ product} \times 2000\ lb/ton = 0.522\ lb\ PM/ton\ product$$

Visalia, Continuous Potato Chip Fryer No. 1 w/ Modified Mist Eliminator

Nov. 20 1991

Date	Run	Testing Start/Stop Time	Time	Input, Raw Potato Totalizer lb	Input, Raw Potato lb/hr	Frying Oil Makeup lb	Oil Temp (°F) Fryer Disc	Oil Temp (°F) HT Exc	Exhaust Fan RPM	Engr Set RPM
20	4	1450 Start	1439	0056170	14570	8919	308	351	870	660
			1449	0057640	14480	9123	310	350	898	670
			1504	62170	14590	9450	309	351	891	676
			1519	65805	14480	9747	308	349	891	690
			1534	69440	14570	283	307	351	891	690
			1549	73080	14480	521	306	349	891	692
20	4	End 1602	1604	76720	14570	880	306	350	891	690
				Δ = 18180# / 1.25 hr	= 14,544#/hr					
21	5	0855 Start	0854	Readings N/A Valid	Readings N/A Valid	1601	309	354	964	724
			0909			1954	310	353	964	748
			0924			2349	305	352	964	744
			0939			2694	307	353	964	745
			0954			3084	304	354	964	743
		End 1007	1009			3474	305	353	964	741
	6	1100 Start	1059			4580	306	350	944	721
			1114			4873	306	348	944	723
			1129			5235	305	347	944	708
			1144			5562	302	349	944	706
			1159			5953	305	349	944	706
		End 1212	1214			6312	306	350	944	704

Comments: My Time - 1330:00 equal WES Time 1330:30(pm)

Operator uses to regulate fryer input Potato Hopper Auger Speed
New Exhaust Fan w/ Mist Elim. It is variable speed
Thus damper no longer used
Incoming weigh belt is no longer used (D. Duncan) to monitor process and is no longer calibrated. Will include outputs for use as process rates in report. Outputs based on production info. 14569, 14590, 14481 lb/hr are the Totals (3) rate that continually show on screen - no matter what the input rate is. Discontinue use.
11/21 Fryer shuts down ~ 8 AM minor problem (metal rubbing), started up again ~ 8:30 A.
Process Rate determined by Fryer Output
Temp, type potato, potato moisture (specific gravity), product color and experience. Goal is to maintain highest production rate. Chips packaging records (only ones available) To be used to approximate Average Process Rate for the chips
Operator lowered fryer outlet temp and process rate as product too dark. Potatoes from storage are variable

Visalia Eagle Snacks Kettle Fryer #7 Nov 20, 1991

TEST No. + Time	Batch Start, hr	Batch WT, lb	Oil Temp., °F Set	Oil Temp., °F Start	Oil Temp., °F Low	Oil Temp., °F Out	Cook Time min/sec	Batch Cycle Time m/s	Scrub Liq PSIG	Batch Set WT, lb	Comments [p.2]
	0734	59.0E								59.0	
	0744	59.0E	293	299	260	274	6:18	7:33	10.5+		
	0751	59.4	3	87	3	4	7:09	8:27			
Start	0800	58.2	4	9	62	4	6:43	7:57			
0750	0808	57.0E	3	88	76	81	4 46	6:01			Hand loaded hopper (≈ 20-30, exploration from inspector Table)
	0814	61.4	293	291	256	76	7:59	9:14			
Run	0823	59.4	4	92	53	3	6:17	7:32	10.5+	59.0	
3	0830	60.8	3	286	257	3	6:54	8:16			
	0839	59.4	4	7	65	3	7:01	8 28			
	0847	60.2	294	286	264	273	6:41	7:58			
	0855	61.8	3	5	3	3	6:36	8:01			
	0903	59.4	4	6	3	3	6:43	8:14			
	0911	57.8	m	m	m	m	m	m			
	0920	60.4	3	9	1	3	6:18	7:49			
	0928	61.8	3	5	59	3	7:25	8:50	10.5+		
	0937	57.2	4	6	64	3	7:06	8:28			
	0945	58.8	294	285	265	273	6:06	7:18		59.0	
	0953	57.6	3	4	3	3	5:42	7:16	10.5		
	1001	59.6	4	84	248	3	6 58	8:50			
	1009	56.4	4	5	60	3	6:25	7:43			
	1017	61.8	4	5	1	3	7:35	9:07		58.0	
	1026	55.2	4	6	4	3	6:43	8:05			
	1034	53.4	293	285	269	273	5:10	6:42			
	1041	55.0	4	4	7	3	5:43	7:37			
End	1049	58.8	3	4	66	3	6:28	8:30			
1050	1057	23	$\Sigma = \frac{1,356.818}{178 \text{ min}} \times 60 \frac{\text{min}}{\text{hr}} = 455$ #/hr								

Visalia Eagle Snacks Kettle Fryer #7 Nov. 19, 1991

Test No. + Time	Batch Start, hr	Batch WT, lb	Oil Temp., °F Set	Start	Low	Out	Cook Time min/sec	Batch Cycle Time m/S	Scrub Liq psig	Batch SCT, lb	Comments p.1
	0818	64.2	294	287	266	273	5:54	7:17		57.0	My Time* | WES | Plant Graph
	0825	61.0	295	287	262	274	6:44	8:15	10.5		8:12'0 | 8:12'6 | 8:05
Start	0833	60.0	294	287	259	273	5:05	6:29			Automated raking
0830	0840	60.2	294	286	257	277	7:33	9:01			
1	0847	58.4	293	299	257	276	5:21	7:20			Automated cycling
	0856	57.2	294	293	263	275	6:04	7:20	10.5		by Fryer Temp.
	0904	56.6	294	286	268	275	5:52	7:13		57.0	
	0911	57.0	294	285	262	275	6:53	8:24			
Run	0920	59.8	293	286	264	276	6:38	7:52			
1	0927	59.6	294	290	263	275	6:08	7:22			
	0935	54.4	294	287	262	274	6:28	7:43			
	0943	56.2	294	291	266	275	5:38	8:51	10.5		
	0950	56.6	294	285	261	276	5:49	7:17			
	0957	58.2	294	286	262	276	5:48	7:03			
	1004	57.8	294	287	255	276	6:17	7:31			Rake stuck
	1011	60.2	293	287	263	282	7:31	8:45			
	1020	58.0E	293	295	263	275	7:26	8:39			
	1029	62.4	293	289	258	275	5:57	7:11		57.0	1134
	1036	57.6	294	286	257	276	5:52	7:06	10.5		835
	1043	56.4	293	287	260	275	5:02	6:16			
	1049	55.6	293	285	261	275	5:38	7:05			3 hr 9 min
	1056	56.2	294	287	259	276	5:46	7:04			189 min
	1103	57.4	293	285	261	275	6:42	7:57			
	1111	58.0E	3	6	69	4	5:46	6:59		56.0	
End	1119	53.2	3	283	71	74	5:19	6:54			
1130	1126	56.8	m	m	m	m	m	m			
	1134	58.2	Σ=	1445.6 lb / 189 min	×	60 min / hr	= 459 lb/hr	was	460 lb/hr		
		25									
	1205										
	1212	55.6	294	285	262	274	6:00	7:29		56.0	
Start	1219	57.2	3	5	3	4	6:01	7:30	10.5		
12:15	1226	62.0	3	285	254	274	7:34	8:58			
	1236	54.8	3	86	268	275	6:14	7:29			57
Run 2	1243	55.4	4	6	64	74	7:02	8:16			
	1252	57.6	4	290	67	274	6:01	7:44			Cutter @ Kettle 8, delay
	1300	57.8	3	89	65	74	6:38	8:25			
	1308	55.6	294	287	266	275	6:16	7:30			Scrubber Purge Cycle
	1315	56.8	4	5	6	4	6:28	7:43	10.5	56.0	~ 3 min
	1323	57.0	94	86	63	74	6:53	8:07			
	1331	58.0	4	6	5	4	6:44	8:00			
	1339	57.6	4	6	6	4	6:28	7:52			
2	1346	57.0	3	85	6	4	6:40	8:05	10.5		
	1354	56.0E	294	291	261	274	6:20	7:33		56.0	
	1403	55.4	4	85	4	5	6:51	8:22			
	1411	57.2	m	m	m	m	m	m			No computer readings
	1420	53.6	4	8	4	4	6:24	7:38			m = missing
	1428	54.6	3	9	8	5	4:48	8:16		56.0	
	1437	56.0E	m	m	m	m	m	m			mound dumped to Feeder
	1444	56.2	293	285	258	274	6:15	7:36			
	1451	55.6	3	5	259	4	6:40	8:02		56.0	
	1459	56.6	4	7	62	4	6:41	6:56	10.5		
1515	1506	59.0	293	285	260	274	6:37	7:51			
End	1514	59.8									
		57.0	23	Σ = 1302.6# / 182 min	×	60 min / hr	= 429 lb/hr	was	430 lb/hr		

Kettle 7 Nov 1? ... 91

Run 1

$0.0052 \frac{gr}{dscf} \times \frac{1\#}{7000\ gr} \times 10638 \frac{dscf}{min} \times 60 \frac{min}{hr} = 0.4742$

$0.4742\ lb\ PM/hr \times \frac{hr}{127\ \#\ potato\ product} \times 2000 \frac{\#}{ton} =$ 7.47 # PM / ton potato product

Run 2

$0.0041 \frac{gr}{dscf} \times \frac{1\#}{7000\ gr} \times 10720 \frac{dscf}{min} \times 60 \frac{min}{hr} = 0.3770$

$0.3770\ \#PM/hr \times \frac{1\ hr}{127\#} \times 2000 \frac{\#}{ton} =$ = 5.94 # PM / ton product

Run 3

$0.0037 \times \frac{1\#}{7000\ gr} \times 10772 \frac{dscf}{min} \times 60 \frac{min}{hr} = 0.3416$

$0.3416\ \#PM/hr \times \frac{1\ hr}{126\#} \times 2000 \frac{\#}{ton} =$ 5.42 # PM / ton product

$\boxed{6.3\ \#\ PM / ton\ product}$

Avg

$0.0043 \frac{gr}{dscf} \times \frac{1\#}{7000\ gr} \times 10712 \frac{dscf}{min} \times 60 \frac{min}{hr} = 0.3948$

$0.3948\ \#PM/hr \times \frac{1\ hr}{127\#} \times 2000 \frac{\#}{ton} =$ 6.2 # PM / ton product

Continuous #1

Run 2

$0.0555\ gr/dscf \times 1\#/7000\ gr \times 1928\ dscf/min \times 60\ min/hr = 0.922\ \#/hr$

$0.922\ \#/hr \times 1\ hr/3358\ \# \times 2000\#/ton = 0.549\ \#\ PM/ton\ product$

Run 3

$0.0445\ gr/dscf \times 1\#/7000\ gr \times 1798\ dscf/min \times 60\ min/hr = 0.6858$

$0.6858\ \#\ PM/hr \times hr/3358 \times 2000\#/ton = 0.409\ \#\ PM/ton\ product$

$\boxed{0.479\ \#\ PM/ton\ product}$

Date Nov. 20, 1991 Continuous Line #1

Test Average Values

- Front Half (Filterable)

39.8 mg PM × 0.015432 gr/mg = 0.6142 gr

0.6142 gr / 26.642 ~~24.666~~ DM dscf sampled = 0.0231 gr/dscf

0.0231 gr/dscf × 1#/7000 gr × 1863 dscf/min × 60 min/hr = $\boxed{0.3681}$ # PM/hr

0.3681 #PM/hr × 1 hr/3358 # potato product × 2000#/ton = 0.2193 #PM/ton potato product

0.2

- Back Half (Condensible)

47.0 mg PM × 0.015432 gr/mg = 0.7253 gr

0.7253 gr / 26.642 DM ~~24.666~~ dscf sampled = 0.0272 gr/dscf

0.0272 gr/dscf × 1#/7000 gr × 1863 dscf/min × 60 min/hr = $\boxed{0.4347}$ # PM/hr

0.4347 #PM/hr × 1 hr/3358 # potato product × 2000#/ton = 0.2589 #PM/ton potato product

0. 3

Date Nov. 19, 1991 Kettle #7

Test Average Values

- Front Half (Filterable)

$\underline{24.06}$ mg PM $\times$ 0.015432 gr/mg = $\underline{0.3713}$ gr

$\underline{0.3713}$ gr / $\underline{105.091}$ dscf sampled = $\underline{0.0035}$ gr/dscf

$\underline{0.0035}$ gr/dscf $\times$ 1#/7000 gr $\times$ $\underline{10712}$ dscf/min $\times$ 60 min/hr = $\boxed{0.3244}$ # PM/hr

$\underline{0.3244}$ # PM/hr $\times$ 1 hr/$\underline{127}$ # potato product $\times$ 2000#/ton = $\underline{5.1086}$ # PM/ton potato product

- Back Half (Condensible)

$\underline{4.87}$ mg PM $\times$ 0.015432 gr/mg = $\underline{0.0752}$ gr

$\underline{0.0752}$ gr / $\underline{105.091}$ dscf sampled = $\underline{0.0007}$ gr/dscf

$\underline{0.0007}$ gr/dscf $\times$ 1#/7000 gr $\times$ $\underline{10712}$ dscf/min $\times$ 60 min/hr = $\boxed{0.0657}$ # PM/hr

$\underline{0.0657}$ # PM/hr $\times$ 1 hr/$\underline{127}$ # potato product $\times$ 2000#/ton = $\underline{1.0346}$ # PM/ton potato product