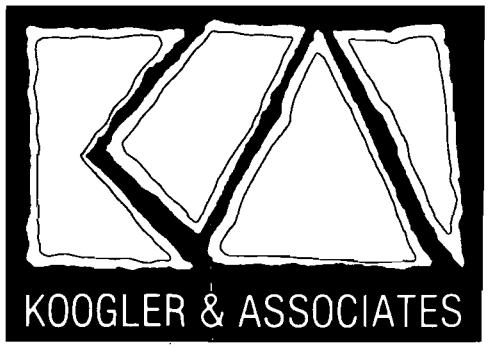
FLUORIDE EMISSION MEASUREMENTS
MULTIFOS MIXED-FEED BUILDING

IMC-AGRICO
NEW WALES, POLK COUNTY, FLORIDA

APRIL 5-7, 2000

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES
4014 N.W. 13TH STREET
GAINESVILLE, FLORIDA
352-377-5822



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To the best of my knowledge, all applicable field and analytical procedures comply with the Florida Department of Environmental Protection requirements and all test data and plant operating data are true and correct.

John B. Koogler, Ph.D., P.E.

State of Florida
Registration No. 12925

6/5/00

Date

KOOGLER & ASSOCIATES

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KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES

1.0 INTRODUCTION

IMC-Agrico operates a phosphate fertilizer complex at New Wales, Polk County, Florida. The fertilizer complex includes manufacturing facilities for phosphate based animal feed ingredients. During the period April 5-7, 2000, Koogler & Associates Environmental Services of Gainesville, Florida, conducted fluoride emission measurements from the multifos mixed-feed storage building.

The multifos mixed-feed (mixed-feed) storage building is 90 feet long (east-west), 67.5 feet wide (north-south) and 55 feet high. The building is a modified A-frame building with north and south sidewalls approximately 14 feet high. The building is ventilated only by the natural ventilation. The openings in the building include a large door at the west end for front-end loader ingress and egress. A man door at the west end of the building and a conveyor opening at the east end of the building, both approximately 25 feet below the ridge line, man doors at the east end of the building and the south side of the building both near the southeast corner of the building and an equipment opening at ground level near the southeast corner of the building. Additionally, there is a ridge vent which runs the entire length (90 feet) of the building. During the period of testing, the man doors were closed. The openings that remained were the loader door at the west end of the building, the conveyor opening at the east end of the building, the equipment opening at the east

end of the building and the roof vent. A sketch of the building and openings is included in the Appendix of this report.

The sampling procedure used to measure fluoride emissions from the mixed-feed building was based upon a protocol previously approved by FDEP for measuring fluoride emissions from GTSP storage buildings. The method includes the measurement of the areas of all openings in the building, periodic measurements of airflow through these openings (either into or out of the building) and the measure of the fluoride concentration of the gases entering or leaving the building at each opening. For the April 5-7, 2000, test period, the roof vent was divided into five discrete openings, the conveyor opening and the equipment opening at the east end of the building were considered as discrete openings and the loader door at the west end of the building was divided into two discrete openings.

During the period of testing, the multifos production rate and hence, the multifos transfer rate into the mixed-feed building, averaged 79.7 tons per hour. During the three day test period, the building ranged between 10-80 percent filled with product. During all three days of the test, material was transferred into the building and loaded out of the building.

The emission measurements consisted of three separate determinations with each determination being made over a 6-7 hour period. The measured fluoride emission

rate from the building ranged from 0.0050 to 0.0210 pounds per hour and averaged 0.0108 pounds per hour. During the test period, the building ventilation rate averaged approximately 20,000 cubic feet per minute.

2.0 BUILDING DESCRIPTION

Multifos is a phosphate based animal feed product consisting of phosphoric acid, soda ash and phosphate rock. During the period of testing, the multifos production rate averaged 79.7 tons per hour. This was also the rate at which multifos was transferred into the mixed-feed storage building by overhead conveyor. The conveyor traverses the storage building from east-west approximately 25 feet below the ridge line of the building and approximately 30 feet above the floor.

The mixed-feed building is 90 feet long, 67.5 feet wide and 55 feet high. During the time of testing, the openings in the building included the ridge vent, a conveyor opening and an equipment opening at the east end of the building, and a loader door at the west end of the building. Three man doors exist in the building but were closed during the three day test period. The ridge vent has an effective width of 15 inches and a length of 90 feet resulting in a total open area of 112.5 feet. This vent was divided into five discrete openings, each with an area of 22.5 square feet. The conveyor opening at the east end of the building has an opening of 8 feet by 10 feet or 80 square feet and the equipment opening at the east end of the building has an opening 8 feet by 10.5 feet or 84 square feet. The loader door at the west end of the building is 16.5 feet high and 16 feet wide; an area of 256 square feet.

Each of the openings was represented with a single sampler. Two samplers were located in the opening of the loader door (representing the two discrete openings) and one sampler was placed upwind of the building during each of the three sampling periods to provide background fluoride measurements. The roof Samplers were numbered 1 through 5, the conveyor Sampler at the east end of the building was numbered 6, the background Sampler was numbered 7, the equipment opening Sampler at the east end of the building was numbered 8 and the loader door Samplers were numbered 9 and 10.

During the test period, multifos was fed to the building at daily rates that ranged from 75.3 to 84.0 tons per hour with an average of 79.7 tons per hour. The discharge of multifos from the overhead transfer conveyor to the storage building was generally near the center of the building; under Samplers 3 and 4. During all three sampling periods, material was being removed from the storage building by front-end loader transfer to a hopper feeding a discharge conveyor at the east end of the building. The three test periods represented normal operation of the mixed-feed building.

3.0 SAMPLING POINT LOCATIONS

As previously described, the four building openings were divided into nine discrete sampling areas. The roof vent was subdivided into five areas each with an open area of 22.5 square feet, the conveyor opening and equipment opening at the east end of the building were treated as single areas with openings of 80 and 84 square feet, respectively, and the loader door at the west end of the building was subdivided into two areas each with an area of 132 square feet. Fluoride concentrations were measured near the centroid of each of these areas and airflow and direction (in or out of the building) was measured at each open area nominally once per hour. At the beginning and end of each test period, the flow rate of each sampler (which was controlled with a critical orifice) was measured with a mass flow meter.

4.0 SAMPLING PROCEDURE

The fluoride emissions from the mixed-feed building were determined generally in accordance with a protocol previously approved by FDEP for measuring fluoride emissions from GTSP storage buildings. A copy of this protocol is included in the Appendix of this report.

The test method involves measuring the airflow into and out of the building at several locations and simultaneously measuring the fluoride concentration of the air at each of the locations. From these measurements, the mass flow of fluoride at each sampling point is calculated and the masses are algebraically summed to determine the net fluoride emissions from the building. Prior to conducting any fluoride measurements, smoke tracers were used to determine the general airflow patterns within the building. The smoke tracers demonstrated that the airflow through all openings, except the loader door, was quite well defined. This can be observed in Tables 1, 2 and 3; summaries of data representing each of the three test runs. During all three test periods, the airflow was out of the building at the five openings representing the roof vent (Samplers 1-5) and the opening on the east end of the building were the conveyor entered the building (Sampler No. 6).

At Sampler No. 8 (the equipment opening on the east end of the building), the airflow fluctuated between in and out during Run 1 and was consistently into the

building during Runs 2 and 3. The airflow at the loader opening (Samplers 9 and 10) was variable during each run. A review of the field data sheets demonstrates that the flow fluctuated from in to out and at some times the flow was into the building at the bottom of the opening and out of the building at the top (or vice versa).

To account for the fluctuating airflow at openings 9 and 10, the following procedure was used:

- A total airflow volume was calculated for each area for each time step increment of each of the three test runs. These airflow volumes were calculated by multiplying the area of the opening by the air velocity measured with a thermistor type airflow meter (ft/min) by the duration of the time increment.

- The incremental volumes for each opening were totaled for each test run to determine a total raw airflow volume for each opening (see Tables 1-3). The flows for all openings were summed to provide a total raw airflow balance for the building. For all three test runs, the measured airflow into the building exceed the airflow out of the building (resulting in a negative raw volume balance) because of the uncertainty caused by the fluctuating flow at Areas 9 and 10.

- As the only questionable airflow volumes were those measured at Areas 9 and 10, a total adjusted airflow volume was calculated by adjusting the volumetric flows for Areas 9 and 10 such that the total adjusted airflow volume balance for the building would be zero; that is, the airflow out of the building would equal the airflow into the building.

To determine the mass flow of fluoride at each opening, the fluoride concentration measured by the sampler at the opening was multiplied by the adjusted airflow volume for the area to give a total mass flow of fluoride (either into or out of the building) at each opening for the total duration of each test run. These calculations are summarized in Tables 1-3. The hourly fluoride emission rates for each test run were determined by dividing the total fluoride emissions for each test run by the duration of each test run. These data are summarized in Table 4.

The background fluoride concentration measured during each test run with Sampler 7 was not used to correct the mass fluoride entering or leaving the mixed-feed storage building at each sampler location. It was determined that actual measurements of the fluoride in the air entering the building (at points where the airflow was into the building) would provide a self-correcting mechanism for background fluoride concentrations. It is interesting to note, however, that for Runs 1 and 2, the fluoride concentrations measured by the background sampler approached the fluoride levels in the distilled water blanks and for Run 3 (with the

airflow across the chemical plant), the fluoride level measured by the background sampler was approximately 3.5 times of that of the distilled water blank. It should be noted that all samples were corrected for the distilled water blanks.

5.0 TEST CONDITIONS AND SUMMARY OF RESULTS

During the test period of April 5-7, 2000, the multifos plant operated normally and the transfer of product to the mixed-feed storage building and the removal of the product from the building for shipment was normal. During the test period, the multifos production rate ranged from 75.3 to 84.0 tons per hour and averaged 79.7 tons per hour.

Following are general comments and/or conditions related to each of the test runs.

Run No. 1

- Date - April 5, 2000
- Wind - generally from the north at 10-15 miles per hour
- Ambient temperature - 51°F at 0800
- Material transfer to building began at 0928
- Sampling began nominally at 0922 and ended at 1621
- Building was approximately 10 percent full of product at the beginning of the run
- The average transfer rate of product to the mixed-feed building was 75.3 tons per hour for the test period.
- The material drop point (product discharge point into the mixed-feed storage building) was below Sampler 4 (near the center of the building)
- Material was being removed from the building for shipment by front-end loader during the test period.

Run No. 2

- Date - April 6, 2000
- Wind - generally from the east at 3-5 miles per hour
- Material transfer to building began at 0800
- Sampling began nominally at 0805 and ended at 1446. The samplers did not operate for approximately 33 minutes between 1217 and 1250 because of a power outage.
- Building was approximately 80 percent full of product at the beginning of the run
- The average transfer rate of product to the mixed-feed building was 84.0 tons per hour for the test period.
- The material drop point (product discharge point into the mixed-feed storage building) was below Sampler 4 (near the center of the building)
- Material was being removed from the building for shipment by front-end loader during the test period.

Run No. 3

- Date - April 7, 2000
- Wind - generally from the southeast
- Material transfer to building began at 0800
- Sampling began nominally at 0804 and ended at 1718. Samplers were off between 1012 and 1218 due to plant shutdown.
- Building was approximately 65 percent full of product at the beginning of the run
- The average transfer rate of product to the mixed-feed building was 79.7 tons per hour for the test period.
- The material drop point (product discharge point into the mixed-feed storage building) was between Samplers 3 and 4 (near the center of the building but closer to the west end).

- Material was being removed from the building for shipment by front-end loader during the test period.

The fluoride emission calculations are summarized in Tables 1-3 and the test results are summarized in Table 4. The fluoride emission rate from the building averaged 0.0108 pounds per hour. This emission rate is based on three separate measurements ranging in duration from 6.13-7.13 hours. The rate at which multifos product was being transferred into the building during the test period averaged 79.7 tons per hour and the building ventilation rate (natural ventilation) averaged 20,103 cubic feet per minute.

All field and analytical data sheets are included in the Appendix of this report as is a copy of the general test protocol.

FLUORIDE EMISSION TEST – RUN NO. 1
MULTIFOS MIXED FEED BUILDING
IMC-AGRICO NEW WALES CHEMICAL COMPLEX
APRIL 5, 2000

Sample	Area Opening (ft^2)	Velocity (ft/min)	(1) Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Total Raw Volume (ft^3)
Roof														
1	22.5	60	74385	50	47138	20	27945	30	53528	60	90720	40	101520	395235
2	22.5	60	74385	90	84848	150	209588	150	267638	230	347760	190	482220	1466438
3	22.5	30	37193	70	65993	30	41918	20	35685	100	151200	90	228420	560408
4	22.5	20	24795	20	18855	90	125753	150	267638	75	113400	75	190350	740790
5	22.5	120	148770	20	18855	30	41918	170	303323	130	196560	130	329940	1039365
Ground														
6	80	120	528960	75	251400	30	149040	110	697840	80	430080	175	1579200	3636520
8	84	100	462840	-195	-686322	-190	-991116	-70	-466284	85	479808	60	568512	-632562
9	132	-95	-690954	75	414810	-200	-1639440	-172	-1800427	-102	-904781	-157	-2337667	-6958459
10	132	-95	-690954	75	414810	-200	-1639440	-172	-1800427	-102	-904781	-157	-2337667	-6958459
Volume Balance (ft^3)			-30581		630386		-3673836		-2441488.4		-33.6		-1195172	-6710725 (2)
Time Step (min)			55.1		41.9		62.1		79.3		67.2		112.8	418.4

Sample	Sampled Emissions mg F (3)	lb F	Initial Flow (l/min)	Final Flow (l/min)	Average Flow (l/min)	Start time	End time	Total time (min) (4)	Sampled Volume (l)	Sample Volume (ft^3)	Fluoride Sample (lb/ft^3)	Total Adjusted Volume (ft^3)	Total Emissions (lb) (5)
Roof													
1	0.095	2.09E-07	0.95	0.99	0.97	9:49	16:21	392.00	380.24	13.43	1.56E-08	395235	0.00616
2	0.097	2.15E-07	0.93	0.92	0.93	9:40	16:21	401.00	370.93	13.10	1.64E-08	1466438	0.02404
3	0.490	1.08E-06	0.93	0.93	0.93	9:28	16:21	413.00	384.09	13.56	7.96E-08	560408	0.04463
4	0.122	2.68E-07	0.96	0.89	0.93	9:13	16:21	428.00	395.90	13.98	1.92E-08	740790	0.01421
5	0.174	3.84E-07	0.94	0.93	0.94	9:13	16:21	428.00	400.18	14.13	2.72E-08	1039365	0.02823
Ground													
6	0.069	1.52E-07	0.90	0.93	0.92	9:19	16:21	422.00	386.13	13.64	1.12E-08	3636520	0.04065
8	0.019	4.25E-08	0.98	1.00	0.99	9:13	16:21	428.00	423.72	14.96	2.84E-09	-632562	-0.00180
9	0.009	2.03E-08	0.90	0.89	0.90	9:14	16:21	427.00	382.17	13.50	1.50E-09	-3603096.5	-0.00541
10	0.009	1.97E-08	0.99	1.03	1.01	9:14	16:21	427.00	431.27	15.23	1.29E-09	-3603096.5	-0.00465
Total								418.44				0	0.1461

TABLE 1

(1) Area x Velocity x Time Step; (+) Volume is flow out of building and (-) Volume is flow into building.
(2) Imbalance into building is result of fluctuating flow direction of Areas 9 and 10.
(3) DI water blank corrected.
(4) Time may be adjusted for sampler downtime
(5) Total fluoride emissions for entire test period.

FLUORIDE EMISSION TEST – RUN NO. 2
MULTIFOS MIXED FEED BUILDING
IMC-AGRICO NEW WALES CHEMICAL COMPLEX
APRIL 6, 2000

Sample	Area Opening (ft^2)	Velocity (ft/min)	(1) Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Total Raw Volume (ft^3)
Roof														
1	22.5	90	92138	30	43538	40	63000	100	163125	20	13950	20	38025	413775
2	22.5	30	30713	50	72563	20	31500	75	122344	50	34875	30	57038	349031
3	22.5	60	61425	50	72563	40	63000	30	48938	60	41850	20	38025	325800
4	22.5	25	25594	40	58050	0	0	50	81563	20	13950	20	38025	217181
5	22.5	110	112613	120	174150	40	63000	70	114188	30	20925	20	38025	522900
Ground														
6	80	90	327600	18	92880	40	224000	26	150800	35	86800	15	101400	983480
8	84	-70	-267540	-125	-677250	-250	-1470000	-273	-1662570	-340	-885360	-245	-1739010	-6701730
9	132	-35	-210210	-45	-383130	-70	-646800	60	574200	35	143220	70	780780	258060
10	132	-35	-210210	-45	-383130	-70	-646800	60	574200	35	143220	70	780780	258060
Volume Balance (ft^3)			-37879		-929768		-2319100		166786.25		-386570		133088	-3373443 (2)
Time Step (min.)			45.5		64.5		70		72.5		31		84.5	368

Sample	Sampled Emissions mg F (3)	lb F	Initial Flow (l/min)	Final Flow (l/min)	Average Flow (l/min)	Start time	End time	Total time (min) (4)	Sampled Volume (l)	Sample Volume (ft^3)	Fluoride Sample (lb/ft^3)	Total Adjusted Volume (ft^3)	Total Emissions (lb) (5)
Roof													
1	0.104	2.29E-07	0.99	0.97	0.98	8:05	14:46	368.00	360.64	12.74	1.80E-08	413775	0.00745
2	0.066	1.45E-07	0.92	0.99	0.96	8:05	14:46	368.00	351.44	12.41	1.16E-08	349031	0.00407
3	0.087	1.91E-07	0.95	0.92	0.94	8:05	14:46	368.00	344.08	12.15	1.57E-08	325800	0.00511
4	0.147	3.24E-07	0.86	0.85	0.86	8:05	14:46	368.00	314.64	11.11	2.91E-08	217181	0.00633
5	0.178	3.92E-07	0.95	0.91	0.93	8:05	14:46	368.00	342.24	12.09	3.25E-08	522900	0.01698
Ground													
6	0.037	8.16E-08	0.90	0.92	0.91	8:05	14:46	368.00	334.88	11.83	6.90E-09	983480	0.00679
8	0.013	2.92E-08	0.97	0.99	0.98	8:05	14:46	368.00	360.64	12.74	2.30E-09	-6701730	-0.01538
9	0.009	1.98E-08	0.91	0.90	0.91	8:05	14:46	368.00	333.04	11.76	1.69E-09	1944781.25	0.00328
10	0.012	2.66E-08	1.00	1.04	1.02	8:05	14:46	368.00	375.36	13.26	2.01E-09	1944781.25	0.00391
Total								368.00				0	0.0385

TABLE 2

(1) Area x Velocity x Time Step; (+) Volume is flow out of building and (-) Volume is flow into building.
(2) Imbalance into building is result of fluctuating flow direction of Areas 9 and 10.
(3) DI water blank corrected.
(4) Time may be adjusted for sampler downtime
(5) Total fluoride emissions for entire test period.

FLUORIDE EMISSION TEST – RUN NO. 3
MULTIFOS MIXED FEED BUILDING
IMC-AGRICO NEW WALES CHEMICAL COMPLEX
APRIL 7, 2000

Sample	Area Openin (ft^2)	Velocity (ft/min)	(1) Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Velocity (ft/min)	Volume (ft^3)	Total Raw Volume (ft^3)
Roof														
1	22.5	30	29363	30	57038	80	90000	60	96525	120	198450	20	47250	518625
2	22.5	30	29363	30	57038	60	67500	70	112613	150	248063	50	118125	632700
3	22.5	30	29363	20	38025	75	84375	60	96525	20	33075	50	118125	399488
4	22.5	30	29363	20	38025	50	56250	30	48263	90	148838	80	189000	509738
5	22.5	80	78300	20	38025	50	56250	120	193050	100	165375	150	354375	885375
Ground														
6	80	30	104400	10	67600	10	40000	30	171600	25	147000	60	504000	1034600
8	84	-280	-1023120	-260	-1845480	-300	-1260000	-230	-1381380	-270	-1666980	-320	-2822400	-9999360
9	132	-30	-172260	-40	-446160	-240	-1584000	50	471900	45	436590	33	457380	-836550
10	132	-30	-172260	-40	-446160	-240	-1584000	50	471900	45	436590	33	457380	-836550
Volume Balance (ft^3)			-1067490		-2442050		-4033625		280995		147000		-576765	-7691935(2)
Time Step (min.)			43.5		84.5		50.0		71.5		73.5		105.0	428.0

Sample	Sampled Emissions mg F (3)	lb F	Initial Flow (l/min)	Final Flow (l/min)	Average Flow (l/min)	Start time	End time	Total time (min) (4)	Sampled Volume (l)	Sample Volume (ft^3)	Fluoride Sample (lb/ft^3)	Total Adjusted Volume (ft^3)	Total Emissions (lb) (5)
Roof													
1	0.084	1.86E-07	0.99	0.98	0.99	8:04	17:18	428.00	421.58	14.89	1.25E-08	518625	0.00647
2	0.113	2.49E-07	0.92	0.88	0.90	8:04	17:18	428.00	385.20	13.60	1.83E-08	632700	0.01157
3	0.115	2.54E-07	0.92	0.90	0.91	8:04	17:18	428.00	389.48	13.75	1.85E-08	399488	0.00739
4	0.086	1.90E-07	0.94	0.95	0.95	8:04	17:18	428.00	404.46	14.28	1.33E-08	509738	0.00678
5	0.079	1.75E-07	0.89	0.88	0.89	8:04	17:18	428.00	378.78	13.38	1.31E-08	885375	0.01158
Ground													
6	0.050	1.10E-07	0.98	0.91	0.95	8:04	17:18	428.00	404.46	14.28	7.69E-09	1034600	0.00795
8	0.024	5.26E-08	0.98	0.96	0.97	8:04	17:18	428.00	415.16	14.66	3.59E-09	-9999360	-0.03588
9	0.020	4.43E-08	0.89	0.88	0.89	8:04	17:18	428.00	378.78	13.38	3.31E-09	3009418	0.00996
10	0.022	4.91E-08	1.00	0.98	0.99	8:04	17:18	428.00	423.72	14.96	3.28E-09	3009418	0.00987
Total								428.00				0	0.0357

TABLE 3

(1) Area x Velocity x Time Step; (+) Volume is flow out of building and (-) Volume is flow into building.
(2) Imbalance into building is result of fluctuating flow direction of Areas 9 and 10.
(3) DI water blank corrected.
(4) Time may be adjusted for sampler downtime
(5) Total fluoride emissions for entire test period.

TABLE 4

FLUORIDE EMISSION SUMMARY
IMC-AGRICO MULTIFOS MULTI-FEED STORAGE BUILDING
NEW WALES CHEMICAL COMPLEX
APRIL 5-7, 2000

Run	Sample Period				Product Transfer Rate to Bldg	Fluoride Emissions		Avg. Bldg Ventilation Rate
	Start	End	Time (min)	Time (hr)	(tph)	(lb/test)	(lb/hr)	(cfm)
1	0922	1621	418	6.97	75.4	0.1461	0.0210	18,735
2	0805	1446	368	6.13	84.0	0.0385	0.0063	18,211
3	0804	1718	428	7.13	79.7	0.0357	0.0050	23,363
Avg				6.74	79.7		0.0108	20,103

APPENDIX

GENERAL TEST PROTOCOL

SAMPLER LOCATIONS

FIELD AND ANALYTICAL DATA SHEETS

PLANT OPERATING DATA

PROJECT PARTICIPANTS

GENERAL TEST PROTOCOL

METHOD FOR DETERMINATION OF GASEOUS AND WATER SOLUBLE FLUORIDE EMISSIONS FROM A GTSP STORAGE BUILDING

1. Principle and Applicability

1.1 Principle. Gaseous and water soluble fluorides are withdrawn from various predetermined sample points in the roof monitor and leeward eave vents using several modified EPA Method 13B sampling trains. The concentration of fluoride captured in the sample line, impinger water and filter of each sample train is then determined, using a specific ion electrode.

1.2 Applicability. This method may be used, subject to Department approval and possible site-specific modifications, for determining gaseous and water soluble fluoride emissions from GTSP storage buildings and similar structures.

2. Apparatus

2.1 Sampling Train. Sampling equipment shall meet the specifications listed for Method 13B of 40CFR60, Appendix A with several exceptions as follows. See Figure 1 for sampling train schematic.

2.1.1 Sample Inlet. The standard sampling nozzle and probe of the 13B sample train shall be replaced with a sample inlet constructed of a material inert to fluoride. The inlet shall consist of an approximate 65 mm diameter funnel fitted into the free end of the sample line. The funnel shall be inverted (facing downward) to sample the area of maximum flow out of the building at the sampling site.

2.1.2 Sampling Line. The sampling line connecting the sample inlet to the impinger assembly shall be leak free and of a material inert to fluoride.

2.1.3 Impinger Assembly. The impinger train shall consist of three (3) midget impingers followed by a dry trap. All three impingers will be of the standard design with standard tips. Each of the three (3) impingers will be charged with 15 ml of distilled-deionized water. The dry trap shall be empty.

Alternatively, the impinger assembly can consist of two polypropylene bubblers followed by a dry trap. Each of the two bubblers will be filled with 50 ml of deionized-distilled water. The polypropylene tube shall be 32 mm in diameter and 164 mm long. The cap of the absorber must be polypropylene cap with two ports. A glass impinger

stem, 6 mm in diameter and 158 mm long, is inserted into one port of the absorber cap. The tip of the stem is tapered, as is the tip of the standard midget impinger. Clearance from the bottom of the absorber to the tip of the stem must be 6 $\pm$ 2 mm.

After the first run, specific ion electrode readings will be taken on the three impingers from the sampling train at the site that would reasonably be expected to have the highest fluoride concentrations. If over five percent of the captured fluoride is in the third impinger (or second bubbler), the volume of water in all the sampling equipment will be increased by an amount specified by the Department representative before the second run begins.

2.1.4 Filter. A Whatman No. 1 or comparable filter will be located behind the impinger assembly.

2.1.5 Metering System. The metering system as described in EPA Method 13B can be replaced with a critical flow device and a vacuum pump equipped with a vacuum gage that would allow a constant sampling rate of 1.0 liters per minute. All other necessary equipment will be as described in EPA Method 13B.

2.1.6 Hot-Wire Anemometers. Hot-wire anemometers will be used to measure air velocities in the building. The anemometers shall be calibrated in a manner acceptable to the Department prior to the test. The calibration range shall include the expected velocities within the building, i.e., 0.2-10.0 fps.

2.1.7 Flow Direction Indicator. Since the hot-wire anemometers that will be used to measure velocities cannot measure the direction of those velocities, a device must be used to indicate flow directions at all of the designated velocity measurement points. The type of device used will be at the discretion of the company, subject to approval by the Department.

2.1.8 Wind Speed and Direction Indicator. A wind speed and direction indicator will be located in the vicinity of the GTSP storage building during the sampling effort.

2.2 Sampling Recovery.

2.2.1 Probe Brushes and Extensions. Probe brushes and extensions will be of a material inert to fluoride.

2.2.2 Sample Containers. All containers used to recover wash and impinger solutions will be of a polyethylene material inert to fluoride. Containers will be washed with HCl prior to use.

2.3 Analysis. All analytical equipment will be as described in Method 13B with the exception that all apparatus associated with he fusion and distillation steps will be eliminated.

3. Reagents

Reagents for sampling and analysis will be the same as those described in EPA Method 13B with the exception that all reagents associated with the fusion and distillation steps will be eliminated.

4. Procedure

4.1 Pretest Preparation

4.1.1 Plant. Prior to and during all test runs, the GTSP plant will be operated within 10 percent of its permitted capacity. The storage building will be filled to at least 10 percent capacity, of which 20 percent shall be freshly manufactured GTSP (produced no more than five days prior to the test).

4.1.2 Storage Building. Prior to and during the test, all openings, with the exception of the roof monitor, eave vent, end wall vents and other designed openings in the building, will be sealed.

4.1.3 Outloading. During one sampling run (8 hours), normal outloading of the GTSP product shall occur from the GTSP storage building.

4.1.4 Product Drop point. For the duration of the test periods, the drop point of GTSP into the storage building will be as close as possible to where the product enters the building.

4.1.5 Sampling Train. Clean all impingers as described in EPA Method 13B. Charge all impingers with the appropriate amounts of distilled-deionized water. Perform all necessary calibrations as described in Method 13B. If a critical flow device is used to control the flow through the sampling train, it shall be calibrated prior to the test with a standard dry gas meter or mass flow meter.

4.2 Preliminary Determinations

4.2.1 Weather Conditions. Assess what the probable weather conditions will be during the test effort. If they are less than ideal, the test may be postponed at the option of the Department or the Company.

4.2.2 Sampling Locations. A minimum of one sampler for each 100 feet of building length will be located in the roof monitor. Additionally, one sampler shall be as close as physically practical to the product drop point during the test. The samplers shall be located beginning 50 feet from each end wall and at approximate 100 foot intervals in between. The extra sampler should be located over the GTSP drop point (see Figure 2).

A minimum of three (3) samplers shall be located along the sidewall building vent to obtain a sample of the air leaving the leeward side of the building. The sampling system inlet shall be at the same elevation as the vent opening and between 1 and 2 feet inside the building. The locations of the samplers along the sidewall building vent shall be determined just prior to each test run.

At the option of the Company, a single sampler may be used to measure an upwind or background fluoride concentration. The sampling point shall be no closer than 100 feet to any part of the storage building, including the railcar loading shelter.

4.2.3 Leak Checks. The sampling train shall be checked for leaks before and after each run as per EPA Method 13B.

4.3 Sampling

4.3.1 Velocity Determinations. For the determination of air flow in the roof monitor vent, velocity measurements shall be made in line with each sampling point along the roof monitor vent and 1 to 1.5 feet below the level of the walkway. An average velocity shall be determined, either by taking four readings across the vent each time or by characterizing the flow pattern across the vent at each sampling point and choosing a point of average velocity. The flow pattern should be defined prior to the start of each run and verified at the end. If the Company wishes to use the single, average point option, it shall conduct a one or two day study prior to the actual test to demonstrate that a single point can be used to indicate an average velocity during the entire run.

The velocity measurements at the eave vents shall be made in centroid of the vent opening. Velocity measurements shall be made at least at each sampling point, but no more than 100 feet apart. The velocity reading shall be made for at least 30 seconds at each point and visually averaged by the operator. A velocity measurement shall be made at each point immediately prior to the start of a test run and approximately every hour thereafter until the end of the run. In addition, the flow direction shall be determined when and where each velocity measurement is made.

4.3.2 Sampling Data. Prior to the start of the test, at 60-minute intervals during each test run and at the conclusion of each test run, the velocity, flow direction, DGM reading, temperature and all other pertinent data for each sampling point will be recorded on field data sheets. If a critical flow device is used in lieu of a DGM, the pressure differential across the device shall be recorded at the 60-minute intervals and at the end of the test period. A final flow check shall be made on with a standard dry gas meter or a mass flow meter. The flow rate through the critical flow device test period shall be the average of the pre-test and post-test flow rates.

4.3.3 Test Duration. A test shall consist of three runs. Each run shall be a minimum of eight hours. One of the three 8-hour test runs shall coincide with the shift during which GTSP is being loaded into the railcars. The Company shall arrange to load out at a maximum rate of the 8-hour period.

4.3.4 Weather Data. Record the ambient wind speed and direction at hourly intervals during the testing period. If unfavorable weather conditions arise, the test may be halted and/or postponed at the option of the Department representative or the Company.

4.3.5 Plant Stoppages. If the supply of GTSP to the building is reduced or halted during the testing for approximately 15 minutes or more, the testing should be stopped. Sampling should be restarted 15 minutes after the GTSP supply has reached its previous rate to allow the emissions to maximize. The time for that run must be extended by the length of the sampling train downtime.

5. Sample Recovery

5.1 Sample Inlet and Sample Line. At the conclusion of each sampling run, and before the sample pump is turned off, the sample line shall be elevated above the impingers in such a way that particulate matter collected in the sample inlet and sample line cannot be lost. The interior surfaces of each sample inlet and sample line shall then be brushed and rinsed at least three times with distilled-deionized water at per EPA Method 13B, Section 7.2.1. The washings shall be added to a clean polyethylene container.

5.2 Impingers. The solutions from all three impingers will be added to the sample inlet and sample line washings with the exception of the sample train expected to contain the highest fluoride concentration. The impingers and connecting glassware shall be rinsed three (3) times and the washings added to the existing sample container. The filter following the impingers shall be recovered and added to the existing sample container.

5.2.1 Highest Fluoride Sample Train. At the conclusion of each sample run the sample inlet and sample line washings, first and second impinger solutions and washings, and the third impinger solution and washings shall be placed in three (3) separate containers. The filter following the impingers shall be combined with the sample from the third impinger. After fluoride analysis of the impinger solutions, the washings may be combined into one (1) container.

5.3 Prior to analysis, all washings must be measured volumetrically.

6. Analysis

Analysis of all fluoride samples will be as described in EPA Method 13B with the following exceptions:

1. The fusion and distillation steps will be eliminated.

2. The impinger solution may be divided into two or three portions if requested by the Department: one for Company analysis, one for Department analysis and possibly one sealed as a reference sample. The Company's sample will contain the filter.

7. Calculations

For calculating the mass emission rate, each sampling point shall be considered to represent the emissions from a specific area and should be centered in that area. The mass rate from each area will be the measured concentration times the measured flow rate (area represented by monitor times average measured velocity for area). Then the total mass rate for the building will be the sum of all the individual mass rates, as follows:

$e = C_X Q_X$; where e = average emission rate from one area, lbs/hr

C_X = average concentration from one area, lbs/dscf

Q_X = average volumetric flow rate from one area, dscf/hr

then:

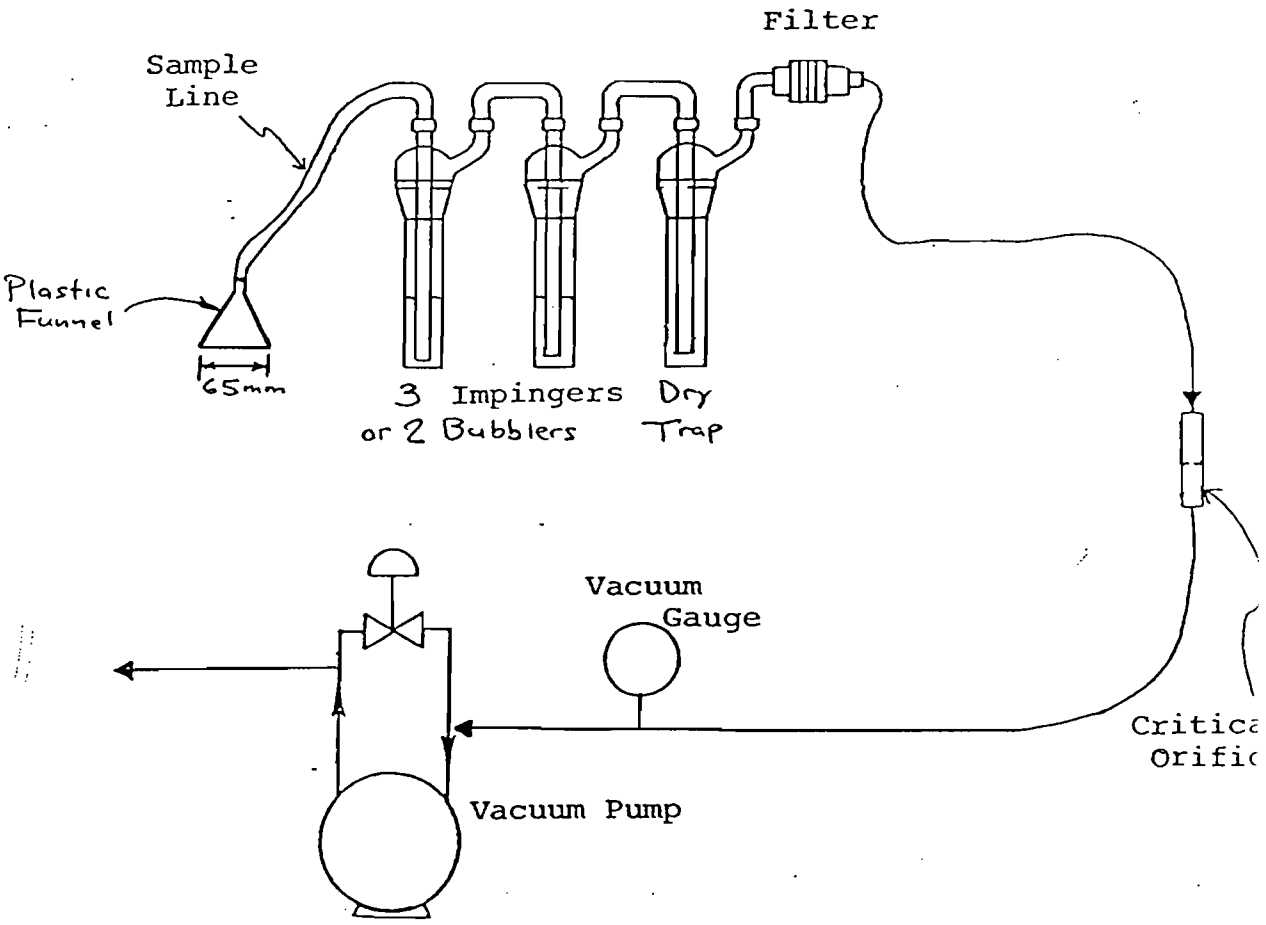
$$E = e_1 + e_2 + \ldots + e_n$$

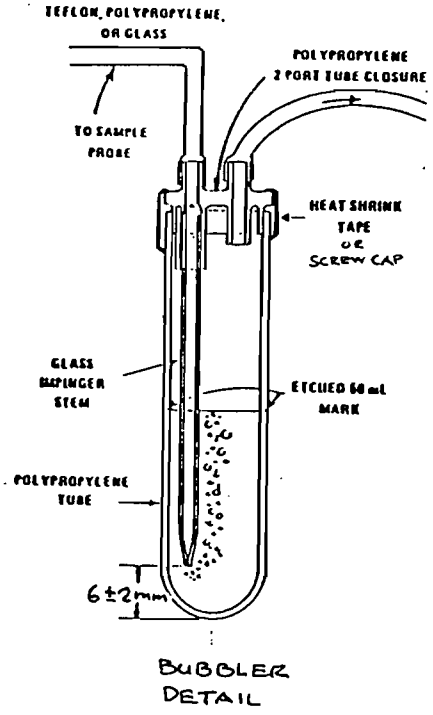
where E = total mass rate from the building, lb/hr, for the run. The test results will be the average emissions, lb/hr, for the three runs.

8. Test Report

The test report shall include all applicable sections described in Subsection 17-2.700(7), Florida Administrative Code (FAC) and all other pertinent data collected during the test.

Figure 1
SAMPLING TRAIN





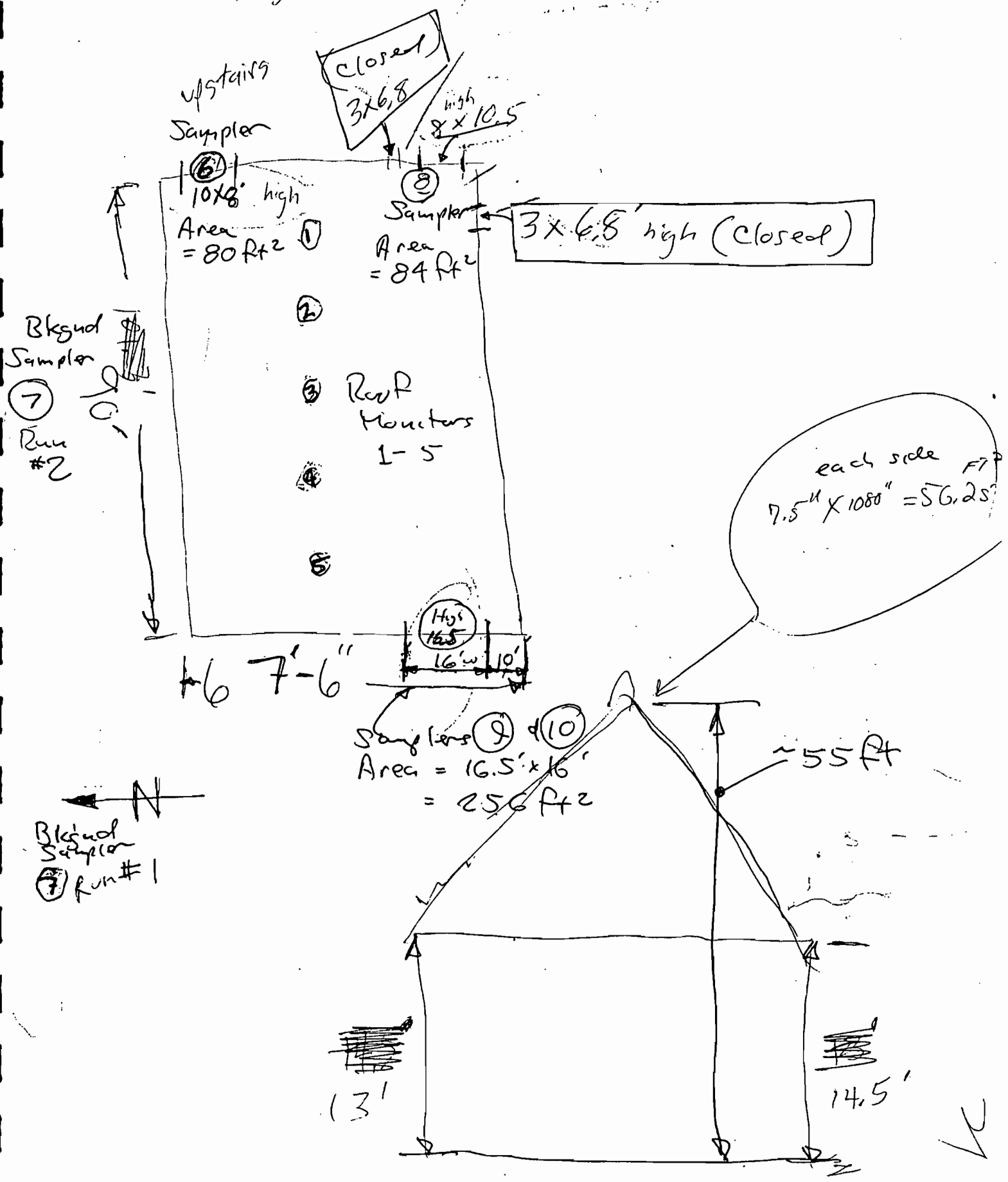
BUBBLER DETAIL

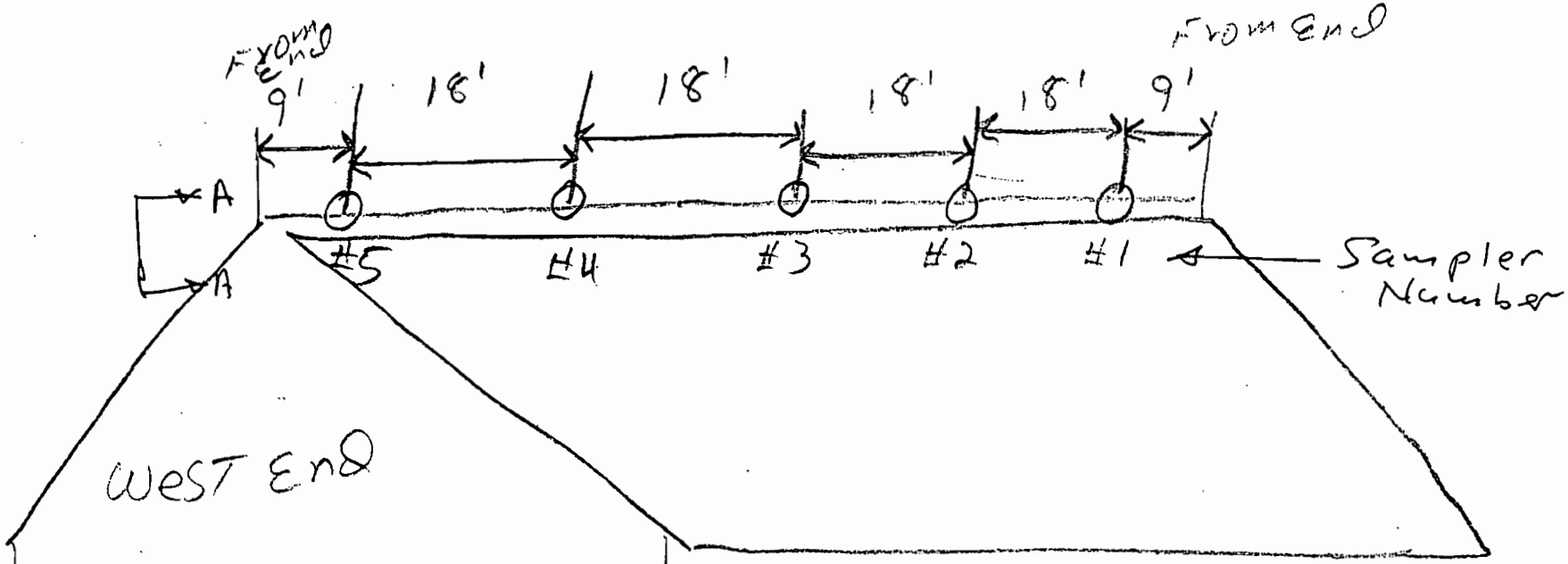
SAMPLER LOCATIONS

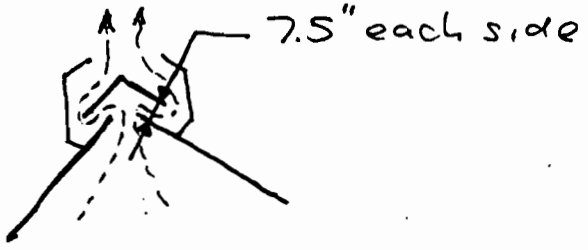
Bkgnd Sampler Run #3 (7)

IMC

Mixed Feed Storage Building







Section A-A

Roof Monitor
Total Open Area
$(2 \times 7.5") \times 90' = 112.5\ ft^2$
Area represented by each monitor
$= 112.5 / 5$
$= 22.5\ ft^2$

FIELD AND ANALYTIAL DATA SHEETS

RUN NO. 1

COMPANY: IMC-Agrico
LOCATION: NEW WALES
PLANT: MIXED FEED
DATE: 04/05/00
RUN: ONE

FLUORIDE ANALYSIS

PERFORMED BY: DAVID CARROLL

SAMPLE	TOTAL VOLUME (ml)	PPM	TOTAL MG. F	
1	189	0.54	0.102	
2	194	0.54	0.105	
3	199	2.5	0.498	
4.A.	56	1.9	0.106	total
4.B.	141	0.12	0.017	
4.C.	55	0.076	0.004	
5	181	1	0.181	
6	191	0.4	0.076	
7	168	0.041	0.007	
8	158	0.16	0.025	
9	184	0.088	0.016	
10	182	0.087	0.016	
DI BLANK		0.038		

Total mg. values not corrected for Blank.

Analysis performed in accordance with method 13B.

Equipment: Orion Expandable ionanalyzer EA 920 with fluoride electrode.

Sampler Data Sheet

Plant : IMC New Wales

Date : 4/5/00

Location : Mixed Feed Building

Run No. 1

mass flow meter determinate

Sampler No.	Start Time	Inital Vac. (In. Hg.)	Inital Flow (l/m)	Inital L.C. (l/m)	Inital L.C. Vac. (In. Hg.)	End Time	Final Vac. (In. Hg.)	Final Flow (l/m)	Final L.C. (l/m)	Final L.C. Vac. (l/m)
			~~095~~	~~0.0~~	~~22.8~~					
1	09:49	21.5	095	0.0	22.8	16:21	21.5	0.99	0.0	23
2	09:40	21.2	0.93	0.01	22.0	16:21	21.5	0.92	0.0	23
3	09:28	21.5	0.93	0.01	22.8	16:21	22	0.93	0.0	23
4	09:17	22.5	0.96	0.02	23.9	16:21	22	0.89	0.0	24
5	~~09:13~~	21.5	0.94	0.0	23.4	16:21	22	0.93	0.0	24
6	09:19	22.9	0.90	0.01	23.9	16:21	22.2	0.93	0.02	24.0
7	9:08	21.2	0.84	0.01	22.8	16:23	21.0	0.84	0.04	22.6
8	09:10	21.2	0.95	0.01	23	16:21	21.0	1.0	0.02	23.2
9	09:14	23.5	0.90	0.0	19	16:21	19	0.89	0.01	20
10	09:14	17	0.99	0.01	24.1	16:21	22.5	1.03	0.01	24.5

Leak Checks Done Behind Filter
Flows Done From Front of Train
~~Material also being loaded out of building with Front End loader~~

Background Sampler located at 350° From North Center of Bldg. Approx 75 ft upwind of bldg.

Building 10% Full at start of Run

Wind from North 360°. 10 - 15 mph

Amb. Temp 51° @ 08:00

Material Entering Building at 09:28

Heavy amount of Particulate and ~~[illegible]~~ Acid like smell at Startup 09:40

Material Drop Point Sampler #4

SAMPLER DATA SHEET

Sample Volume (liquid)

PLANT:

DATE:

LOCATION:

RUN NO: 1

SAMPLER	MOISTURE Final	MOISTURE First	TOTAL VOLUME
1	100	89	189
2	102	92	194
3	102	97	199
4 B	99	42	141
5	100	81	181
6	100	91	191
7	97	71	168
8	94	64	158
9	100	86	184
10	96	86	182
4A			56
4C			~~55~~ 55

96
56
152

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/5/00
LOCATION: Mixed Feed Bldg.
RUN NO: 1

SAMPLER		TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1		09:50	60	OUT	
2		09:42	60	OUT	
3		09:31	30	OUT	
4		09:19	20	OUT	
5		9:04	120	OUT	
6		9:40	120	OUT	
7	BKG.	10:13	700	30° from North	
8		9:45	100	OUT	
9		~~9:45~~ 9:46	95	IN	
10					

6525 cfm

Baghouse vent

AIR VELOCITY DATA SHEET

PLANT: ±MC
DATE: 4/5/00
LOCATION:
RUN NO: 1

SAMPLER		TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1		10:44	50	OUT	
2		10:48	90	OUT	
3		10:53	70	OUT	5625
4		10:56	70	OUT	
5		11:01	20	OUT	
6		10:58	75	OUT	6000
7	BKG				
8		10:53	195	IN	16 380
9	〃	10:51	75	OUT	~~24000~~
10					19,800

Run 1

Smoke candle #1 – 11:15

Air In from loader door.

rising vertically to roof monitor and upstairs opening no visible smoke heading towards hopper opening.

#2 13:25

smoke candle lit near front end loader ~~door~~ opening

smoke was pushed in bottom section of loader and came back out the top section of the opening.

AIR VELOCITY DATA SHEET

PLANT: TMC
DATE: 4/5/06
LOCATION: Mixed Feed Bldg.
RUN NO: 1

SAMPLER		TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1		10:55	80	OUT	
2		11:30	150	OUT	7200
3		10:47	30	OUT	~~2676~~
4		11:43	90	OUT	
5		11:39	30	OUT	2400
6		11:52	[illegible]	OUT	
7	PKG	12:35	650	30°	
8		11:49	190	~~IN~~	15,960
9					
10	7	11:45	200	IN	52,800

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/5/06
LOCATION: Mixed Feed Bldg.
RUN NO: 1

SAMPLER		TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1		12:47	30	OUT	
2		12:50	150	OUT	
3		12:55	20	OUT	11,700
4		12:58	150	OUT	
5		13:03	170	OUT	
6		13:00	110	OUT	8800
7	GKG.	12:42	175	→	30°
8		12:50	70	IN	5880
9		12:52	215	IN	~~50760~~
			50		
10			250		45302.4
			176 AVE	IN	

Little to no Material on Belt coming in 12:53, last less than 5 min. Belt full again @ 12:58.

AIR VELOCITY DATA SHEET

PLANT:

DATE:

LOCATION:

RUN NO:

SAMPLER		TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1		14:00	600	OUT	22
2		14:01	230	OUT	VAC 22
3		14:00	100	OUT	VAC 22
4		13:58	75	OUT	VAC 22.5
5		13:53	130	OUT	VAC 22
6		14:05	80	OUT	VAC
7	BKG	13:45	450	——	30
8		14:07	85	OUT	
9					
10		13:55	115	IN	26840
			75	IN	
			115	IN	

13 3575
6400
7140

OUT
26927.5

IN
26840

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/5/00
LOCATION: Mix
RUN NO: 1

SAMPLER		TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)	VAC.
1		15:15	40	OUT		21.5
2		15:17	190	Out		22
3		15:08	90	OUT	1782.5	22
4		1506	75	OUT		22.5
5		15:00	130	OUT	~~5,040~~	22
6		15:05	175	OUT	14,000	
7	BKG	14:52	740	→	30°	21.5
8		15:00	140	OUT	5,040	
9						18
10		14:55	100 70 ~~245~~	IN	27,720	23

Drop Paint under Sampler #3

IN 27,720 — OUT 30852.5 — 130 − 220 ∝ 6

AIR VELOCITY DATA SHEET

PLANT:
DATE:
LOCATION:
RUN NO:

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
VAC				
1				
2				
3				
4				
5				
6	16:10	70	OUT	
7	16:12	750	—	30°
21.5				
8	16:08	180	IN AND OUT	
21.5				
9				
18.2	16-18	600 ~~IN OUT~~		
10		180 IN		
23				

Batch CYCLE FINISHED @ 16:16 PM

Flow shorted end of production run.

SAMPLER DATA SHEET

Vacuum Checks

PLANT: IDM

DATE: 4/5/00

LOCATION: Mixed Feed Building

RUN NO: 1

SAMPLER	TIME	VACUMN	TIME	VACUMN
1	10:44	21.5	11:55	21.5
2	10:48	21.7	11:56	21.5
3	10:50	22	11:47	22
4	10:50	22.5	11:43	22.5
5	11:01	22	11:49	22
6	10:28	23.5	11:52	23.5
7	10:22	21.5	11:32	21.5
8	10:26	21.5	11:49	21.5
9	10:24	17.8	11:34	17.9
10	10:25	22.5	11:35	22.5

			SAMPLER DATA SHEET			
			Vacuum Checks			
PLANT:						
DATE:						
LOCATION:						
RUN NO:						
SAMPLER		TIME	VACUMN		TIME	VACUMN
1		12:47	21.5			
2		12:50	22			
3		12:55	22			
4		12:58	22			
5		1303	22.5			
6		12:58	22.5			
7		12:42	21.5			
8		12:50	21.5			
9		12:44	17.5			
10		12:45	22.5			

CHAIN OF CUSTODY RECORD

Project Number _____

Project Name IMC New Wales

Sample Location ~~Mulberry - New Wales~~, FL
~~Ambient Sampling~~ Feed Building

Sample Identification	Remarks
Cont 1	Sampler # 1 IMC
2	2
3	3
4 A+B+C	4 3 containers
5	5
6	6
7	7
8	8
9	9
10	10
Blanks	Blanks

Sampled By: (Signature) Jeri A. Hanks Date: 4/5/00 Time: See DATA SHEETS

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) Daniel Cullen Date: 4/5/00 Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) _____ Date: _____ Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By Lab: (Sign) _____ Date: _____ Time: _____

Sample Shipped VIA: _____ UPS _____ Fed Express _____ Bus

Shipping Bill Number: _____

KRAMER & ASSOCIATES

RUN NO. 2

COMPANY: IMC-Agrico
LOCATION: NEW WALES
PLANT: MIXED FEED
DATE: 04/06/00
RUN: TWO

FLUORIDE ANALYSIS

PERFORMED BY: DAVID CARROLL

SAMPLE	TOTAL VOLUME	PPM	TOTAL MG. F
1	183	0.59	0.108
2	169	0.41	0.069
3	181	0.49	0.089
4.A.	102	1.3	0.133
4.B.	141	0.13	0.018
4.C.	81	0.038	0.003
5	182	1	0.182
6	178	0.23	0.041
7	183	0.03	0.005
8	170	0.1	0.017
9	180	0.072	0.013
10	198	0.083	0.016
DI BLANK		0.022	

Total mg. values not corrected for Blank.

Analysis performed in accordance with method 13B.

Equipment: Expandable ionanalyzer EA 920 with fluoride electrode.

BEST AVAILABLE COPY

Sampler Data Sheet

Plant : IMC New Wales

Date : 4/6/2000

Location : Mixed Feed Bldg.

Run No. 2

Bar C 30.20

Sampler No.	Start Time	Inital Vac. (In. Hg.)	Inital Flow (l/m)	Inital L.C. (l/m)	Inital L.C. Vac. (In. Hg.)	End Time	Final Vac. (In. Hg.)	Final Flow (l/m)	Final L.C. (l/m)	Final L.C. Vac. (l/m)
1	07:05	21.5	0.99	0.0	23.0	14:46	21.5	0.97	0.0	23.0
2		21.5	0.92	0.0	24.0			0.89	0.0	23.0
3		21.5	0.95	0.0	23.0		22.0	0.92	0.0	23.5
4		22.0	0.86	0.0	24.0		22.5	0.85	0.0	24.0
5		22.0	0.95	0.0	23.5		22.0	0.91	0.0	23.5
6	↓	22.0	0.90	0.0	24.0 24		22.5	0.92	0.00	24.5
7	08:07	21.5	0.82	0.0	23.0	14:51	21.7	0.81	0.01	23.3
8	08:05	21.0	0.99	0.0	23.0	14:46	21.8	0.99	0.01	23.1
9		18.0	0.91	0.0	20.5		18.8	0.90	0.01	20.4
10	↓	21.6	1.00	0.0	24.5	↓	22.5	1.04	0.01	24.8

End of production run @ Big Sampler located ≈ 60ft @ [redacted] N of Bldg.

Drop Point Sampler #4

Material also being loaded out of Building with front end loader. 16 ft³/48 Loader use varies IN/Out as does location #6. 09:00

Building 80% Full at start of run.

Wind 90° East 3-5 mph

* Background Sampler shut off for 3 min so that it could be moved father upwind, now located 200' East of Bldg. 10:41

SAMPLER DATA SHEET

Sample Volumes (liquid)

PLANT: IMC
DATE: 4/6/00
LOCATION: Mixed Feed Building
RUN NO: 2

FINAL

SAMPLER	MOISTURE ~~GAIN~~	Rinse	TOTAL VOLUME	
1	104	79	183	
2	106	63	169	
3	105	76	181	
4 ~~B~~	104	37	141	
5	105	77	182	
6	104	74	178	
7	101	82		183
8	100	70	170	178
9	102	78	180	
10	101	97	198	
4A		102	102	1
4C	1	80	81	

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/6/00
LOCATION: Mixed Feed Bldg
RUN NO: 2

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
VAC				
1	08:10	90	OUT	
21.5				
2	08:13	30	OUT	
22				
3	08:17	60	OUT	
22				& 212.5
4	08:19	75	OUT	
22.5				
5	08:24	110	OUT	
23				
6	08:27	60	OUT	4800 ~~90~~ 67°F INSIDE Bldg.
22.5				
7				
21.5	08:09	200	—	90°
8	08:14	65	IN/OUT	5460
21.2				
9	08:12	80		
18		180	IN/OUT	21,120
10		200		
22.5				

Ambient Temp 56°F

Smoke candle at loader door / In at bottom of door and back out at top

Drop point moved to Sampler # 5 08:40

(8:16)

OUT
1.5612.5

start 8:05
8:16 (69)
9:25 (66)
10:25 (80)
11:45 (65)
12:50 (68)
13:53
14:46 end

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/6/00
LOCATION: Mixed Feed Bldg.
RUN NO: 2

SAMPLER		TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
VAC IN Hg					
1		09:34	30	OUT	
22					
2		09:31	50	OUT	
22					6525
3		09:28	50	OUT	
22					
4		9:24	40	OUT	
23					
5		09:20	120	OUT	
23					
6		09:26	18	OUT	1440
22.8					
7	BKG	09:15	200		90° E
21.5					
8		09:23	250	IN/OUT	16,800
21.2					
9					
18.5					
10		~~09:20~~	~~80~~	~~OUT~~	~~18,480~~
21.8			~~120~~	~~IN~~	
			~~200~~	~~IN~~	
		09:50	160	OUT	

79°F

9:25

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/6/00
LOCATION: Mixed Feed Bldg.
RUN NO: 2

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
VAC "Hg				
1	10:20	40	OUT	
22				
2	10:25	20	OUT	
22				
3	10:26	40	OUT	> 3150 out
22				
4	10:34	0	—	
23				3200 out
5	10:36	40	out	
22				
6	10:35	40	OUT	
22.5				
7	10:5	225	—	30°
21.8				
8	10:31	250	IN	21,00 in
21.2				
9	10:27	70	IN/out	18480
18.5				
10				

83°F

Wind SE 150° @ 11:21

10:25 IN 18480 out 24830

AIR VELOCITY DATA SHEET

PLANT: TMC
DATE: 4/6/00
LOCATION: Mixed Feed Bldg
RUN NO: 2

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
VAC "Hg				
1	11:57	100	OUT	
22				
2	11:[illegible]	75	OUT	
22				
3	11:40	30	OUT	1200
22				
4	11:36	50	OUT	
23				
5	11:33	70	OUT	
22				
6	11:43	260	OUT	2080
22.8				
7	11:47	500	—	150°
21.8				
8	11:41	273	IN/~~OUT~~	2293 z IN
21.5				
9				
18.5		60 ~~IN~~	OUT	
10		50 ~~OUT~~	IN	2640 OUT
23				

Ambient Temp. 75°F

(11:45) IN 22932 OUT

AIR VELOCITY DATA SHEET

PLANT: FMC
DATE: 4/6/00
LOCATION: Mixed Fred Building
RUN NO: 2

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1	12:38	20	OUT	
2	12:45	50	OUT	
3	12:48	60	OUT	> 4050
4	12:50	20	OUT	
5	12:52	30	OUT	
22"				
6	12:59	35	OUT/IN	2500
22				
7	13:02	35-50		VAR.
21.8				
8	12:56	340	IN	28560
21.5				
9				
18.5	> 12:58	50	OUT	
10		80	OUT/IN	18,480
22.8		80	OUT	

Breaker Tripped sometime between noon and 12:30, all samplers not running except No. 7 (BKG)

Power restored 12:50

Power off @ 13:10 restored 13:13

(12:50) OUT 25,330 IN 28,560

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/6/00
LOCATION: Mixed Feed Building
RUN NO: 2

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1		~~2050~~	OUT	
22				
2		90	OUT	
27				
3	13:54	75	OUT	) 2475
22				
4	13:51	20	OUT	
22				
5	13:48	20	OUT	
22				
6	13:48	15	OUT/IN	1200
23				
7		150-400		VAR. East + SE
21.5				
8		245	OUT IN	20580
21.2				
9				
18.8				
10	13:54	70	OUT	
		70	OUT/IN	18,480
		70	OUT	

(13:53)

IN 20580

OUT 22155

CHAIN OF CUSTODY RECORD

Project Number _____

Project Name IMC New Wales Facility

Sample Location : Mulberry, FL
Mixed Feed Building

Sample Identification	Remarks
#1	Sampler #1 Imp. Catch Inc.
2	#2
3	#3
4A, 4B, 4C	#4A, 4B + 4C
5	#5
6	#6
7	#7
8	#8
9	#9
10	#10
Blank DI H_2O + Filter	Blanks

Sampled By: (Signature) _____ Date: 6/6/00 Time: See DATASHEETS

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) _____ Date: _____ Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) _____ Date: _____ Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By Lab: (Sign) _____ Date: _____ Time: _____

Sample Shipped VIA: _____ UPS _____ Fed Express _____ Bus

Shipping Bill Number: _____

KOLMAR & ASSOCIATES

RUN NO. 3

COMPANY: IMC-Agrico
LOCATION: NEW WALES
PLANT: MIXED FEED
DATE: 04/07/00
RUN: THREE

FLUORIDE ANALYSIS

PERFORMED BY: DAVID CARROLL

SAMPLE	TOTAL VOLUME	PPM	TOTAL MG. F
1	209	0.43	0.090
2	197	0.6	0.118
3	205	0.59	0.121
4.A.	199	0.46	0.092
4.B.			0.000
4.C.			0.000
5	197	0.43	0.085
6	176	0.31	0.055
7	176	0.094	0.017
8	194	0.15	0.029
9	195	0.13	0.025
10	197	0.14	0.028
DI BLANK		0.027	

Total mg. values not corrected for Blank.

Analysis performed in accordance with method 13B.

Equipment: Expandable ionanalyzer EA 920 with fluoride electrode.

Sampler Data Sheet

Plant : IMC New Wales

Date : 4/7/2000

Location : Mixed Feed Building

Run No. 3

Baro. 30.24

Sampler No.	Start Time	Inital Vac. (In. Hg.)	Inital Flow (l/m)	Inital L.C. (l/m)	Inital L.C. Vac. (In. Hg.)	End Time	Final Vac. (In. Hg.)	Final Flow (l/m)	Final L.C. (l/m)	Final L.C. Vac. (l/m)
1	08:00	21.5	0.99	0.0	23.0	17:18	21.5	0.98	0.0	23.0
2		21.5	0.92	0.0	23.0		22.0	0.88	0.0	23.0
3		22.0	0.92	0.0	23.5		22.0	0.90	0.0	23.5
4		22.0	0.94	0.0	24.0		22.5	0.95	0.0	24.0
5		22.0	0.89	0.0	24.0		22.0	0.88	0.0	24.0
6		22.5	0.89	0.0	24.0		22.5	0.91	0.02	24.4
7	08:00	22.0	0.80	0.0	23.0	17:14	22.0	0.80	0.02	23.1
8	08:04	21.5	0.98	0.0	23.0	17:18	22.0	0.96	0.0	23.0
9		19.0	0.89	0.02	20.5		19.0	0.88	0.02	20.2
10		21.5	1.00	0.0	24.0		22.5	0.98	0.0	24.5

Building 24 full

Wind from SE @ 125°

Background located 200' east of bldg.

Drop point Sampler #4, #3 closer at 08:30

Heavy particulate and ~~acid~~ -like smell at plant start-up, 08:

Material being loaded out by front-end loader.

Plant went down at 10:04 SAMPLERS shut off at 10:12

Resumed sampling at 12:18

Run #3

Time Steps

	43.5	8:04
		8:47.5
84.5	~~132.5~~	10:12
50.0	~~182.0~~	11:00 ●
		12:18 } Samples ~~66~~
	71.5	13:08
		14:19.5
	73.5	15:33
	105.0	17:18

Total ~~554.0~~ min
428.0 min

Sample
Start 8:04

End 17:18

554.0 min

17
−8 :9(60) = 540
+ 14
554

9.17

SAMPLER DATA SHEET

PLANT: IMC New
DATE: 4/7/2000
LOCATION: Mixed Feed Bin/Dryer
RUN NO: 3 Final

Sample Volume WALOS (Liquid)

SAMPLER	MOISTURE ~~GAIN~~	Rinse	TOTAL VOLUME
1	103	106	209
2	108	89	197
3	110	95	205
4	106	93	199
5	106	91	197
6	104	72	176
7	101	75	176
8	101	93	194
	99	96	195
9	~~99~~	~~98~~	~~197~~
10	99	98	197

AIR VELOCITY DATA SHEET

PLANT: TNS
DATE: 4/7/00
LOCATION: Mixed Feed Bldg.
RUN NO: 3

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1		30	OUT	
22				
2	08:19	30	OUT	
22.5				
3	08:15	30	OUT	45°
21.5				
4	08:12	30	OUT	
22.5				
5	08:08	30	OUT	
22.5				
6	08:21	30	OUT/IN	240°
22.5				
7	08:24	540		135°
21.5				
8	08:18	~~280~~	IN/OUT	235°
21.5				
9	08:15	~~45~~	IN/out	
18.5		~~15~~	IN/out	
10		~~30~~	OUT/IN	
22.5				
	Loader	Door	varies	as does

location #6

Start
8:09 (9)
8:13 (69)
9:22 (196)
12:38 (66)
13:38 (83)
15:01 (64)
16:01 (73)
17:19
END

8:13

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/10/00
LOCATION: Mixed Feed Bldg.
RUN NO: 3

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1	09:15	~~30~~	OUT	
22				
2	09:18	30	OUT	
22				2700
3	09:22	20	OUT	
22				
4	09:25	20	OUT	
22.5				
5	09:28	20	OUT	
22.5				
6	09:28	10	OUT	800
23				
7	09:32	575		VAR 135°-175°
22.8				
8	09:25	-260	IN	21840
21.5				
9				
23.5				
10	09:23	~~50~~	OUT/IN	9680
22.8		~~40~~	OUT/IN	
		-40	OUT/IN	

09:22

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/7/00
LOCATION: Mixed Feed Building
RUN NO: 3

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1	12:24	80.	OUT	
21.5				
2	12:41	60	OUT	
20.2				
3	12:37	75	OUT	5962.5
22				
4	12:34	50	OUT	
22.5				
5	12:30	50	OUT	
22.5				
6	12:13	10	OUT	500
7		50		East
21.8				
8	12:40	300	IN	32680
21.5				
9	12:34	30	OUT	
14.4		30	OUT	
10	↓	40	OUT	8800
22.5		240		
	12:35	450	IN	
		225	IN	
	↓	150	IN	
	Air Swirling around louver door.			

12:38

AIR VELOCITY DATA SHEET

PLANT: ~~IMC~~
DATE: 4/7/00
LOCATION: Mixed Feed Bldg.
RUN NO: 3

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1	13:32	60	OUT	
21.5				
2	13:35	~~30~~	OUT	
22				
3	13:39	60	OUT	7650
22				
4	13:42	30	OUT	~~2450~~
22				
5	13:45	120	OUT	
22				
6	13:44	30	OUT	2450
22.8				
7	13:40	475	IN	South
21.8				
8	13:41	+230	~~OUT~~	19320
21.5				
9	13:37	40	OUT	
18.8		+50		13200
10		90		
~~22.6~~				

13:38 OUT 23250

IN 19320

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/7/00
LOCATION: Mixed Feed Bldg.
RUN NO: 3

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1	1504	120	OUT	
21.5				
2	15:04	+150	OUT	
22.4				
3	15:00	20	OUT	10,800
23				
4	14:57	90	OUT	
22.5				
5	14:54	100	OUT	
22.5				
6	14:05	25	OUT	2000
22				
7	15:08	500		SE
21.5				
8	15:03	+270	IN	22680
21.5				
9		60	OUT	
19	14:59	60		11,800
10		45	↓	
22.5		+45		

15:01 OUT
24600

IN
22680

AIR VELOCITY DATA SHEET

PLANT: IMC
DATE: 4/7/00
LOCATION: Mixed Feed Bldg.
RUN NO: 3

SAMPLER	TIME	VELOCITY (FT/MIN)	DIRECTION (IN OR OUT)	APPROACH ANGLE (DEGREES)
1	15:59	20	out	
2	16:01	50	out	
3	16:05	50	OUT	7470
4	16:08	50	OUT	
5	16:11	750	OUT	
6	16:11	600	OUT	4800
7	16:11	500-700		South
8	16:01	+320		IN 26880
9	16:04	~~40~~	OUT	
10		~~40~~ 70		8800
		+33		

IN 26880 OUT 21870

CHAIN OF CUSTODY RECORD

Project Number

Project Name: Inc New Wells

Sample Location: Milberry, FL
Mixed Feed Bldg.

Sample Identification	Remarks
S # 1 INC	Sampler # 1 Inc New Wells
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
Blank	DI + Filter Blank

Sampled By: (Signature) [signature] Date: 4/7/00 Time: See DATA SHEETS

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) David Cook Date: 4/7/00 Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By: (Sign) _____ Date: _____ Time: _____

Relinquished By: (Sign) _____ Date: _____ Time: _____

Received By Lab: (Sign) _____ Date: _____ Time: _____

Sample Shipped VIA: _____ UPS _____ Fed Express _____ Bus

Shipping Bill Number: _____

PLANT OPERATING DATA

Mixed feed operations during test					
	gal acid	tons soda ash	ton rock		
4/5/00					
16:10	215380	12785	111682		
9:15	199301	12757	111298		
totals	16079	28	384		
hours	1.63	specific gravity		tons	ton/hr
6.916667	109.1595	28	384	521.1595	75.34837
4/6/00					
14:30	248594	12856	112464		
10:00	236851	12831	112189		
9:00	43.01	5.49	60.02	recorded as gpm and	
8:00	43	5.5	60	tph for 2 hours	
totals	16903.6	35.99	395.02		
hours	1.63	specific gravity		tons	ton/hr
6.5	114.7577	35.99	395.02	545.7677	83.96426
4/7/00					
17:12	265077	12893	112857		
12:10	start again				
9:45	down				
8:00	248594	12857	112464		
totals	16483	36	393		
hours	1.63	specific gravity		tons	ton/hr
6.783333	111.9023	36	393	540.9023	79.73989
the specific gravity of the acid was 1.63-1.645 for the days					

Mixed Data Sheet for Building Test

Date: 4/5/00 Operator: J. NEWKOOP

Time	Totalizer Readings		
	Acid gpm	Soda Ash TPH	Rock TPH
0915	199301	12757	111298
1000	201417	12760	111350
1100	202905	12763	111385
1200	205528	12767	111446
1300	207420	12770	111491
1400	210111	12776	111556
1500	212074	12780	111604
1600	214776	12784	111667
1610	215380	12785	111682

Mixed Data Sheet for Building Test

Date: 4-6-00 Operator: LUCAS

Time	Totalizer Readings		
	Acid ~~gpm~~ gal	Soda Ash ~~TPH~~ Ton	Rock ~~TPH~~ Ton
~~0800~~ Did not run CDT	~~43.00~~	~~5.50~~	~~60.00~~
~~0900~~	~~43.04~~	~~5.49~~	~~60.02~~
10:00	236851	12831	112189
11:00	240270	12839	112269
12:00	243331	12843	112318
13:00	244862	12848	112376
14:00	247343	12854	112435
14:30	248594	12856	112464

totalizer

Mixed Data Sheet for Building Test

Date: 4-7-2000 Operator: B. Watson

Time	Totalizer Readings			
	Acid ~~gpm~~ gal	Soda Ash ~~TPH~~ Ton	Rock ~~TPH~~ Ton	
08:00	248594	12857	112464	
09:10	251559	12864	112536	
~~10:00~~ 9:45	DOWN			
11:00	— DOWN		—	
12:06	— DOWN		—	
12:10	252697	12866	112566	
~~13:00~~ 13:20	255975	12872	112642	- DOWN 7 min CHANGING TOS
~~14:00~~ 14:08	257300	12876	112676	
15:00	259447	12881	112725	
16:00	262016	12887	112786	
17:12	265077	12893	112857	FINISH

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

KOOGLER & ASSOCIATES

John B. Koogler, Ph.D., P.E.	Project Advisor
Stephen S. Bell	Field Test Crew
Glen A. Haven	Field Test Crew

IMC-AGRICO

C. D. Turley

KOOGLER & ASSOCIATES
ENVIRONMENTAL SERVICES