PSD-234A

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

August 22, 1997

Mr. A. A. Linero, P.E.
New Source Review Section
Bureau of Air Regulation
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Cargill Fertilizer, Inc.
Animal Feed Plant
Permit 0570008-013-AC (PSD-FL-234)

Dear Mr. Linero:

The purpose of this letter is to notify the Department of a change in the Animal Feed Ingredients (AFI) plants located at Cargill's Riverview facility. In Cargill's initial application for the second AFI plant, it was indicated that the AFI Loadout System would consist of a total of four (4) product silos, controlled by a single baghouse. Cargill now desires to add a fifth product silo to the loadout system. This fifth silo will be controlled by the common baghouse serving the loadout system. However, the loadout silo will continue to be limited to a total of 3,500 hr/yr operation time. As a result, there is no change in allowable emissions as a result of this addition. Since the construction permit does not specify the number of product storage silos, no changes to the construction permit are necessary.

Cargill appreciates the opportunity to submit this information. Please call if you have any questions or comments.

Sincerely,

David A. Buff

David A. Buff, P.E.
Principal Engineer
Florida P.E. #19011
SEAL

DB/arz

cc: David Jellerson
Kathy Edgemon

cc: S. Arif, BAR
SWD
Hillsboro Co.

9651074A/4

CARGILL
FERTILIZER, INC.

8813 Highway 41 South - Riverview, Florida 33569 - Telephone 813-677-9111 - TWX 810-876-0648 - Telex 52666 - FAX 813-671-6146

Certified Mail: P 204 941 054

August 6, 1997

Mr. Syed Arif
Air Permitting Engineer
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Mr. Arif:

Re: Cargill Fertilizer, Inc. - Riverview Facility
AFI Plant; Permit No. PSD-FL-234, 0570008-013-AC
Facility ID No. 0570008; Emission Unit ID No. 078

As discussed in our conversation this morning, the purpose of this letter is to fulfill the requirement of Specific Condition No. B.2 of the above-reference permit. The scrubber that will evacuate the defluorination area will conform to the specifications submitted in the letter dated March 13, 1997. If you have any questions, please contact me at (813) 671-6369.

Sincerely,

Kathy Edgerton
Environmental Engineer

cc: Morris, Russo
File: P-30-39-1

cc: S. Arif, BAR
SWD
Hillsboro Co.

EMISSIONS TESTING
of the
CARGILL FERTILIZER, INC.
ANIMAL FEED INGREDIENT PLANT
Riverview, Florida

July 2, 1998

Permit No. 0570008-013-AC

SES Reference No. 98S50

Project Participants

Byron E. Nelson
Mark S. Gierke
John R. McEwen

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

EMISSIONS TESTING
of the
CARGILL FERTILIZER, INC.
ANIMAL FEED INGREDIENT PLANT
Riverview, Florida

July 2, 1998

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Visible Emissions Evaluation
Process Operational Data
Laboratory Data
Field Data Sheets
Calibration Data
Calculations and Symbols

1.0 INTRODUCTION

Southern Environmental Sciences, Inc. conducted particulate and nitrogen oxides emissions tests and a visible emissions evaluation of the Cargill Fertilizer, Inc. Animal Feed Ingredient Plant on July 2, 1998. This plant is located on U.S. 41 at Riverview Drive in Riverview, Florida. Testing was performed to determine if the plant was operating in compliance with requirements of the Environmental Protection Commission of Hillsborough County (EPCHC) and the Florida Department of Environmental Protection (FDEP).

2.0 SUMMARY OF RESULTS

The plant was found to be in compliance with all applicable emission limiting standards. Results of the particulate and nitrogen oxides emissions tests are summarized in Table 1.

The maximum allowable particulate emission rate for this source is 6.0 pounds per hour. The average measured particulate emission rate was 5.85 pounds per hour, within the average allowable limit.

The allowable nitrogen oxides emission rate for this source is 6.50 pounds per hour. The average measured nitrogen oxides emission rate was 2.24 pounds per hour, well within the average allowable limit.

TABLE 1. PARTICULATE & FLUORIDE EMISSIONS TEST SUMMARY

Company: CARGILL FERTILIZER, INC.
Source: Animal Feed Ingredient Plant

	Run 1	Run 2	Run 3
Date of Run	07/02/98	07/02/98	07/02/98
Production Rate (TPD)	516	516	516
Start Time (24-hr. clock)	1042	1214	1345
End Time (24-hr. clock)	1144	1316	1448
Vol. Dry Gas Sampled Meter Cond. (DCF)	39.147	42.812	39.345
Gas Meter Calibration Factor	0.998	0.998	0.998
Barometric Pressure at Barom. (in. Hg.)	30.13	30.13	30.13
Elev. Diff. Manom. to Barom. (ft.)	0	0	0
Vol. Gas Sampled Std. Cond. (DSCF)	37.996	41.480	37.760
Vol. Liquid Collected Std. Cond. (SCF)	1.674	7.101	8.982
Moisture in Stack Gas (% Vol.)	4.2	14.6	19.2
Molecular Weight Dry Stack Gas	30.00	30.00	30.00
Molecular Weight Wet Stack Gas	29.49	28.25	27.69
Stack Gas Static Press. (in. H2O gauge)	-0.28	-0.29	-0.31
Stack Gas Static Press. (in. Hg. abs.)	30.11	30.11	30.11
Average Square Root Velocity Head	0.682	0.691	0.686
Average Orifice Differential (in. H2O)	1.462	1.610	1.479
Average Gas Meter Temperature (°F)	88.7	89.8	94.9
Average Stack Gas Temperature (°F)	150.5	154.5	155.3
Pitot Tube Coefficient	0.84	0.84	0.84
Stack Gas Vel. Stack Cond. (ft./sec.)	40.61	42.20	42.30
Effective Stack Area (sq. ft.)	28.27	28.27	28.27
Stack Gas Flow Rate Std. Cond. (DSCFM)	57,428	52,849	50,059
Stack Gas Flow Rate Stack Cond. (ACFM)	68,890	71,585	71,767
Net Time of Run (min.)	60	60	60
Nozzle Diameter (in.)	0.250	0.250	0.250
Percent Isokinetic	91.5	108.6	104.3
Particulate Collected (mg.)	30.7	17.4	48.4
Particulate Emissions (gr./DSCF)	0.012	0.006	0.020
Particulate Emissions (lb./hr.)	**6.14**	**2.93**	**8.49**
Avg. Particulate Emissions (lb./hr.)		**5.85**	
Allowable Part. Emissions (lb./hr.)		**6.0**	
NOx Concentration (ppm)	**6.2**	**5.5**	**5.8**
NOx Emissions (lb./hr.)	**2.55**	**2.08**	**2.08**
Average NOx Concentration (ppm)		**5.8**	
Average NOx Emissions (lb./hr.)		**2.24**	
Allowable NOx Emissions (lb./hr.)		**6.50**	

Note: Standard conditions 68°F, 29.92 in. Hg

A visible emissions evaluation was performed over a 30 minute period. The maximum opacity observed was five percent with a maximum 6 minute average of 5 percent, well within the allowable limit of 20 percent.

3.0 PROCESS DESCRIPTION

This facility consists of defluorinated acid batch tanks, pug mill, dryer and cooler/classifier along with diatomaceous earth and limestone unloading systems, and the AFI loadout system. The animal feed plant uses a combination of baghouses, cyclones and wet scrubbers to control PM/PM_{10} emissions. Baghouses are used to control all raw material (diatomaceous earth and limestone) handling operations, as well as product loadout operations. PM/PM_{10} emissions from the animal feed dryers and cooler/classifier systems are controlled by cyclones followed by a wet scrubber.

Process rates during the test period were determined by plant personnel.

4.0 SAMPLING PROCEDURES

4.1 Methods

All sampling was performed using methods currently acceptable to the FDEP. Particulate sampling and analyses were conducted in accordance with EPA Method 5 - Determination of Particulate Emissions from Stationary Sources, 40 CFR 60, Appendix A. Nitrogen oxides sampling was conducted in accordance with EPA Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental

Analyzer Procedure), 40 CFR 60, Appendix A. The visible emissions evaluation was performed using procedures described in EPA Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources, 40 CFR 60, Appendix A.

4.2 Sampling Locations

Locations of the sample ports and stack dimensions are shown in Figure 1. Horizontal traverses were made through each of two ports located at a ninety degree angle from one another on the circular stack. Twelve sample points were chosen in accordance with EPA Method 1 - Sample and Velocity Traverses for Stationary Sources, 40 CFR 60, Appendix A.

4.3 Sampling Train

The particulate sampling train consisted of a stainless steel nozzle, an 8 foot heated stainless steel lined probe, a heated glass-fiber filter backed by a teflon filter support, and four impingers arranged as shown in Figure 2. The first and second impingers were each charged with 100 milliliters of distilled, deionized water. The third impinger served as a dry trap and the fourth impinger was charged with indicating silica gel desiccant.

The impingers were cooled in an ice and water bath during sampling. A Nutech Corporation control console was used to monitor the gas flow rates and stack conditions during sampling.

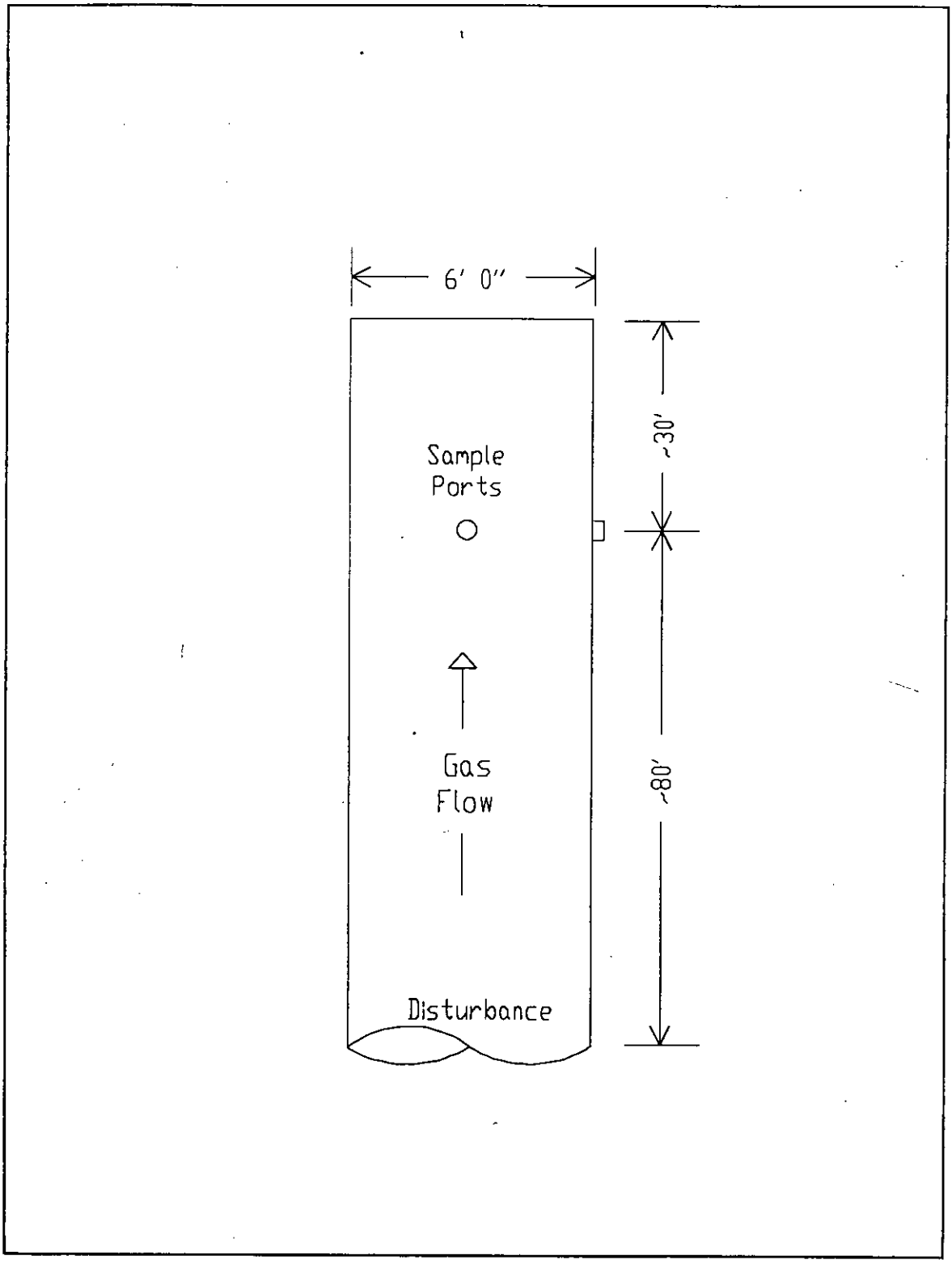


Figure 1. Stack Dimensions and Sample Port Locations, Cargill Fertilizer, Inc. Animal Feed Ingredient Plant, Riverview, Florida.

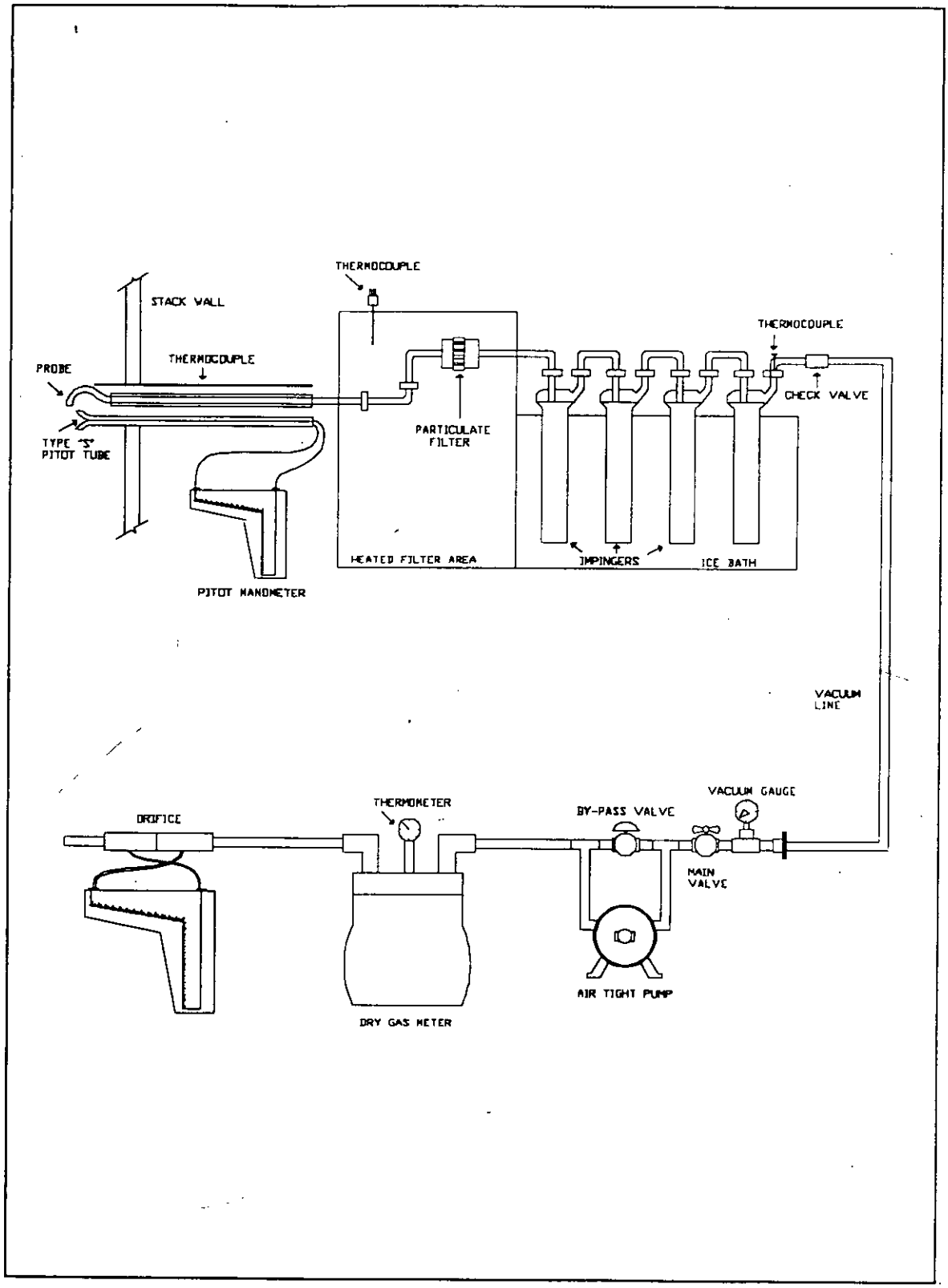


Figure 2. EPA Method 5 Sampling Train.

The nitrogen oxides sampling train consisted of a stainless steel probe, calibration valve, heated Teflon sample line, condenser and a Thermo Environmental Instruments, Inc. Model 10S Chemiluminescent NO/NO_x analyzer as shown in Figure 3.

4.4 Sample Collection

Prior to sampling, the pitot tubes were checked for leaks and the manometers were zeroed. A pretest leak check of the sample line was conducted by sealing the nozzle and applying a 15" Hg vacuum. A leak rate of less than 0.02 cubic feet per minute (CFM) was considered acceptable. Samples were collected isokinetically for five minutes at each of the points sampled.

4.5 Sample Recovery

A post test leak check was performed at the completion of each run by sealing the nozzle and applying a vacuum equal to or greater than the maximum value reached during the sample run. A leak rate of less than 0.02 CFM or 4 percent of the average sampling rate (whichever was less) was considered acceptable. The nozzle and probe were then brushed and rinsed with acetone, and the washings were placed in clean polyethylene containers and sealed. The glass fiber filter was removed from the holder with forceps and placed in a covered petri dish for return to the laboratory. The front half of the filter holder was rinsed with acetone and the washings were added to the nozzle and probe wash. The contents of the first three impingers were measured volumetrically and the silica gel in the fourth impinger was weighed to the nearest 0.1 gram for determination of moisture content.

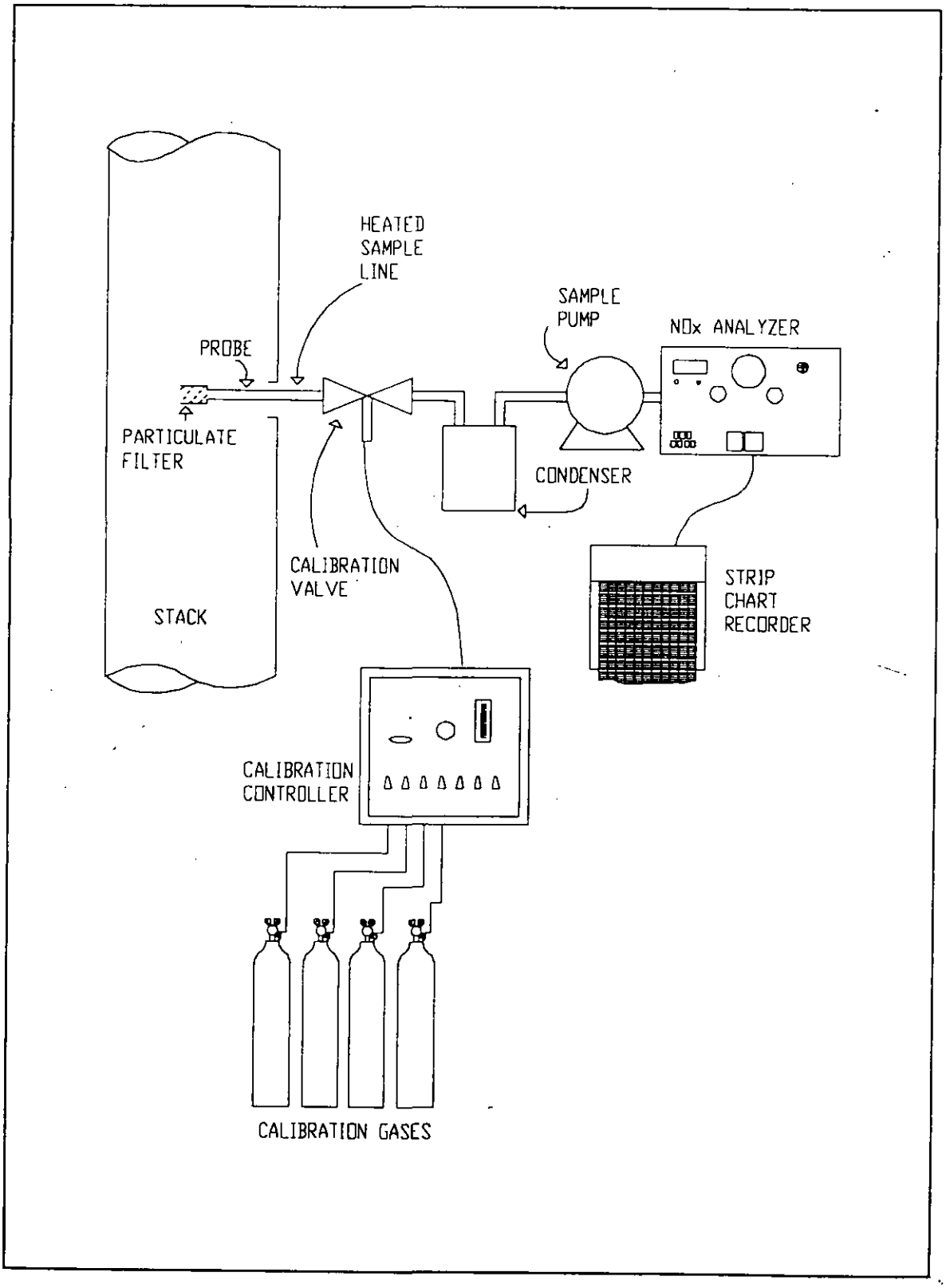


Figure 3. EPA Method 7E Sampling Train.

Two calculations of the moisture content of the stack gas were made for each run. One determination was made from the impinger analysis and one from the assumption of saturated conditions based upon the average stack gas temperature and a psychrometric chart as described in EPA Method 4 - Determination of Moisture Content in Stack Gases, 40 CFR 60, Appendix A. The lower of the two values of moisture content was considered to be correct and was used in the emissions computations.

5.0 ANALYTICAL PROCEDURE

5.1 Pretest Preparation

The glass fiber filters were numbered, oven dried at 105°C for two to three hours, desiccated, and weighed to a constant weight in preparation for the test. Results were recorded to the nearest 0.1 milligram. Filters were loaded into holders and a filter was set aside as a control blank. The impingers were charged as described in section 4.3. The first three impinger solutions were measured volumetrically and the silica gel in the fourth impinger was weighed to the nearest 0.1 gram.

5.2 Analysis

Upon return to the laboratory, the particulate filters were removed from the containers with forceps, dried at 105°C for two to three hours, desiccated and weighed to a constant weight. Results were recorded to the nearest 0.1 milligram. The probe and nozzle washes and an acetone blank were measured volumetrically and transferred to clean, tared evaporating dishes and evaporated to dryness over low heat. The evaporating

dishes were then oven dried at 105°C for two to three hours, desiccated and weighed to a constant weight. Results were recorded to the nearest 0.1 milligram. The total particulate reported is the sum of the filter weight gain and the weight gain of the evaporating dishes, corrected for the acetone blank.

APPENDIX

Project Participants

Certification

Visible Emissions Evaluation

Process Operational Data

Laboratory Data

Field Data Sheets

Calibration Data

Calculations and Symbols

PROJECT PARTICIPANTS AND CERTIFICATION

CARGILL FERTILIZER, INC.
ANIMAL FEED INGREDIENT PLANT
Riverview, Florida

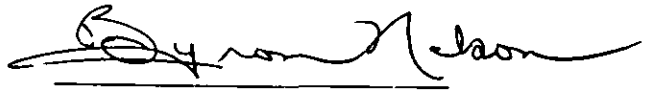
July 2, 1998

Project Participants:

Mark S. Gierke John R. McEwen	Conducted the field testing.
Byron E. Nelson	Performed the visible emissions evaluation.
Kathy Edgemon (Cargill Fertilizer, Inc.)	Provided process rates.
Byron E. Nelson	Performed laboratory analyses.
Byron E. Nelson	Computed test results.
Byron E. Nelson	Prepared the final test report.

Certification:

I certify that to my knowledge all data submitted in this report is true and correct.



Byron E. Nelson, CIH

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

1204 North Wheeler Street, Plant City, Florida 33566 (813)752-5014

VISIBLE EMISSIONS EVALUATION

COMPANY: Cargill Fertilizer

UNIT: Animal Feed Ingredient Plant

ADDRESS: U.S. 41 at Riverview Dr.

Riverview, Florida

PERMIT NO.: 057008-013-AC

COMPLIANCE? YES ☒ NO ☐

AIRS NO.: NA

EU NO.: NA

PROCESS RATE: 516 TPD

PERMITTED RATE: 1160 TPD combined

PROCESS EQUIPMENT: AFI Plant

CONTROL EQUIPMENT: Baghouses/cyclones/wet scrubbers

OPERATING MODE: Normal

AMBIENT TEMP. (°F) START ~95 STOP ~95

HEIGHT ABOVE GROUND LEVEL START ~100' STOP ~100'

HEIGHT REL. TO OBSERVER START ~100' STOP ~100'

DISTANCE FROM OBSERVER START ~300' STOP ~300'

DIRECTION FROM OBSERVER START 346° STOP 340°

EMISSION COLOR: White

PLUME TYPE CONTIN. ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT NO ☒ YES ☐

IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☐ NA

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START Stack exit STOP Stack exit

DESCRIBE BACKGROUND START Sky STOP Sky

BACKGROUND COLOR START Blue STOP Blue

SKY CONDITIONS START Clear STOP Clear

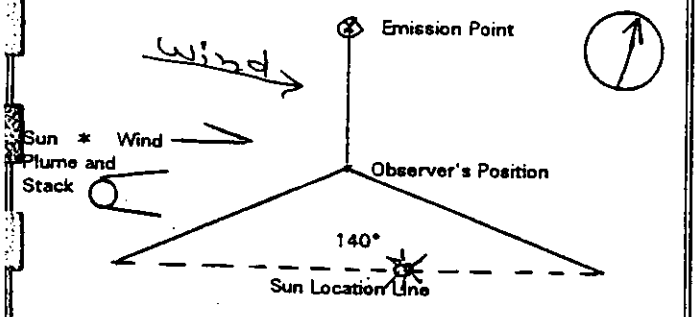
WIND SPEED (MPH) START 3-5 STOP 3-5

WIND DIRECTION START W STOP W

AVERAGE OPACITY FOR HIGHEST PERIOD 5%

RANGE OF OPAC. READINGS MIN. 5% MAX. 5%

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



COMMENTS

OBSERVATION DATE: 7/2/98 START TIME: 1230 STOP TIME: 1300

SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
0	5	5	5	5	30				
1	5	5	5	5	31				
2	5	5	5	5	32				
3	5	5	5	5	33				
4	5	5	5	5	34				
5	5	5	5	5	35				
6	5	5	5	5	36				
7	5	5	5	5	37				
8	5	5	5	5	38				
9	5	5	5	5	39				
10	5	5	5	5	40				
11	5	5	5	5	41				
12	5	5	5	5	42				
13	5	5	5	5	43				
14	5	5	5	5	44				
15	5	5	5	5	45				
16	5	5	5	5	46				
17	5	5	5	5	47				
18	5	5	5	5	48				
19	5	5	5	5	49				
20	5	5	5	5	50				
21	5	5	5	5	51				
22	5	5	5	5	52				
23	5	5	5	5	53				
24	5	5	5	5	54				
25	5	5	5	5	55				
26	5	5	5	5	56				
27	5	5	5	5	57				
28	5	5	5	5	58				
29	5	5	5	5	59				

Observer: Byron Nelson

Certified by: FDEP thru CTA Certified at: Tampa Florida

Date Certified: 2/25/98 Exp. Date: 8/27/98

I certify that all data provided to the person conducting the test was true and correct to the best of my knowledge:

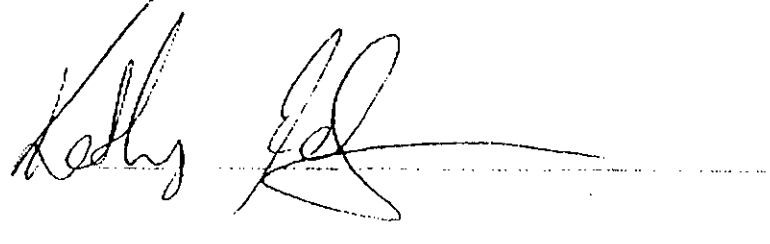
Signature: See Process Data

Title:

PROCESS OPERATIONAL DATA

Plant Name: Cargill Fertilizer, Inc. - Tampa Plant
Date: July 2, 1998
Source Identification: Animal Feed Ingredients Plant

PARAMETER	UNIT	Run 1	Run 2	Run 3	AVG
Granulation Process					
Acid Feed	GPM	64	69	64	66
Limestone	lb/min	353	375	365	364
Production Rate	TPD				516
Burner Fuel Rate	CFH	12,300	13,300	12,800	12800
Scrubber Recirculation Flow	GPM	1,000	1,011	1,000	1,004
Scrubber Make-up Flow	GPM	46	30	35	37
Scrubber Pressure Drop	"H2O	14	14	13	14
Scrubber Fan	AMPS	63	62	62	62

Production Supervisor 

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

PARTICULATE MATTER COLLECTED

Plant: CARGILL FERTILIZER, INC.
Unit No. Animal Feed Plant
Test Date: 07/02/98

Analyzed by: B. Nelson

Acetone blank container no.	21	Filter blank no.	5009
Acetone blank volume, ml.,(Va)	150	Filter blank tare weight, g.	0.3377
Acetone blank final weight, g.	100.0897	Filter blank final weight, g.	0.3378
Acetone blank tare weight, g.	100.0900	Filter weight diff., g.	0.0001
Acetone blank weight diff.,g.,(ma)	0		

Run No.	1
Filter No.	5006
Liquid lost during transport, ml.	0
Acetone wash container no.	10
Acetone wash volume, ml. (Vaw)	110
Acetone wash residue, g. (Wa)	0.0000

Container Number	WEIGHT OF PARTICULATE COLLECTED		
	Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.366	0.3405	0.0255
2 (Wash)	105.2509	105.2457	0.0052
		TOTAL	0.0307
		Less acetone blank, g. (Wa)	0.0000
		Weight of particulate matter, g.	0.0307

Run No.	2
Filter No.	5007
Liquid lost during transport, ml.	0
Acetone wash container no.	11
Acetone wash volume, ml. (Vaw)	125
Acetone wash residue, g. (Wa)	0.0000

Container Number	WEIGHT OF PARTICULATE COLLECTED		
	Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.3551	0.342	0.0131
2 (Wash)	102.5382	102.5339	0.0043
		TOTAL	0.0174
		Less acetone blank, g. (Wa)	0.0000
		Weight of particulate matter, g.	0.0174

Run No.	3
Filter No.	5008
Liquid lost during transport, ml.	0
Acetone wash container no.	18
Acetone wash volume, ml. (Vaw)	145
Acetone wash residue, g. (Wa)	0.0000

Container Number	WEIGHT OF PARTICULATE COLLECTED		
	Final Weight	Tare Weight	Weight Gain
1 (Filter)	0.381	0.3391	0.0419
2 (Wash)	105.6585	105.652	0.0065
		TOTAL	0.0484
		Less acetone blank, g. (Wa)	0.0000
		Weight of particulate matter, g.	0.0484

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

MOISTURE COLLECTED

Plant Cargill - Tampa

Unit AFI
Date 7/2/98
Run No. 1

Impinger Number	1	2	3	4	Weighed by:
Final Weight (grams):	120.0	103.0	0	256.8	MG
Initial Weight (grams):	100.0	100.0	0	244.3	MG
Difference (grams):	20.0	3.0	0	12.5	
Total Condensate (grams):				35.5	

Unit AFI
Date 7/2/98
Run No. 2

Impinger Number	1	2	3	4	Weighed by:
Final Weight (grams):	224.0	120.0	0	251.8	MG
Initial Weight (grams):	100.0	100.0	0	245.2	MG
Difference (grams):	124.0	20.0	0	6.6	
Total Condensate (grams):				150.6	

Unit AFI
Date 7/2/98
Run No. 3

Impinger Number	1	2	3	4	Weighed by:
Final Weight (grams):	250.0	135.0	0	250.9	MG
Initial Weight (grams):	100.0	100.0	0	245.4	MG
Difference (grams):	150.0	35.0	0	5.5	
Total Condensate (grams):				190.5	

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

FIELD DATA SHEET

Company: Cargill - TPA
Source: AFI
Operator(s): M. Burke / J. McEwen

Dimensions Dia. ~~X~~ / L x W □: 72"
Stack Static Press. ("H_2O): -.28
Meter Box No.: 004
Meter ΔH@: 1.947
Meter Correction Factor: .998
Pitot Cp: .84
Nozzle ID: #18
Nozzle Dia. (inches): .250
Probe Length/Liner: 8'SS

Assumptions:
% Moisture: 16
Stack Temp.: 150
Meter Temp.: 95
Md/Ms: 1.065
K Factor: 3.13

Run Number: 1
Date: 7/2/98
24 hr Time at Start: 1042
24 hr Time at End: 1144
Filter No(s).: 5006
Barometric Press. ("Hg): 30.13
Elev.Diff. Mano. to Barom. (ft): 0
Ambient Temperature (°F): 87

Sample Train Leak Check:
Initial 0.010 CFM@ 15 "Hg
Final 0.008 CFM@ 10 "Hg
Initial Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

Point No.	Sample Time (min.)	Meter Vol. Vm (ft^3)	Velocity Head, ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., Ts (°F)	Meter Temp., Tm (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)	Other
1	0	41.363	.48	1.50	134	84	265	56	3.0	
2	5	44.90	.51	1.60	149	85	265	56	3.0	
3	10	48.16	.45	1.41	150	86	268	58	3.0	
4	15	51.40	.47	1.47	151	88	268	58	3.0	
5	20	54.83	.44	1.38	150	89	261	60	3.0	
6	25	57.77	.35	1.10	153	89	256	60	2.5	
7	30	60.715	.42	1.31	147	90	255	62	3.5	
8	35	63.75	.43	1.35	152	90	261	57	3.5	
9	40	66.90	.46	1.44	153	90	258	58	4.0	
10	45	70.07	.53	1.66	154	90	263	58	4.0	
11	50	73.58	.55	1.72	157	91	254	59	4.5	
12	55	77.10	.51	1.60	156	92	266	60	4.5	
13	60	80.510								
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

FIELD DATA SHEET

Company: Cargill - TPA
Source: AFI
Operator(s): M. Burke / J. McEwen

Dimensions Dia.Ø: 72"
L x W□:
Stack Static Press. ("H_2O): -.29
Meter Box No.: 004
Meter ΔH@: 1.947
Meter Correction Factor: .998
Pitot Cp: .84
Nozzle ID: #18
Nozzle Dia. (inches): .250
Probe Length/Liner: 8'SS

Assumptions:
% Moisture: 12
Stack Temp.: 150
Meter Temp.: 95
Md/Ms: 1.04
K Factor: 3.36

Run Number: 2
Date: 7/2/98
24 hr Time at Start: 1214
24 hr Time at End: 1316
Filter No(s).: 5007
Barometric Press. ("Hg): 30.13
Elev.Diff. Mano. to Barom. (ft): 0
Ambient Temperature (°F): 91

Sample Train Leak Check:
Initial 0.008 CFM@ 15 "Hg
Final 0.008 CFM@ 10 "Hg
Initial Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

Point No.	Sample Time (min.)	Meter Vol. Vm (ft^3)	Velocity Head,ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., Ts (°F)	Meter Temp., Tm (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)	Other
1	0	82.600	.50	1.68	144	85	264	60	4.0	
2	5	88.00	.51	1.71	154	86	257	55	4.0	
3	10	91.54	.46	1.55	156	87	248	55	4.0	
4	15	94.92	.49	1.65	157	89	261	56	4.5	
5	20	98.37	.50	1.68	156	90	262	57	4.5	
6	25	102.10	.42	1.41	156	91	259	57	4.0	
7	30	105.080	.36	1.21	150	90	245	59	4.0	
8 2	35	108.05	.47	1.58	154	91	250	59	5.0	
9	40	111.38	.46	1.55	155	91	254	59	5.0	
10 4	45	115.24	.54	1.81	156	92	266	56	5.5	
11	50	118.27	.54	1.81	158	93	266	56	6.0	
12	55	121.90	.50	1.68	158	93	257	56	6.0	
13	60	125.412								
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

FIELD DATA SHEET

Company: Cargill - Tampa
Source: AFI
Operator(s): M. Burke / J. McEwen

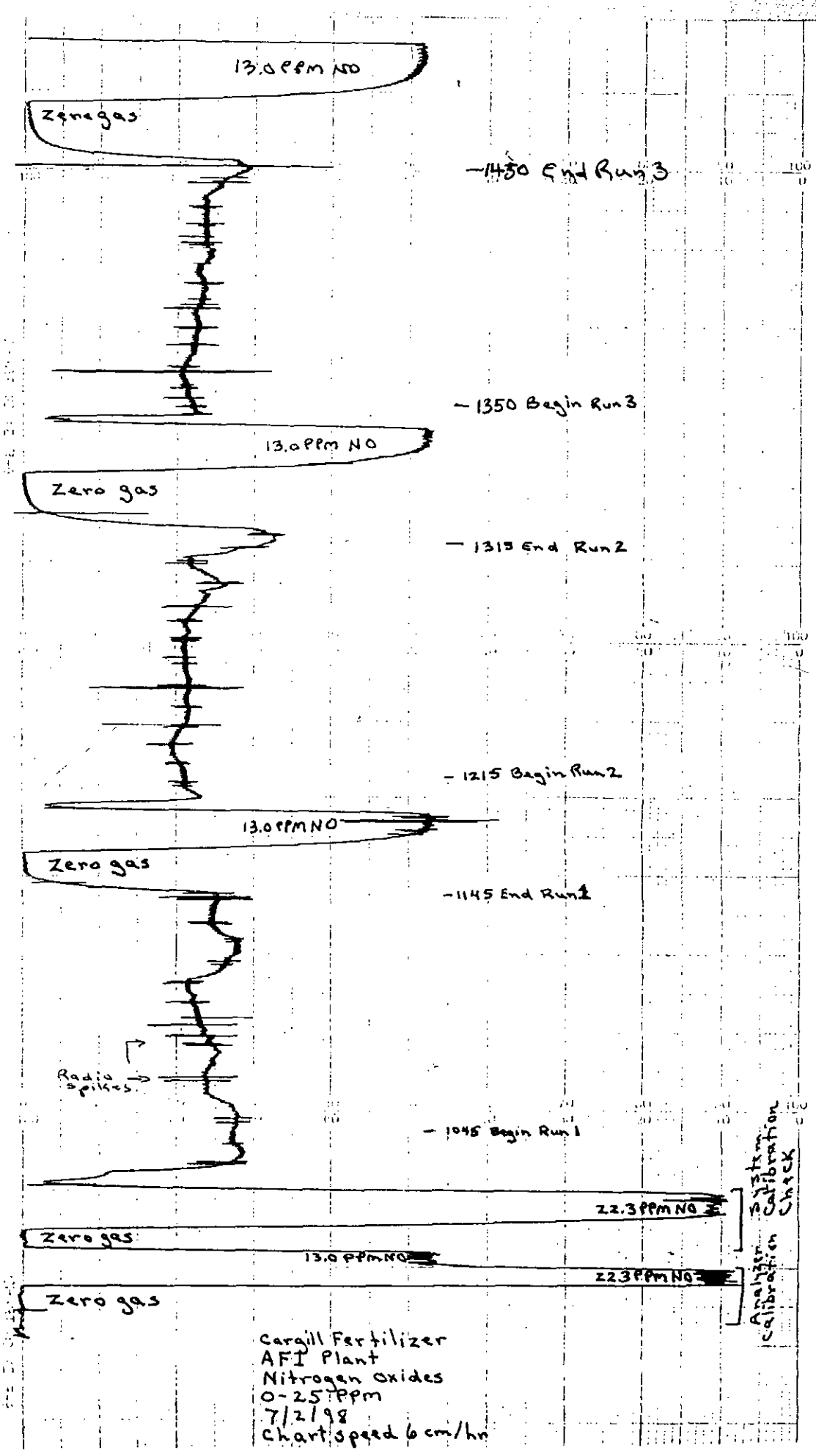
Run Number: 3
Date: 7/2/98
24 hr Time at Start: 1345
24 hr Time at End: 1448
Filter No(s).: 5009
Barometric Press. ("Hg): 30.13
Elev.Diff. Mano. to Barom. (ft): 0
Ambient Temperature (°F): 93

Dimensions Dia.☒ / L x W☐: 72"
Stack Static Press. ("H_2O): -.31
Meter Box No.: 004
Meter ΔH@: 1.947
Meter Correction Factor: .998
Pitot Cp: .84
Nozzle ID: #18
Nozzle Dia. (inches): .250
Probe Length/Liner: 8'SS

Assumptions:
% Moisture: 16
Stack Temp.: 150
Meter Temp.: 95
Md/Ms: 1.065
K Factor: 3.13

Sample Train Leak Check:
Initial 0.009 CFM@ 15 "Hg
Final 0.007 CFM@ 12 "Hg
Initial Pitot Tube (-) ✓ (+) ✓
Final Pitot Tube (-) ✓ (+) ✓

Point No.	Sample Time (min.)	Meter Vol. Vm (ft^3)	Velocity Head,ΔP ("H_2O)	Orifice Diff., ΔH ("H_2O)	Stack Temp., Ts (°F)	Meter Temp., Tm (°F)	Hot Box Temp. (°F)	Exit Temp. (°F)	Pump Vacuum ("Hg)	Other
1	0	128.151	.48	1.50	148	91	264	58	4.0	
2	5	131.50	.51	1.60	156	91	265	58	4.0	
3	10	134.90	.45	1.41	158	92	266	56	4.0	
4	15	138.11	.52	1.63	159	94	270	55	4.5	
5	20	141.60	.47	1.47	159	94	266	55	4.0	
6	25	144.80	.33	1.03	159	96	262	56	4.0	
7	30	147.531	.41	1.28	152	96	254	58	4.5	
8	35	150.54	.46	1.44	155	96	259	58	5.0	
9	40	153.77	.44	1.38	154	96	264	57	5.0	
10	45	157.00	.56	1.75	155	97	262	57	6.5	
11	50	160.52	.58	1.82	155	98	263	59	7.0	
12	55	164.15	.46	1.44	154	98	255	60	6.0	
13	60	167.496								
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										


13.0 ppm NO
Zero gas
1450 End Run 3
1350 Begin Run 3
13.0 ppm NO
Zero gas
1315 End Run 2
1215 Begin Run 2
13.0 ppm NO
Zero gas
1145 End Run 1
Radio spikes
1045 Begin Run 1
22.3 ppm NO
Zero gas
13.0 ppm NO
22.3 ppm NO
Zero gas
System calibration check
Analyzer calibration
Cargill Fertilizer
AFI Plant
Nitrogen Oxides
0-25 ppm
7/2/98
Chart speed 6 cm/hr

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

1240 North Wheeler St. ☐ Plant City, Florida 33566 ☐ (813) 752-5014

NITROGEN OXIDES ANALYZER CALIBRATION DATA
EPA METHOD 7E

COMPANY	Cargill Fertilizer	ANALYZER CALIBRATION DATA FOR SAMPLING	
SOURCE	Animal Feed Ingredient Plant	RUNS:	1 - 3
OPERATOR	B. Nelson	INSTR. SPAN RANGE	25 PPM
DATE	7/2/98		

	Cylinder Value (PPM)	Analyzer calibration response (PPM)	Absolute Difference (PPM)	Difference (% of span)
Zero gas	0.0	- 0.1	0.1	0.4
Mid-range gas	13.0	13.0	0	0.0
High-range gas	22.3	22.3	0.0	0.0

NITROGEN OXIDES SYSTEM CALIBRATION BIAS AND DRIFT DATA

			Initial values		Final values		
		Analyzer calibration response (PPM)	System calibration response (PPM)	System calibration bias (% of span)	System calibration response (PPM)	System calibration bias (% of span)	Drift (% of span)
Run 1	Zero gas	- 0.1	0.0	0.4	0.1	0.8	0.4
	Upscale gas	22.3 / 13.0	22.3 / 13.0	0.0	13.1	0.4	0.4
Run 2	Zero gas	- 0.1	0.1	0.8	0.0	0.4	- 0.4
	Upscale gas	13.0	13.1	0.4	13.0	0.0	- 0.4
Run 3	Zero gas	- 0.1	0.0	0.4	0.1	0.8	0.4
	Upscale gas	13.0	13.0	0.0	12.9	- 0.4	- 0.4

$$\text{System Calibration Bias} = \frac{\text{System Cal. Response - Analyzer Cal. Response}}{\text{Span}} \times 100$$

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

NOZZLE CALIBRATION

Date: 7/2/98 by: M. Dierke

Nozzle ID	Run No.	D_1 (INCHES)	D_2 (INCHES)	D_3 (INCHES)	ΔD (INCHES)	D_{Avg} (INCHES)
#18	1-3	.250	.249	.251	.002	.250

where: D_1, D_2, D_3 = Nozzle diameter measured on a different diameter (inches). Tolerance = 0.001 inches

ΔD = Maximum difference in any two measurements (inches). Tolerance = 0.004 inches

D_{avg} = Average of D_1, D_2, D_3

****

SAMPLE POINT LOCATIONS

Company:	Cargill - Tampa
Source:	AFI
Date:	7/2/98
Stack/Duct Dimensions:	72"
Port Length:	N/A
Points corrected for port length? Yes ☐ No ☒	

Sketch of Stack/Duct

Point No.	Distance from Duct Wall (inches)
1	3.2
2	10.5
3	21.3
4	50.7
5	61.5
6	68.8

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

Dry Gas Meter Calibration

Meter Box Number : 004 Barometric Pressure: 30.08
Date: 5/19/98 Wet Test Meter # : P-576

Orifice Manometer Setting (DELTA H) in. H2O	Gas Volume		Temperature		Time (Theta) min	Yi	Delta H@i in. H2O
	Wet Test Meter (Vw) ft.^3	Dry Gas Meter (Vd) ft.^3	Wet Test Meter (Tw) Deg F	Dry Gas Meter (Td) Deg F			
0.50	5.000	5.048	75.0	79.0	12.85	0.997	1.848
1.00	6.000	6.116	74.5	83.3	11.15	0.995	1.914
1.50	10.000	10.147	74.5	79.8	15.30	0.992	1.959
2.00	13.000	13.082	75.0	80.8	17.30	1.000	1.976
3.00	10.000	10.090	75.0	82.0	10.90	0.997	1.984
4.00	12.000	11.999	74.5	83.5	11.40	1.007	2.000
						0.998	1.947

Delta H@	Acceptable Range	2.147	to	1.747
Yi	Acceptable Range	1.018	to	0.978

$$Yi = \frac{Vw\ Pb\ (td + 460)}{Vd\ (Pb + Delta\ H/13.6)\ (Tw + 460)}$$

$$Delta\ H@ = \frac{.0317\ (Delta\ H)}{Pb\ (td+460)} \qquad [(tw+460)\ (theta) / Vw]^2$$

where:

Vw= Gas Volume passing through the std test meter, ft.^3.

Vd = Gas Volume passing through the dry gas meter, ft^3

Tw = Temperature of the gas in the std test meter, deg. F.

Td = Average temperature of the gas in the dry gas meter, Deg F.

Delta H = Pressure differential across orifice, in. H20.

Yi = Ratio of accuracy of std test meter to dry gas meter for each run.

Y = Average ratio of accuracy of std test meter to dry gas meter.

Pb = Barometric pressure, in. Hg.

Theta = Time of calibration run, min.

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

POSTTEST DRY GAS METER CALIBRATION FORM

Meter Box Number: 004 Wet Test Meter #: P-576
Date: 07/20/98 Pretest Y: 0.998
Barometric Pressure: 30.06

Orifice Manometer setting (Delta H) in. H20	Gas volume		Temperature		Time (Theta) min	Vacuum Setting in. Hg	Yi
	Wet Test Meter (Vw) ft.^3	Dry Gas Meter (Vd) ft.^3	Wet Test Meter (Tw) Deg F	Dry Gas Meter (Td) Deg F			
2.00	10.000	10.155	81.50	88.00	12.25	10.00	0.992
2.00	10.000	10.197	81.00	88.50	12.07	10.00	0.989
2.00	10.000	10.218	80.50	90.00	12.12	10.00	0.991
						Average	0.991

Acceptable Limits **0.948** **to** **1.05**

$$Yi = \frac{Vw\ Pb\ (td + 460)}{Vd\ (Pb + Delta\ H/13.6)\ (Tw + 460)}$$

Where:

Vw = Gas Volume passing through the wet test meter, ft.^3.
Vd = Gas volume passing through the dry gas meter, ft^3.
Tw = Temperature of the gas in the wet test meter, deg F.
Tdi = Temperature of the inlet gas of the dry gas meter, Deg F.
Tdo = Temperature of the outlet gas of the dry gas meter, Deg F.
Td = Average temperature of the gas in the dry gas meter, Deg F.
Delta H = Pressure differential across orifice, in. H2O.
Yi = Ratio of accuracy of wet test meter to dry gas meter for each run.
Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y +/- 0.05Y.
Pb = Barometric pressure, in. Hg.
Theta = Time of calibration run, min.

THERMOMETER CALIBRATIONS

Ref.	Wet Test Meter		Dry Gas Meter	
deg F	Inlet deg F	Outlet deg F	Inlet deg F	Outlet deg F
81.0	n/a	82.0	80.0	80.0
Difference	n/a	1.0	-1.0	-1.0

Quality Control Limit +/- 5 deg F

Southern Environmental Sciences, Inc.

TYPE S PITOT TUBE INSPECTION FORM

PITOT TUBE ID NUMBER	008A
INSPECTION DATE	5/18/98
INSPECTED BY	John McLaren

PITOT TUBE ASSEMBLY LEVEL?	(YES)	NO
PITOT TUBE OPENINGS DAMAGED?	YES (explain below)	(NO)

ANGLE	MEASUREMENT	LIMITS
$\alpha 1$	3°	<10°
$\alpha 2$	1°	<10°
$\beta 1$	1°	<5°
$\beta 2$	1°	<5°
γ	2°	
θ	1°	
A	1.26 inches	
$z = A \sin \gamma$	.044 inches	< 1/8 inch
$w = A \sin \theta$	.022 inches	< 1/32 inch
P_A	.630 inches	
P_B	.630 inches	
D_T	.371 inches	

COMMENTS: _____

CALIBRATION REQUIRED?	YES	(NO)

SOUTHERN ENVIRONMENTAL SCIENCES, INC

THERMOMETER CALIBRATIONS

Calibrated By: M. Gierke Date: 5/29/98

ALL TEMPERATURES ARE IN DEGREES RANKIN

ID No.	Type	Range	ICE BATH			TEPID WATER			BOILING WATER			HOT OIL		
			STD Temp.	Therm. Temp.	Deg.or % Diff.	STD Temp.	Therm. Temp.	Deg.or % Diff.	STD Temp.	Therm. Temp.	Deg.or % Diff.	STD Temp.	Therm. Temp.	Deg.or % Diff.
T1	PT	2000°F	494	497	.6%	536	535	.2%	675	672	.4%	797	794	.4%
T2	PT	2000°F	494	496	.4%	536	535	.2%	673	671	.3%	794	791	.4%
T3	PT	2000°F	494	497	.6%	536	535	.2%	671	668	.4%	812	810	.2%
T4	PT	2000°F	494	496	.4%	536	535	.2%	673	670	.4%	800	803	.4%
T5	PT	2000°F	494	497	.6%	536	535	.2%	675	671	.6%	798	795	.4%
T6	PT	2000°F	494	497	.6%	536	536	0%	671	668	.4%	802	799	.4%
T7	PT	2000°F	494	495	.2%	536	536	0%	670	668	.3%	810	808	.2%
T8	PT	2000°F	494	495	.2%	536	536	0%	672	670	.3%	805	802	.4%
T9	PT	2000°F	494	496	.4%	536	535	.2%	671	668	.4%	809	807	.2%
T10	PT	2000°F	494	497	.6%	536	535	.2%	674	671	.4%	815	812	.4%
LAB I4	BM	212°F	494	497	3	536	537	1	672	670	2	-	-	-
I5	BM	250°F	494	496	2	536	535	1	671	669	2	-	-	-
SS110	BM	220°F	494	492	2	536	538	2	673	670	3	-	-	-
SS300	PT	2000°F	494	496	.4%	536	535	.2%	672	669	.4%	800	797	.4%
SS301	PT	2000°F	494	497	.6%	536	536	0%	671	668	.4%	806	803	.4%
2'5PA	PT	2000°F	496	494	.4%	538	535	.6%	671	670	.1%	798	795	.4%
2'5PB	PT	2000°F	496	494	.4%	538	535	.6%	671	669	.3%	795	793	.3%
3'P	PT	2000°F	496	494	.4%	538	535	.6%	672	672	0%	810	806	.5%
3'INC	PT	2000°F	496	494	.4%	538	537	.2%	672	671	.1%	804	801	.4%
5'PA	PT	2000°F	498	498	0%	538	536	.4%	672	670	.3%	810	807	.4%
5'PB	PT	2000°F	498	496	.4%	538	536	.4%	673	671	.3%	810	806	.5%
5'PC	PT	2000°F	498	496	.4%	538	536	.4%	674	672	.3%	760	758	.3%
5'VP	PT	2000°F	498	499	.2%	538	536	.4%	676	674	.3%	795	792	.4%
5'INC	PT	2000°F	498	498	0%	538	536	.4%	676	673	.4%	802	800	.2%
8'PA	PT	2000°F	498	496	.4%	538	535	.6%	672	669	.4%	805	801	.5%
8'PB	PT	2000°F	498	495	.6%	538	537	.2%	672	669	.4%	799	796	.4%
10'P	PT	2000°F	498	494	.8%	538	535	.6%	674	671	.4%	799	795	.5%
15'BP	PT	2000°F	498	496	.4%	538	535	.6%	675	672	.4%	802	799	.4%
15'AP	PT	2000°F	498	495	.6%	538	536	.4%	671	668	.4%	806	803	.4%

QUALITY CONTROL LIMITS; Impinger Thermometers +/- 2 DEG, Bimetallic Thermometers, +/- 5 DEG, Pyrometers/Thermocouples +/- 1.5%

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. * Rural Route #1, Tamaqua, PA 18252

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1).

Customer:
APCI-LARGO
7900 118TH AVENUE NORTH
LARGO FL 34643-

Order No: CSS-892073-01
Batch No: 255-2021C
PO:
Release:

Cylinder No: SG9153267BAL
Bar Code No: DDH459
Cylinder Pressure*: 2000 psig
Certification Date: 03/06/98
Expiration Date: 03/06/00

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	13.0±0.11 PPM	SG9161313BAL	GMIS	18:98 PPM	THERMO ENVIRON	54517300	02/07/98	CHEMILUMINESCENCE

NO2 (Reference Value Only): .240 PPM

NITROGEN Balance Gas

Contaminant

Nitrogen Dioxide .240 PPM

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Notes:
NO2 IS FOR INFORMATION ONLY.
NOT A CERTIFIED ANALYSIS.

Analyst: Robert J Spare

Approved By: Bruce Andersen

(16921)

Pub. No. 320-9702

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. * Rural Route #1, Tamaqua, PA 18252

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
APCI-LARGO
7900 118TH AVENUE NORTH
LARGO FL 34643-

Order No: CSS-804506-01
Batch No: 255-5318B
PO:
Release:

Cylinder No: SG9165791BAL
Bar Code No: DJJ121
Cylinder Pressure*: 2000 psig
Certification Date: 10/23/97
Expiration Date: 10/23/99

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	22.3±0.05 PPM	SG9150591BAL	NTRM 82629	18.84 PPM	THERMO ENVIRON	54517300	10/09/97	CHEMILUMINESCENCE

NO2 (Reference Value Only): .000

NITROGEN Balance Gas

Contaminant

NOX 22.3 PPM

*** STANDARD SHOULD NOT BE USED BELOW 150 PSIG**

Notes:
NOx value is for information only. Not a certified analysis.

Analyst: Michael Koval
Michael Koval

Approved By: Bruce Andersen/MK
Bruce Andersen

(16921)

Pub. No. 320-9702

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

1204 North Wheeler St. Plant City, Florida 33566 (813) 752-5014

NOX EMISSIONS TEST CALCULATIONS

COMPANY: CARGILL FERTILIZER, INC.
SOURCE: Animal Feed Ingredient Plant
TEST DATE: 07/02/98
DATA ANALYST: B. Nelson

RUN NO.	AVERAGE CONC. (PPM)	STACK PRESS (in. Hg)	STACK FLOWRATE (dscfm)	EMISSIONS (mg/m3)	EMISSIONS (lbs/ft3)	EMISSIONS (lbs/hr)
1	6.2	30.11	57,428	11.9	7.40E-07	2.55
2	5.5	30.11	52,849	10.5	6.57E-07	2.08
3	5.8	30.11	50,059	11.1	6.93E-07	2.08
AVERAGE	5.8	30.11	53,445	11.2	6.97E-07	2.24

FORMULAS: mg/m3 = ppm x .041573 x molecular wt.

$$\text{lb/ft3} = \frac{\text{mg/m3}}{35.31\ \text{ft3/m3} \times 1000\ \text{mg/g} \times 453.59\ \text{g/lb}}$$

lb/hr = lb/ft3 x flowrate x 60 min/hr

where:

Pstd =	29.92	"Hg
Tstd =	528	deg R
Molecular Wt. of NOx =	46	

AFI-NOX.WK4

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

EMISSIONS TEST CALCULATIONS

Plant: CARGILL FERTILIZER, INC. **Test Date:** 07/02/98
Unit: Animal Feed Plant **Data Input By:** B. McConnell
Run No: 2

Pbar = (Pbar at barom.) - (Elev. diff. barom. to manom., ft.) x (.1/100)
= 30.13 - 0 x (0.1/100) = **30.13**

$$Pm = \frac{Pbar + Delta\ H}{13.6} = \frac{30.13 + \frac{1.610}{13.6}}{} = \mathbf{30.25}$$

$$Vm(std) = (Vm) \times (Y) \times \frac{(Tstd, deg\ R) \times (Pm)}{(Tm, deg\ R) \times (Pstd)}$$

$$= 42.812 \times 0.998 \times \frac{528}{549.8} \times \frac{30.25}{29.92} = \mathbf{41.480}$$

Vw(std) = Vlc x (.04715) = 150.6 x 0.04715 = **7.101**

$$Bws = \frac{Vw(std)}{Vw(std) + Vm(std)} = \frac{7.101}{7.101 + 41.480} = \mathbf{0.146}$$

Bws @ saturation = **0.284**
1 - Bws = **0.854** USE LOWER BWS

Md = 0.44(%CO2) + .32(%O2) + .28(%N2+%CO)
= .44 x 0 + .32 x 0 + 0.28 78
= assume **30**

Ms = Md(1-Bws) + 18(Bws) = 30 * 0.854 + 18 * 0.146
= **28.25**

$$Ps = Pbar + \frac{(Pg, in.\ H2O)}{13.6} = 30.13 + \frac{-0.28}{13.6} = \mathbf{30.11}$$

Vs = 85.49 x (Cp) x (avg sqrt delta P) x sqrt[(Ts,~R)/(Ps)(Ms)]
= 85.49 x 0.84 x 0.691 x sqrt 614.5 / 30.11 x 28.25
= **42.20**

$$An = \frac{[(Nozzle\ diam., in./12)^2 \times 3.14159]}{4} = \frac{[(0.25/12)^2 \times 3.14159]}{4} = \mathbf{0.0003}$$

$$\%I = \frac{(.09450) \times (Ts, deg\ R) \times (Vm(std)}{(Ps) \times (Vs) \times (An) \times (Sample\ Time) \times (1-Bws)}$$

$$= \frac{0.0945 \times 614.5 \times 41.480}{30.11 \times 42.20 \times 0.000341 \times 60 \times 0.854}$$

= **108.6**

SOUTHERN ENVIRONMENTAL SCIENCES, INC.

EMISSIONS TEST CALCULATIONS

Plant: CARGILL FERTILIZER, INC.
Unit: Animal Feed Plant
Run No: 2

Test Date: 07/02/98
Data Input By: B. McConnell

$$As = \frac{(\text{Stack Diam., ft.})^2 \times 3.14}{4} = \frac{6^2 \times 3.14}{4} = 28.27$$

$$As.eff = \frac{As \times (\text{total No. pts.} - \text{No. neg. pts.})}{(\text{Total No. pts.})} = \frac{28.2743 \times (12) - (0)}{(12)} = 28.27$$

$$Q = 60(As,eff)(Vs) = 60 \times 28.27 \times 42.20 = 71,585$$

$$Qstd = \frac{(Q) \times (Tstd) \times (Ps) \times (1-Bws}{(Ts,degR) \times (Pstd)} = \frac{71585.3 \times 528 \times 30.1087 \times 0.8538}{614.5 \times 29.92}$$

$$= 52,849$$

$$Cs = \frac{(.01543) \times (mn, mg)}{Vm(std)} = \frac{0.01543 \times 17.4}{41.4801} = 0.0065$$

$$PMR = \frac{(Cs)(Qstd)(60)}{7000} = \frac{0.0065 \times 52849.39 \times 60}{7000} = 2.93$$

Emissions calculations in emissions test summary may differ slightly from example calculations due to rounding of some numbers in example.

Southern Environmental Sciences, Inc.
1204 North Wheeler Street ☐ Plant City, Florida 33566-2354 ☐ (813) 752-5014

NOMENCLATURE USED IN STACK SAMPLING CALCULATIONS

A_n = Cross-sectional area of nozzle, ft^2

A_s = Cross-sectional area of stack, ft^2

B_{ws} = Water vapor in gas stream, proportion by volume

C_p = Pitot coefficient

C_s = Pollutant concentration, gr/DSCF

F_d = Ratio of gas generated to heat value of fuel, DSCF/mm BTU

ΔH = Average pressure differential across orifice, in. H_2O

%I = Isokinetic variation, %

M_d = Molecular weight of dry gas

M_n = Total amount of pollutant collected, mg

M_s = Molecular weight of stack gas

N = Normality of barium perchlorate titrant

$\sqrt{\Delta P_{avg}}$ = Average of the square roots of the velocity heads

P_{bar} = Barometric pressure at the sampling site, in. Hg

P_g = Stack gas static pressure, in. H_2O

P_m = Absolute pressure at the dry gas meter, in. Hg

P_s = Absolute stack pressure, in. Hg

PMR = Pollutant mass rate, lb/hr

P_{std} = Standard absolute pressure, 29.92 in. Hg

θ = Total sampling time, minutes

Southern Environmental Sciences, Inc.
1204 North Wheeler Street ☐ Plant City, Florida 33566-2354 ☐ (813) 752-5014

NOMENCLATURE USED IN STACK SAMPLING CALCULATIONS
(Continued)

Q = Stack gas flowrate, ACFM

Q_{std} = Stack gas flowrate, DSCFM

T_m = Absolute average meter temperature, °R

T_s = Absolute average stack gas temperature, °R

T_{std} = Standard absolute temperature, 528 °R

V_a = Volume of sample aliquot titrated, ml

V_{lc} = Liquid collected in impingers and silica gel, grams

V_m = Sample volume at meter conditions, DCF

$V_{m(std)}$ = Sample volume at standard conditions, DSCF

V_s = Stack gas velocity, ft/sec

V_{soln} = Total volume of solution, ml

V_t = Volume of barium perchlorate titrant used for the sample, ml

V_{tb} = Volume of barium perchlorate titrant used for the blank, ml

$V_{w(std)}$ = Volume of water vapor in sample corrected to standard conditions, SCF

Y = Dry gas meter calibration factor

13.6 = Specific gravity of mercury

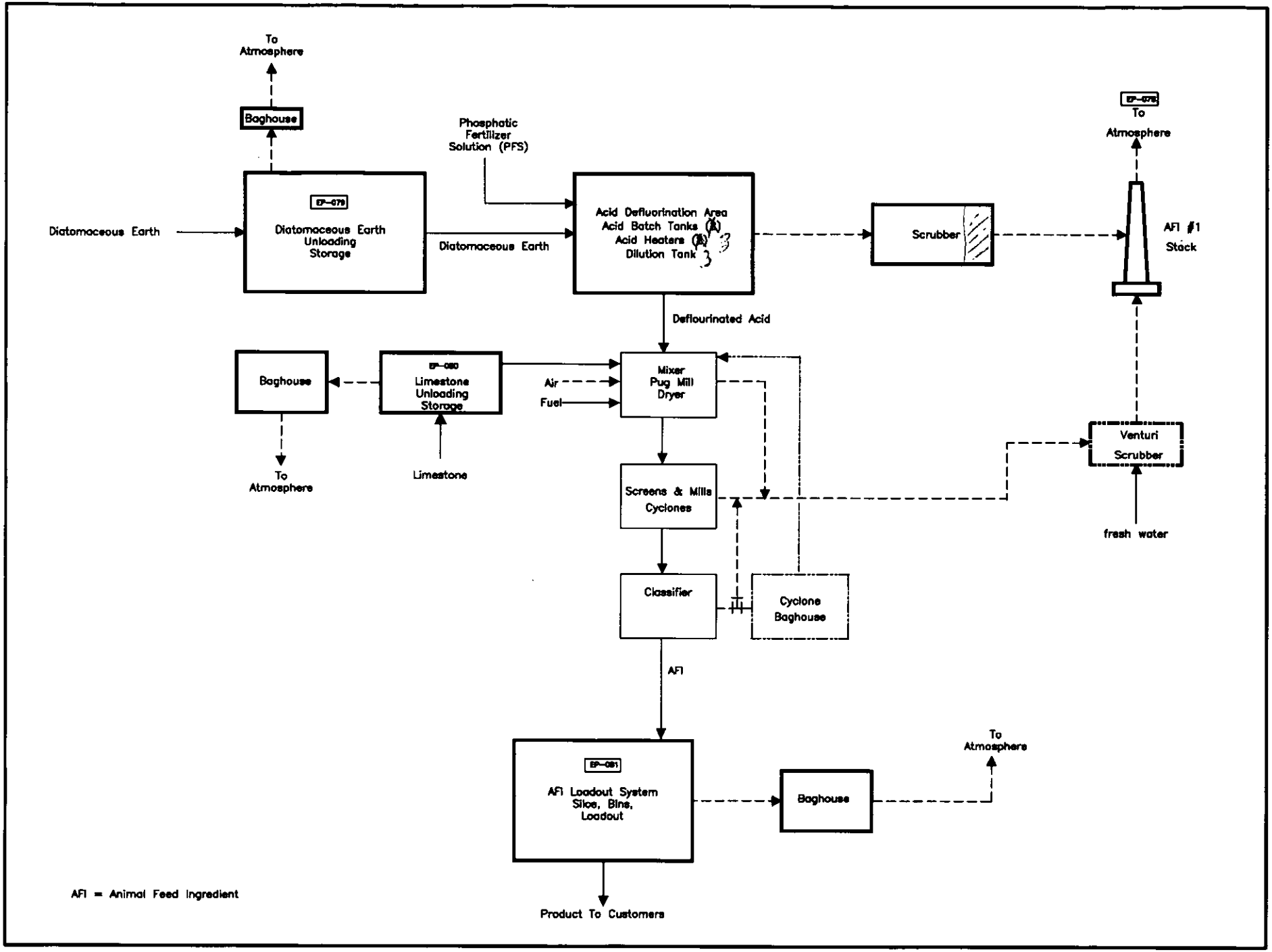


Figure 1
Flow Diagram
Animal Feed Plant
Cargill, Tampa

Process Flow Legend:
Solid/Liquid
Gas
Modified System

Emission Unit: Animal Feed Plant
Filename: AFI.DWG
Latest Revision Date: 11/06/98

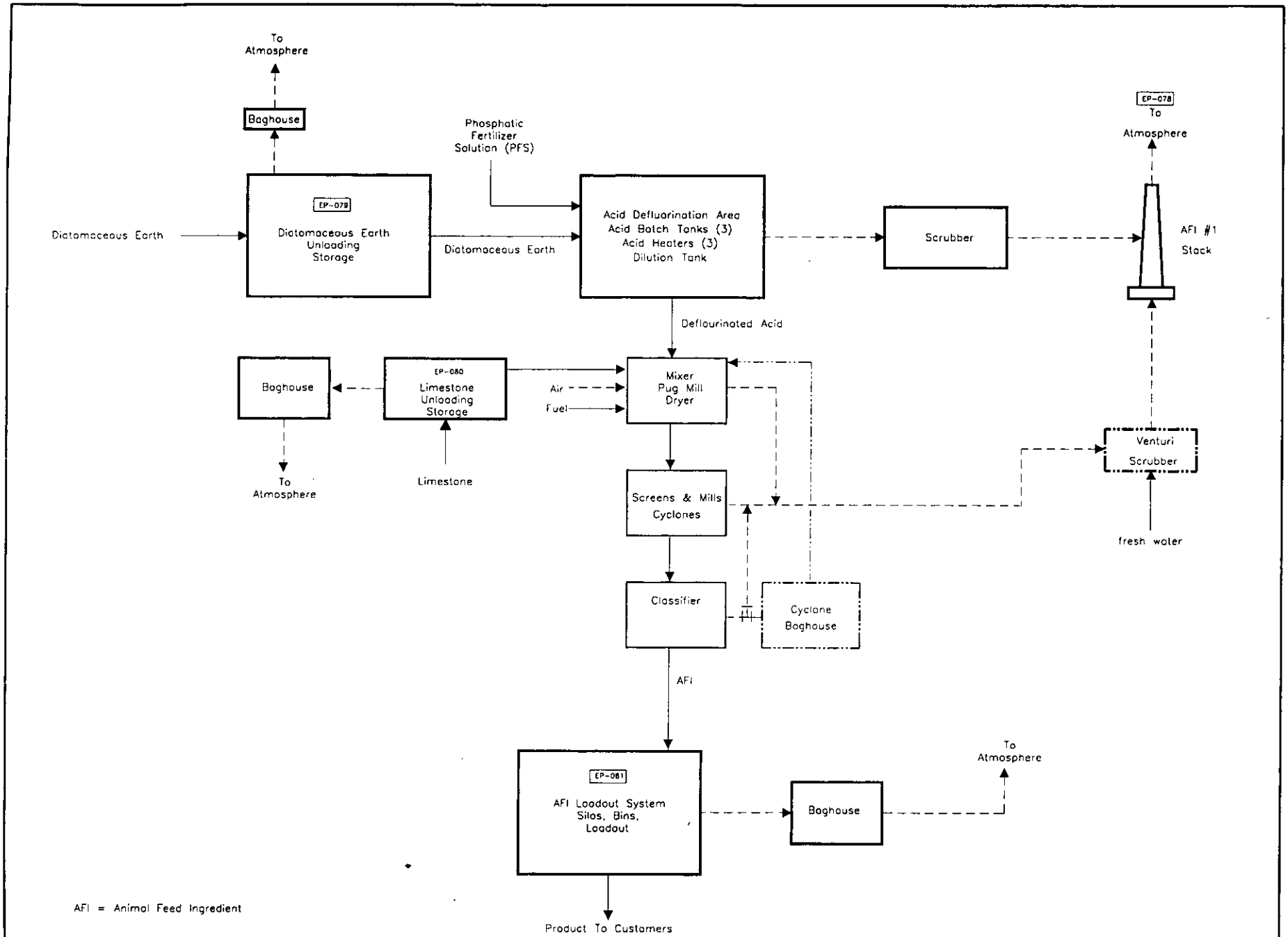


Figure 1
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Process Flow Legend:
Solid/Liquid
Gas
Modified System

Emission Unit: Animal Feed Plant
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Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

January 6, 1999

9837583-0100

Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: A. A. Linero, Administrator, New Source Review Section

Subject: DEP File No. 0570008-028-AC (PSD-FL-234A)
Cargill Fertilizer – Riverview
Animal Feed Plant (AFI) Modification

Dear Mr. Linero:

Cargill Fertilizer has received the Department's letter dated December 21, 1998, in regards to the AFI Plant modification. Responses to the Department's incompleteness questions are presented below, in the same order as they appear in the Department's letter.

1. Cargill submitted results of the compliance testing results for fluorides to the Department during our meeting in Tallahassee in December. However, particulates test data was not submitted. Cargill is forwarding a copy of the particulate data directly to the Department under separate cover.

2. The disparity is due to the different basis for the allowable emissions for fluorides and particulates for the AFI plant, as well as differences between application data and permit limitations. The application submitted by Cargill in July 1996 proposed an F emission limit of 3.26 TPY. In a subsequent submittal dated March 13, 1997, prior to issuance of the current construction permit, the fluorides emissions were based on producing 300,000 TPY of AFI product, 214 tons P2O5 per batch, 7.7 lbs F/batch, and 2.94 TPY F emissions. However, the construction permit issued in June 1997 retained the initially requested 3.26 TPY. For the proposed AFI revisions, maximum production will be 281,050 TPY AFI at 214 tons P2O5 per batch and 7.7 lbs F/batch and 2.76 TPY F. Although this is a 15 percent reduction over the permitted emissions, it is consistent with the original application information, as shown below:

   2.94 TPY x 281,050/300,000 = 2.76 TPY

   In the case of PM/PM10 emissions, the current construction permit emissions are based on a 1,160 TPD AFI granulation rate (580 TPD from each granulation system). PM/PM10 emissions are limited to 6.0 lb/hr per granulation plant, or 12.0 lb/hr total. The proposed emissions are based on a straight ratio to production rate. The proposed production rate is 770 TPD AFI through a single granulation plant:

   12.0 lb/hr x 770/1,160 = 8.0 lb/hr

This represents a 33 percent decrease in PM/PM10 emissions since the daily granulation rate is decreasing by 33 percent.

3. The application has two attachments: Attachment A and Attachment B. Attachment B is a copy of the current construction permit for the AFI plant.

Thank you for consideration of these responses. Please call if you have any questions concerning this information.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David A. Buff, P.E.
Principal Engineer
Florida P.E. # 19011
SEAL

DB/arz 1/6/99

cc: Kathy Edgemon
David Jellerson

G:\DATA\DP\PROJECTS\98\9837\9837583A\01\#01-ltr.doc

cc: J. Reynolds, BAR
SWD
Hillsboro Co.
EPA
NPS

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

December 21, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. David B. Jellerson
Environmental Superintendent
Cargill Fertilizer, Inc.
8813 Highway 41 South
Riverview, Florida 33569

Re: DEP File No. 0570008-028-AC (PSD-FL-234A)
Animal Feed Plant (AFI) Modification - Riverview

Dear Mr. Jellerson:

The Bureau of Air Regulation reviewed the above application received on December 17 and found that additional information is required. The preliminary completeness items are listed below. Additional incompleteness items may be requested within the 30 day period allowed for the completeness review.

1. The application states that compliance testing has been conducted but does not provide the test data. Please submit the detailed test report sheets for the tests containing data on stack flows, scrubber conditions, etc. for each test and provide sketches of the scrubber modifications.

2. Please explain the disparity between the requested 33 percent reduction in the PM/PM_{10} emission limit and the 15 percent emission limit reduction for fluorides.

3. The application has duplicate "Attachment A" sections. Please advise if any other attachments should have been included in place of the duplicate section.

If there are any questions regarding the above, please call John Reynolds at 850/921-9536.

Sincerely,

12/21

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/JR

cc: Gregg Worley, EPA
John Bunyak, NPS
Bill Thomas, SWD
Jerry Campbell, EPCHC
David Buff, Golder Assoc.

Z 333 612 575

US Postal Service

Receipt for Certified Mail

No Insurance Coverage Provided.

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Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
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PS Form **3800**, April 1995

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3. Article Addressed to:
David Jellerson, ES
Cargill Fertilizer
8813 Hwy 41 South
Riverview, Fl
33569

4a. Article Number
Z 333 612 575

4b. Service Type
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X [signature]

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CARGILL
FERTILIZER, INC.

8813 Highway 41 South - Riverview, Florida 33569 - Telephone 813-677-9111 - TWX 810-876-0648 - Telex 52666 - FAX 813-671-6146

Certified Mail:Z 206 635 311

December 14, 1998

Mr. Clair H. Fancy, Bureau Chief
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Linero: 0570008-028-AC

Re: Cargill Fertilizer, Inc. - Riverview Facility
AFI Plant Revisions to Construction Permit Application

Please find enclosed four copies of revisions to the construction permit application for the AFI Plant at our Riverview Facility. Included with these applications is a check in the amount of $250 (check # 1145) for the Florida Department of Environmental Protection.

If you have any questions or require additional information, please call me at (813) 671-6369.

Sincerely,

Kathy Edgemon
Environmental Engineer

cc: Jellerson
File: P-30-39-1

cc: J. Reynolds, BAR
SWD
Hillsboro Co.

DAVID RAYMER
CARGILL, INC. - FERTILIZER
8813 HWY 41 SOUTH
RIVERVIEW, FL 33569

1145

17-2/910

DATE 12/14/98

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