AP-42 Section 9.5.3
Reference 5
Report Sect.
Reference

Rec'd 12/5/94
R

Tom -

This is the information you asked for. This is a flood chart which is as close as I can come.

Call me if you have any questions

Dave Phelps -

Department of Natural Resources
Environmental Protection Division

David Phelps
Environmental Specialist
Air Quality Bureau

Wallace State Office Building • Des Moines, Iowa 50319 • (515) 281-8189

TABLE 1. Summary of the Results of the January 16, 1987, Particulate Emission Compliance Test on the Blood Dryer Stack at the Farmland Foods Plant Located in Iowa Falls, Iowa.

ITEM	Run 1	Run 2	Run 3
Date of test	01-16-87	01-16-87	01-16-87
Time runs were done (HRS)	747/848	920/1022	1047/1148
Process Weight (Dry) (LB/HR)	1030	1030	1030
Volumetric flow			
actual (ACFM)	2988	3038	2926
standard (DSCFM)	1839	1835	1790
Gas temperature (DEG-F)	193	200	202
Moisture content (%V/V)	24.42	25.13	23.93
Gas composition (%V/V,dry)			
carbon dioxide	1.40	2.00	1.80
oxygen	18.80	17.80	18.20
carbon monoxide	0.00	0.00	0.00
nitrogen	79.80	80.20	80.00
Isokinetic variation (%)	104.7	101.5	98.6
Particulate concentration			
actual (GR/ACF)	.00483	.00424	.00545
standard (GR/DSCF)	.00784	.00703	.00891
Part. emission rate (LB/HR)	0.12	0.11	0.14

* Run 1 - Dry catch only; Runs 2 & 3 - Dry plus organic wet catch

Test No. 1
Blood Dryer Stack

3.1 **Results of Orsat & Moisture Analyses——Methods 3 & 4(%v/v)**

	Run 1	Run 2	Run 3
Date of run	01-16-87	01-16-87	01-16-87
Dry basis (orsat)			
carbon dioxide	1.40	2.00	1.90
oxygen	18.80	17.80	18.20
carbon monoxide	0.00	0.00	0.00
nitrogen	79.80	80.20	80.00
Wet basis (orsat)			
carbon dioxide	1.06	1.50	1.37
oxygen	14.21	13.33	13.85
carbon monoxide	0.00	0.00	0.00
nitrogen	60.31	60.04	60.86
water vapor	24.42	25.13	23.93
Dry molecular weight	28.98	29.03	29.02
Wet molecular weight	26.38	26.26	26.38
Specific gravity	0.908	0.907	0.911
Water mass flow (LB/HR)	1669	1728	1579

FO 1.500 1.550 1.500

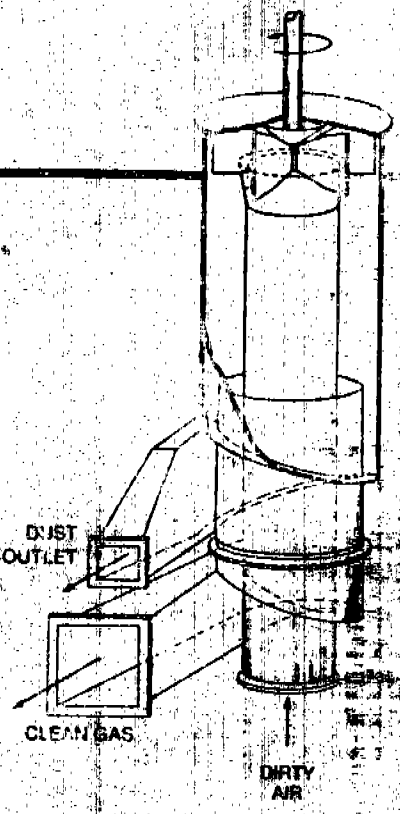
Test No. 1
Blood Dryer Stack

3.2 Results of Particulate Loading Determinations------Method 5

	Run 1	Run 2	Run 3
Date of run	01-16-87	01-16-87	01-16-87
Time run start/end.....(HRS)	746/ 848	920/1022	1047/1148
Static pressure.....(IN.WC)	0.32	0.32	0.32
Cross sectional area (SQ.FT)	0.92	0.92	0.92
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	220.0	0.0	0.0
impingers.....(GRAMS)	0.0	265.0	229.0
desiccant.....(GRAMS)	73.0	29.0	32.0
total.....(GRAMS)	293.0	294.0	261.0
Total particulate material collected(grams)	0.0217	0.0188	0.0226
Gas meter coefficient.....	1.0083	1.0063	1.0083
Barometric pressure..(IN.HG)	30.13	30.13	30.13
Avg. orif.pres.drop..(IN.WC)	1.53	1.45	1.32
Avg. gas meter temp..(DEF-F)	72.5	82.1	84.5
Volume through gas meter.			
at meter conditions...F)	42.27	41.62	39.16
standard conditions.(DSCF)	42.20	41.29	39.13
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.250	.250	.250
Avg.stack gas temp ..(DEG-F)	193	200	202
Volumetric flow rate.....			
actual.....(ACFM)	2988	3	2926
dry standard.....(DSCFM)	1839	1835	1790
Isokinetic variation.....(%)	104.7	101.5	98.6
Particulate concentration...			
actual.....(GR/ACF)	0.00483	0.00424	0.00545
dry standard.....(GR/DSCF)	0.00784	0.00703	0.00891
Particle mass rate...(LB/HR)	0.12	0.11	0.14

Ref. Farmland Foods Inc.

HELICLONE™ SEPARATOR



JAN - 8 1987

The HELICLONE™ Separator is a mechanical centrifugal separator employing the principle of dynamic precipitation.

It combines the dual functions of air mover and dust separator.

The central inlet tube directs particle laden gases into a fan wheel which imparts centrifugal motion to the gases at approximately its tip speed.

Gases are then spun into an outer cylindrical shell where the air borne particles have sufficient residence time in the very high centrifugal force field to migrate to the shell from which they are skimmed off with approximately 15% of the conveying gases, into an annular opening, to a dust receiver. From there the conveying gases can either be recycled to the inlet of the HELICLONE™ or they can be exhausted.

Inward gases of the annular skimming opening are clean and can either be exhausted or directed to a secondary cleaning stage such as a filter which in many instances allows air to recycle into the work area.

Mechanical parts of the HELICLONE™ such as fan wheel, shaft, bearings, etc. are in most cases of standard mechanical design. Therefore, the same considerations regarding spark resistant design, high temperature application, etc. apply as in the case of fans.

The name of the HELICLONE™ Separator is derived from the shape of the outlet housings, which have helical sides. The helical contour is used for expanding the outlet area.

The helical shape of the housing gives great rigidity to the support of the central feeder tube and the skimming tube. The pitch of the helix essentially follows the pitch of the spiralling gases and thus gradually changes their axial flow component into a direction completely perpendicular to the longitudinal axis of the HELICLONE™ Separator.

In the vertical position, the separator can be used as a wet scrubber with the water sprayed into the fan wheel.

The helical design of the outlet housings allows drainage of the scrubbing water by gravity. The wet surfaces of the fan wheel and of the cylindrical shell capture the dust particles. From there they are directed into a small sludge receiver cyclone. The HELICLONE™ performs as a thickener in this case.

The HELICLONE™ Separator has a low space requirement and since it is factory assembled, it also has a low installation cost. It is of rugged construction and is available in a variety of sizes ranging from 500 CFM to 50,000 CFM capacity.

Buffalo design & equipment co., inc.

INTERPOLL INC.
EPA Method 5 Probe (Cyclone) Wash
Gravimetric Analysis Laboratory Data Sheet
(CFR Title 40 Part 60 Appendix A)

Date of Analysis 1-22-87
Technician Rev

EPA-M5 Acetone R.B SPEC ≤ 7.8 µg/cc
Actual acetone residue blank 0 µg/cc

(1)

Interpoll

Job Farmland Foods Pollution
City/State Farmland Foods Pollution Date 1-16-87
Source Flood Dryer Log # 4466-02
Test Site Stack
Sample type PW Tech JB
Remarks: Test/Run 1/1
of 1

Special Handling Required

Evaporating Dish No. 04
Volume of acetone 105 cc
E. Dish Tare Wt. 105.6931 g
E. Dish + Sample Wt 105.7143 g
Comments

(2)

Interpoll

Job Farmland Foods Pollution
City/State Farmland Foods Pollution Date 1-16-87
Source Flood Dryer Log # 4466-05
Test Site Stack
Sample type PW Tech JB
Remarks: Test/Run 1/2
of

Special Handling Required

Evaporating Dish No. 05
Volume of acetone 120 cc
E. Dish Tare Wt. 93.2591 g
E. Dish + Sample Wt. 93.2693 g
Comments

(3)

Interpoll

Job Farmland Foods Pollution
City/State Farmland Foods Pollution Date 1-16-87
Source Flood Dryer Log # 4466-08
Test Site Stack
Sample type PW Tech JB
Remarks: Test/Run 1/2
of

Special Handling Required

Evaporating Dish No. 08
Volume of acetone 120 cc
E. Dish Tare Wt. 92.2579 g
E. Dish + Sample Wt. 92.2698 g
Comment

RESULTS:

✓ 0.0212 D-7 ✓ 0.0082 ✓ 0.0119

L-0185/Y

(EPA Method 5) Impinger Wash (Wet Catch)
Gravimetric Analysis Lab: Organics/Inorganics

Date of Analysis 1-29-87 Data Sheet TR 42(160)

Technician BCV

Project No. _____

Special Handling _____

interpoll

Job _____ Date _____
City/State _____ J/N _____
Source _____
Test Site _____
Sample type _____ Tech _____
Remarks: Test/Run _____
_____ of _____

☐ Organics
Evap. Dish No. _____
Blk. (Solv) Wt. _____ g
E. Dish Tare Wt. _____ g
E. Dish + Sample Wt. _____ g

☐ Inorganics
Evap. Dish No. _____
E. Dish Tare Wt. _____ g
E. Dish + Sample Wt. _____ g

Comments _____

760.7
795.9

interpoll

Job Fairmont Foods Bread Bakery Date 1-16-87
City/State Sioux Falls, SD Log #4461-11
Source Blend Drum
Test Site Stack
Sample type Wet Catch Tech SB
Remarks: Test/Run #2
_____ of _____

Special Handling _____

☑ Organics
Evap. Dish No. 43
Blk. (Solv) Wt. 0.0019 g
E. Dish Tare Wt. 90.3247 g
E. Dish + Sample Wt. 90.3385 g

☐ Inorganics
Evap. Dish No. _____
E. Dish Tare Wt. _____ g
E. Dish + Sample Wt. _____ g

Comments .0119 gms

721.1
74.7

interpoll

Job Fairmont Foods Bakery Date 1-16-87
City/State Sioux Falls, SD Log #4461-12
Source Blend Drum
Test Site Stack
Sample type Wet Catch Tech SB
Remarks: Test/Run #3
_____ of _____

Special Handling _____

☑ Organics
Evap. Dish No. 47
Blk. (Solv) Wt. 0.0219 g
E. Dish Tare Wt. 92.4713 g
E. Dish + Sample Wt. 92.4830 g

☐ Inorganics
Evap. Dish No. _____
E. Dish Tare Wt. _____ g
E. Dish + Sample Wt. _____ g

Comments .0117 gms

RESULTS:

	1	2	3
ORGANICS		0.0102	0.0105
INORGANICS			

L-0188G

AIR POLLUTION CONTROL EQUIPMENT OPERATING DATA*

Plant Farmland Foods Inc Location Iowa Falls, Ia. 50126

Source Type Blood Drying Rated Production 1500 Process Pounds/Hr.

Date 4-12-87 Time _____ Actual Production 1030 Process Pounds/Hr.

Air Flow Data _____ Run No. 1, 2, 3

Mechanical Collector:

Tube Diameter 14 in. No. of Tubes 1. Design Δp 9 in. H_2O @ Gas Temp. 200 °F.

Observed Δp _____ in H_2O. Design cfm/tube @ Observed Δp _____ @ _____ °F.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Electrostatic Precipitator:

Field No.	Primary Voltage (volts)	Primary Current (amps)	Secondary Voltage (KV)	Secondary Current (ma)	Spark Rate (per min.)

Scrubber:

Type _____. Δp (across scrubber) _____ in. H_2O.

Fan Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Liquid Circulation Rate _____ gal/min. % Make-up _____. Blowdown _____ gpm.

Scrubbing Water Change Interval _____

Settling Tank Cleaning Interval _____

Baghouse:

Pressure-Positive _____ Negative _____. No Compartments _____

Type Cleaning _____ Clean Cycle _____ min.

Avg. Baghouse Δp _____ in. H_2O. Δp Range _____ in. H_2O.

Fan: Rated H.P. _____. Operating Volts _____. Operating Amps _____.

Cyclone:

Type Helicone Δp 9" in. H_2O. Diameter 37"OD, 14" Inlet

Fan Rated H.P. 30. Operating Volts 440. Operating Amps _____.

Person Responsible for Data: Thomas O. Rochon

Signature: Thomas O. Rochon

Title/Position: Plant Supervisor

*Averages of operating data taken during actual test run unless requested otherwise.

(EPA Method 5) Filter
Gravimetric Analysis Lab
Data Sheet
FR 42(160)

Date of Analysis 1-20-87
Technician Bec

interpoll

1
Job Farmland Foods
City/State
Source Blood Dryers
Test Site Stack
Sample Type
Remarks
Date 1-16-87
Log # 4466-03
Tech JB
Test/Run 1/c
1 of 1

Special Handling Required
Filter No. 6456
Filter Type 4"G
Filter Tare Wt. 0.8546 g
Filter + Sample Wt. 0.8561 g
Comments

interpoll

2
Job Farmland Foods
City/State
Source Blood Dryers
Test Site Stack
Sample Type
Remarks
Date 1-16-87
Log # 4466-04
Tech JB
Test/Run 1/2
1 of 1

Special Handling Required
Filter No. 6450
Filter Type 4"G
Filter Tare Wt. 0.8[illegible]
Filter + Sample Wt. 0.8[illegible]
Comments

interpoll

3
Job Farmland Foods
City/State
Source Blood Dryers
Test Site Stack
Sample Type
Remarks:
Date 1-16-87
Log # 4466-05
Tech JB
Test/Run 1/3
1c 1

Special Handling Required
Filter No. 6451
Filter Type 4"G
Filter Tare Wt. 0.8[illegible]
Filter + Sample Wt. 0.8[illegible]
Comments

RESULTS:

0.0005	0.0004	0.0002
0.0217	0.0178	0.0224

3/21/95

Dave Phelps:

Running @ 5,600 lbs/hr raw blend 17% solids

2775 lbs/hr @ 65% moisture

Probe into duct after Heliclone → only control

1,030 duct blend mud is correct lbs/hr

MIDWEST RESEARCH INSTITUTE

Project/Acct. No. 4602-03-03 Date/Time MARCH 22, 1995

Project Title MEAT RENDERING AP-42 EMISSION FACTOR CALCULATIONS

Signature T. LAPP Verified by _____ (signature/date)

Phone Contact ☐ Meeting Notes ☐ Work Sheet ☒

I. PARTICULATE DISTRIBUTION between FILTERABLE & CONDENSIBLE:

RUN #1: FILTERABLE ONLY 0.0217 g

RUN #2: FILTERABLE = $\frac{0.0086}{0.0188} = 0.457 = 46\%$

TOTAL = 0.0188 g

CONDENSIBLE = $\frac{0.0102}{0.0188} = 0.543 = 54\%$

RUN #3: FILTERABLE = $\frac{0.0121}{0.0226} = 0.535 = 53\frac{3}{4}\%$

TOTAL = 0.0226 g

CONDENSIBLE = $\frac{0.0105}{0.0226} = 0.465 = 47\%$

II. PARTICULATE EMISSION RATES

FILTERABLE

RUN #1: 0.12 lb/hr

RUN #2: 0.11 lb/hr * 0.46 = 0.051 lb/hr

RUN #3: 0.14 lb/hr * 0.53 = 0.074 lb/hr

CONDENSIBLE

RUN #2: 0.11 lb/hr * 0.54 = 0.059 lb/hr

RUN #3: 0.14 lb/hr * 0.47 = 0.066 lb/hr

TOTAL PARTICULATE EMISSION RATES

RUN 1 = 0.12 lb/hr

RUN 2 = 0.11 lb/hr

RUN 3 = 0.14 lb/hr

III. EMISSION FACTORS -- DRIED BLOOD MEAL PRODUCTION BASIS

PRODUCTION RATE = 1,030 lbs/hr = 0.515 tons/hr (ALL 3 RUNS)

FILTERABLE

RUN #1: 0.12 lb/hr / 0.515 tons/hr = 0.23 lbs/ton

RUN #2: 0.051 lb/hr / 0.515 tons/hr = 0.099 lbs/ton

RUN #3: 0.074 lb/hr / 0.515 tons/hr = 0.14 lb/ton

AVERAGE 0.16 lbs/ton

MIDWEST RESEARCH INSTITUTE

Project/Acct. No: 4602-03-03 Date/Time MARCH 27, 1995

Project Title MEAT RENDERING AP-42 EMISSION FACTOR CALCULATIONS

Signature T. LAPP Verified by _____ (signature/date)

Phone Contact ☐
Meeting Notes ☐
Work Sheet ☒

Condensible

Run #2: 0.059 lbs/hr / 0.515 ton/hr = 0.11 lbs/ton

Run #3: 0.066 lbs/hr / 0.515 ton/hr = 0.13 lbs/ton

Average 0.12 lbs/ton

MRI