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KA 124-97-03

August 11, 1998

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AIR REGULATION

Mr. John Reynolds
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: IMC-Agrico Company (New Wales)
Multifos Plant Production Increase
DEP File No. 1050059-024-AC, PSD-FL-244

Dear Mr. Reynolds:

We would like to thank both you and Al Linero for meeting with us last week to discuss IMC-Agrico's concerns regarding the draft permit for the above project. We truly appreciate your willingness to consider the issues of concern to us and to work with us to resolve them in an expeditious manner.

Our comments on the draft permit are provided below. Most of the comments are inter-related and correspond to just a few key issues.

TECHNICAL EVALUATION & PRELIMINARY DETERMINATION

1. Page 2 of 13, Section IIA, Paragraph 2:

A scrubber will not be required for the mixed feed storage building given the minimal amount of fluorides present in the building. Additional information on this process is provided in Attachment 1, along with references and test data.

2. Page 2 of 13, Section IIA, Paragraph 2:

Only one caustic scrubber, for the new kiln, will be required for the proposed project. No changes are proposed to the existing kilns.

3. Page 3 of 13, Paragraph 1:

IMC-Agrico requests that installation of a new stack be provided for in the permit, as an alternative to ducting the third kiln to the existing stack. A new stack for the third kiln may be necessary if back-pressure becomes an issue.

Please note that a separate stack is not required for compliance testing purposes as it will be possible to test the new kiln by sampling in the duct leading to the main stack, if required. The existing system can be tested by sampling prior to the point at which the new duct connects to the main stack.

4. Pages 3 and 4 of 13:

We do not feel that such an extensive explanation for the completeness date for the project is necessary.

5. Page 4 of 13, Paragraph 2:

The chemical reactions associated with the mixed feed process do not require curing during storage. The material is, however, kept in storage for a period of time to allow for a reduction in the excess moisture.

6. Page 4 of 13, Paragraph 3 (table):

Based on recent nitrogen oxides emissions measurements, it seems that the proposed project will trigger PSD review for NOx. The recent measurements indicate a tentative limit of 15 pounds per hour (66 tpy), to be refined upon completion of construction.

7. Page 5 of 13, Paragraph 1 (table):

The table should not include the existing kilns A and B and their associated scrubbers and baghouses as they are not part

of the proposed modification. A discussion on the proposed modification is provided in Attachment 2.

8. Page 5 of 13, Paragraph 3:

The emission increases associated with SO2 are expected to be less than the PSD threshold, given that the existing kilns are not being modified. We agree that the proposed project should be subject to PSD review for NOx.

9. Page 6 of 13, Paragraph 2:

The 1981 permitted production increase was accommodated with corresponding emission decreases within the plant (see Attachment 3). There was no change in the production rate of 25 tph in 1995, simply a correction in the corresponding raw material input rate referenced in the operation permit. A copy of the corresponding construction permit, issued in 1981, is presented in Attachment 3.

10. Page 7 of 13, Paragraph 2:

It should be noted that the application was prepared based on information available on total fluoride emissions as no information is available on hydrogen fluoride. We agree with the Department's opinion that the proposed project is not major for HAPs.

11. Page 7 of 13, Last Paragraph:

The proposed project is not subject to PSD for SO2. The modeling was conducted merely to determine if the predicted SO2 impacts were significant, given FDEP's concern about SO2 in the SW area of Florida. Please note that the ISC3 modeling was updated to reflect the option of an alternate new stack for the new kiln. The results indicate lower predicted SO2 impacts from the proposed project if a separate stack is used. The modeling results are summarized in Attachment 4. A disk, containing the modeling output, is enclosed.

12. Page 13 of 13, Conclusion:

We do not object to providing FDEP with information on the new kiln design (when available), however, we do not feel that the kiln design requires FDEP approval.

We understand and prefer that the TEPD not be revised based on our comments. Changes are requested to the conditions of the final permit and BACT.

PERMIT CONDITIONS

13. Reference to Permit Number:

The permit number, in the header from page 3 onward, needs to be corrected.

14. Facility Description:

Please note that 55 tph corresponds to the maximum material input rate to the kilns.

15. Page 4 of 8, List of Emission Units:

As previously discussed, please remove EU Nos. 032, 033, 034, 035 and 038 from the list of affected units, as they are not part of the proposed modification.

16. Page 4 of 8, Specific Condition 2:

Please remove existing kilns A and B and their associated scrubbers and baghouses from the table, as they are not part of the proposed modification. Also, we suggest a NOx emission limit of 15 pounds per hour for the new kiln, based on measurements on the existing kilns (see Attachment 5). It may be appropriate to set a final NOx limit based on testing of the new kiln, upon completion of construction.

17. Page 4 of 8, Specific Condition 3:

Based on conversations with design and process staff, the maximum mixed feed preparation plant rate should reflect 100 tph. Compliance testing will be conducted at 90-100 percent of the allowable operating rate.

18. Page 4 of 8, Specific Condition 4:

The rates tabulated by FDEP are representative only of material input to the kilns, as the raw material rates vary depending on moisture, etc. The tabulated rates are appropriate, however, it is requested that the preceding wording reflect that these are kiln input rates.

19. Page 5 of 8, Specific Condition 6:

As discussed during our meeting, it is requested that the condition be re-worded to reflect that the pollution control system for kiln C shall be designed for 99.9+% fluorides removal and that testing will not required to determine the system efficiency. Also, kilns A and B should not be included in this condition.

20. Page 5 and 6 of 8, Specific Conditions 7, 8 and 9:

As discussed during our meeting, the emissions limits set by FDEP will be met by IMC-Agrico. Consequently, these three conditions should be deleted. We do not object to a condition which prohibits the release of the caustic scrubber water to the existing process pond water to ensure that the captured SO2 and F will not be liberated to the atmosphere.

21. Page 7 of 8, Specific Condition 11:

It is requested that the higher operation period be for 30 days to allow for the 15-day prior testing notification, required by rule. This would be consistent with similar conditions for many facilities' Title V permit provisions.

22. Page 7 of 8, Specific Condition 14:

It is requested that the permit allow the use of both fuels for cost leveraging and operational flexibility purposes. It should be noted that the emissions limits, FDEP's primary concern, will be met in either case. Also, it is requested that reference to kilns A and B be removed as they are not part of the proposed modification.

BACT DETERMINATION

23. Page BD-1, Paragraph 1:

The 30 and 55 tph values correspond to kiln input rates. Also, the last sentence should read "avoid" or "escape" PSD review, not circumvent. The former is specifically allowed by rule while the latter is prohibited.

24. Page BD-1, Paragraph 2:

The stated production rates are actually kiln feed rates. Also, the AP-42 NOx emissions factor is based on fuel so the annual NOx emissions are dependent upon fuel use, not tons of material processed. Regardless, the NOx emissions from the proposed project will be subject to PSD review based on recent measurements on the existing kilns (see Attachment 5).

25. Pages BD-1 and BD-2:

As explained to FDEP, the two existing kilns will not be modified or debottlenecked (see Attachment 2). Therefore, they are not subject to PSD review. Consequently, the calculations of net emissions increase would be different. However, the issue is moot.

26. Page BD-5:

Fluorides are not expected to be emitted in any significant quantity from the mixed feed operation or storage building,

unlike TSP, due to differences in the material composition and reaction. Additional information on the mixed feed operation is presented in Attachment 1. Also included are results of measurements conducted in the storage building which reflect extremely low fluoride concentrations.

Please note that the pug mill will be vented to the existing equipment scrubber primarily for control of particulates, as is the case for the existing feed preparation operation.

27. Page BD-6:

We agree with the Department that BACT for NOx emissions should focus on combustion controls. Presently, the kiln exit measurements reflect 1.5% oxygen level. These low excess air conditions effectively reduce the amount of NOx generated. Therefore, IMC-Agrico proposes the use of low excess air, (using cooler air as secondary combustion air) as BACT for NOx. A preliminary NOx limit of 15 pounds per hour would be acceptable with a provision to set the final limit after testing upon completion of construction.

28. Pages BD-7 to BD-10:

As discussed with FDEP during our meeting, we are not in complete agreement over the data used in calculating fluoride emissions and the corresponding scrubber efficiencies. However, no further discussion is warranted as the issue is moot. Based on the commitment made during our meeting, the air pollution control system will be designed for 99.9+% removal of fluorides and 98% removal of SO2, using a combination of the crossflow pond water scrubber and the caustic scrubber; and, the respective emission limits will be met (see Attachment 6). We do not object to a condition which prohibits the release of the caustic scrubber water to the existing process pond water to ensure that the captured SO2 and F will not be liberated to the atmosphere. This approach allows the disposal or beneficial use of the stream without compromising FDEP's intent.

29. Pages BD-12 to BD-14:

The BACT determination should not apply to the existing kilns A and B and their associated scrubbers and baghouses, as previously discussed.

We appreciate the opportunity to submit the above comments. It is our understanding that FDEP will review these comments and then finalize the permit and BACT, as appropriate. As you are aware, the request of extension of time expires around the conclusion of the 30-day public notice period. Consequently, we would appreciate your prompt feedback on any issue where additional information is required.

If you have any questions, or feel that a follow up meeting is required to resolve any issues, please call Pradeep Raval or me.

Very truly yours,

KOOGLER & ASSOCIATES

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

par
encl.

c: C. Dave Turley, IMC-Agrico

cc: C. Holladay, BAR
SWD
Polk Co.
EPA
NPS

ATTACHMENT 1

A. PROCESS INFORMATION
B. TEST DATA
C. REFERENCE INFORMATION

A. PROCESS INFORMATION

MULTIFOS MIXED FEED vs. TRIPLE SUPER PHOSPHATE BLENDING AND STORAGE OPERATION

The FDEP evaluation compared the mixed feed process to the triple super phosphate process, assuming that there is fluoride generation in the storage area. However, the two processes are very different because of the proportions of acid to rock and the presence of soda ash (a strong base) in the mixed feed process.

The triple super phosphate process uses 2.5 tons of P_2O_5 from acid for each ton of P_2O_5 from the rock. This contrasts with the mixed feed process which uses only 0.42 tons of P_2O_5 from acid for each ton of P_2O_5 from the rock. Additionally, in the mixed feed process, 0.85 tons of soda ash is used for each ton of P_2O_5 from phosphoric acid. This works out to be about 1.14 moles of Na_2O for each mole of acid P_2O_5. The soda ash is enough to form monosodium phosphate with all of the phosphoric acid present, and then form some disodium phosphate, which is alkaline and has a solution pH of 9.1 (Merck Index). Samples of mixed feed have been measured to have a pH of 6.5 immediately after mixing, while GTSP samples have been measured to have a pH of 3.1.

In summary, the neutral pH of the mixed feed prevents the fluorapetite from being dissolved by the acid, which is the reaction that occurs in TSP storage that generates fluorides. Consequently, fluorides are not generated in the mixed feed storage area, as there is practically no ongoing reaction involving the rock. Results of fluoride measurements in the storage area are attached.

The mixed feed, however, is allowed to dry over a period of a couple of days to reduce the moisture content. The fuel consumption can be reduced by reducing the amount of moisture in the feed material.

B. TEST DATA

Run 1 Calculations and Results

Facility: New Wales
Plant: Multifos Mixed Feed Storage Building
Company ID: 0
FDEP AIRS & Pt. ID: 0
Test Team: DC/ML

Date: 7/31/98 mm/dd/yy
Start Time: 840 End Time: 1040

Standard Meter Volume Vms: 70.91 dscf

Emission Calculations

Fluoride Total mg: 0.15 mg
0.0021 mg/dscf
0.0869 ambient ppm Dry Basis
0.00276 lb/hr at 10000 cfm

Ambient Data

	Start	1 Hour	End	Avg
At Sample Level				
Dry Bulb	93	95	98	
Wet Bulb	85	85	88	
Relative Humidity	72	66	67	68
At Floor				
Dry Bulb	87	88	90	
Wet Bulb	81	81	81	
Relative Humidity	76	74	68	73
At Bay Door				
Dry Bulb	85	87	92	
Wet Bulb	80	85	82	
Relative Humidity	81	92	65	79

Sample Collection Site Description

The catwalk above the warehouse at the mid point of the warehouse.
Material to the west of the sample point was 1-3 days old.
Material was entering the building east of the sample point.
Kiln feed was being removed directly below the sample point

Run 1 Data

Facility: New Wales
Plant: Multifos Mixed Feed Storage Building
Company ID: 0
FDEP AIRS & Pt. ID: 0
Test Team: DC/ML

Date: 7/31/98 mm/dd/yy
Start Time: 840 End Time: 1040

Number of Traverse Points: 1
Dwell Time/Point: 60 min.
Total Test Time: 60 min.

Stack Diameter: 0 inches
Stack Area: 0.00 sq. ft.

Molecular Weight Dry Md: 28.969
Volume of Water Vapor Condensed: 56 ml
Weight of Water Collected in Silica Gel: 17.3 gram
Moisture Volume Fraction Bwo: 0.0464
Moisture Volume Saturated Bwo: 0.0556
Moisture Percent Saturation: 83
Moisture Used for Calculations: 0.0464
Stack Molecular Weight Ms: 28.460

Barometric Pressure Pb: 30.16 in Hg
Stack Static Pressure Pv: 0.00 in H2O
Stack Pressure Ps: 30.160 in Hg
Average Meter Delta H: 2.000 in H2O
Meter Pressure Pm: 30.307 in Hg
Console Number: 3187
Meter Delta Ha: 1.754
Meter Correction Factor: 0.9730

Average Meter Temperature: 98.7 deg. F
Average Stack Temperature: 95.3 deg. F 35.2 deg C

Average Square Root Delta P: 0.316
Meter Volume Vm: 76.15 cu. ft.
Probe Length/Liner: 0
Cp: 0.84
Nozzle Ident.: 0
Nozzle Diameter Dn: 0 in.
Impinger Set Number: 0
Average Computer K: 30.0000

IMC-Agrico Company

Data Page

Facility New Wales — Date: 7/31/98

Plant Multifos Mixed Feed Storage Building — Run 1

Impinger Set Number: 0

Impinger Number:	1	2	3	4
Final (grams/mls):	146	110	0	342.5
Initial (grams/mls):	100	100	0	325.2

Filter Set Number: 0

Filter Analysis		Probe Wash Analysis	
Filter Number:		Beaker Number:	
Final Weight		Final Weight:	
Initial Weight:		Initial Weight:	

Fluoride

Probe Wash Fluoride ppm: _____ Volume ml: _____ pH _____

Impinger Fluoride ppm: 0.4 Volume ml: 370 pH 4.98

Laboratory Results

Probe Wash Fluoride mg: 0.00

Impinger Fluoride mg: 0.15

Run 1 **Data Sheet**

Facility: New Wales
Plant: Multifos Mixed Feed Storage Building — Company ID:
Team (CB/PR): DC/ML — FDEP AIRS & Pt. ID:

Date	7/31/98		Meter Box Number	3187	
Dwell Time	60	min.	Meter Delta Ha (in. H2O)	1.754	Pitot Check
Traverse Points	1		Meter Correction Factor	0.973	pos in H2O
Stack Diameter		inches	Nozzle Ident.:		neg in H2O
Est % Saturation	90	%	Nozzle Diameter Dn:		Leak Check
Stack Static Pressure		in H2O	Impinger Set Number:		cfm 0.000 cfm
Barometric Pressure	30.16	in Hg	Probe length/Liner:		vac 5 in Hg
Dry Molecular Weight	28.969		Filter Set Number		

Time Start: 840

Point	Time	Meter Volume	Delta P	Calc'd Delta H	Actual Delta H	Stack Temp	Probe Temp	Hot Box Temp.	Meter In Temp	Meter Out Temp	Impinger Temp	Pump Vac
1	0.0	163.066	0.1	2.000	2	93			84	84		
2	52.3	.205	0.1	2.000	2	95			112	93		
3	120.0	239.218	0.1	2.000	2	98			118	101		
End				Average		95.3			98.7		#DIV/0!	
			0.1	Max			0	0			0	0
				Min			0	0			0	
				Range			223-273	223-273			32-68	

Time End: 1040

Pitot Check		Min Value
pos		0.1 in H2O
neg		0.1 in H2O
Leak Check		
cfm		<0.020 cfm
vac		0 in Hg

IMC-Agrico Company

Moisture Data Sheet
Method 13B

Facility New Wales Date: 7/31/98

Plant Multifos Mixed Feed Storage Building Run 1

Impinger Set Number:		0		
Impinger Number:	1	2	3	4
Final (grams/mls):	146	110	0	342.5
Initial (grams/mls):	100	100	0	325.2
Difference (grams/mls):	46	10	0	17.3
Total Moisture Collected:			56 mls	17.3 gram

Fluoride

Laboratory mg 0.15

IMC-Agrico Company

Particulate and Moisture Data Sheet
Method 5

Facility New Wales Date: 7/31/98

Plant Multifos Mixed Feed Storage Building Run 1

Impinger Set Number:		0		
Impinger Number:	1	2	3	4
Final (grams/mls):	146	110	0	342.5
Initial (grams/mls):	100	100	0	325.2
Difference (grams/mls):	46	10	0	17.3
Total Moisture Collected:			56 mls	17.3 gram

Filter Set Number: 0

Filter Analysis		Probe Wash Analysis	
Filter Number:	0	Beaker Number:	0
Final Weight	0.0000	Final Weight:	0.0000
Initial Weight:	0.0000	Initial Weight:	0.0000
Difference:	0.0000	Difference:	0.0000

Particulate Calculations

Particulate

Probe Wash Particulate mg	0.0
Filter Particulate mg:	0.0
Total Particulate mg:	0.0

IMC-Agrico Company

Particulate and Moisture Data Sheet
Method 5 & 13B Combined

Facility New Wales Date : 7/31/98

Plant Multifos Mixed Feed Storage Building Run 1

Impinger Set Number: 0

Impinger Number:	1	2	3	4
Final (grams/mls):	146	110	0	342.5
Initial (grams/mls):	100	100	0	325.2
Difference (grams/mls):	46	10	0	17.3
Total Moisture Collected:			56 mls	17.3 gram

Filter Set Number: 0

Filter Analysis		Probe Wash Analysis	
Filter Number:	0	Beaker Number:	0
Final Weight	0.0000	Final Weight:	0.0000
Initial Weight:	0.0000	Initial Weight:	0.0000
Difference:	0.0000	Difference:	0.0000

Fluoride and Particulate Calculations

Fluoride

Probe Wash Fluoride mg	0.00
Impinger Fluoride mg:	0.15
Total Fluoride mg:	0.15

Particulate

Probe Wash Particulate mg	0.0
Filter Particulate mg:	0.0
Total Particulate mg:	0.0

C. Reference Information

FCI

FERTILIZER TECHNICAL DATA BOOK

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uct is dried & screened & the fines are recycled to the granulation unit.

Run-of-Pile Triple Superphosphate Manufacture

Nongranular superphosphate is commonly produced by continuous den processes followed by a storage curing period of up to 1 month during which chemical reactions are completed. Dens that are suitable for single superphosphate (SSP) are often also suitable for TSP. The main difference is that TSP sets more rapidly than SSP, thus the den retention time can be much shorter. If the retention time is too long, the TSP may become so hard that disintergration is difficult. Depending on the reactivity of the rock and other factors, denning times of 5-20 minutes are suitable for TSP as compared with 30 minutes to 2 hours for SSP.

After storage curing, the TSP usually is reclaimed with a power shovel and disintegrated in a cage mill to pass a 6-mesh screen. Sometimes blasting is necessary to loosen the pile of TSP before reclaiming. The disintegrated TSP may be used for making compound fertilizer by granulation processes, or it may be granulated for direct application.

For mixing of acid & rock many plants use the old TVA cone-mixer which has low mixing efficiency. FCI has designed & built continuous high speed mixers with extraordinary mixing of solids & liquid attaining highest homogeneity of material. The mixed product discharges to a belt conveyor where its retention time is in the range of 5-10 minutes. From there it is conveyed to the storage for final curing.

Cured run-of-pile TSP, 3-6 weeks old, is removed from storage and fed to a screen. The oversize is milled and recycled; the fine material is conveyed to a pugmill or rotary-drum granulator. Water is sprayed onto the bed of material, and steam is sparged underneath the bed to provide wet granular material. The wet granules are discharged to a rotary dryer. The dried granules are screened. The oversize is milled and returned with the fines to the granulator. Dust and fumes from the dryer are scrubbed in a water scrubber.

Effect of Grade & P_2O_5: CaO Ratio of Rock on Proportions of Rock & Phosphoric Acid & on Grade of TSP

Wt. ratio P_2O_5:CaO in rock	%P_2O_5 in product from rock	%P_2O_5 in product from acid	Tons/ton of product P_2O_5 rock	Tons/ton of product P_2O_5 acid	%P_2O_5 rock	%P_2O_5 product
0.588	24.0	76.0	0.73	1.40	33	47.0
0.666	27.0	73.0	0.82	1.35	33	46.1
0.740	30.2	69.8	0.92	1.29	33	45.2
0.666	27.0	73.0	0.96	1.35	28	43.0

Phosphoric acid 54% P_2O_5

Requirements per short ton of granulor TSP made from run-of-pile and other data

Rock (72 BPL), ton	0.43
Acid (54% P_2O_5), ton	0.61
Steam (25 psig minimum), lbs.	147
Fuel, Btu.	570,000
Electricity, KWH	26

DEFLUORINATED PHOSPHATE ROCK

Most of the phosphorus in phosphate rock is present as fluorapatite, $Ca_{10}(PO_4)_6F_2$, a compound so stable that its phosphours cannot be utilized readily by plants or animals. Methods for the processing of phosphate rocks into animal feed supplement are designed to break up the fluorapatite structure so that the phosphorus-fluorine combination is disrupted & the phosphorus appears in a compound in which it is readily available to animal. The nutrient value of defluorinated phosphate rock, 18% P & 32% Ca(min.), is related more or less directly to the 2% citric acid solubility of the P_2O_5.

In defluorinating phosphate rock a mixture of ground phosphate rock 72-75 BPL (80% - 200 mesh), wet phosphoric acid (50-54% P_2O_5) & sodium hydroxide (50%) or sodium carbonate is granulated in a pugmill & is introduced directly into a rotary kiln. However, it is preferable to dry the moist granules in a dryer & subsequently screened to uniform size. Due to structural strength & uniform size, these granules exhibit excellent flow characteristics as they progress through a kiln & are particularly suitable for use in a fluidized bed reactor. Rocks with high Al_2O_3 (over 2%) must be avoided. Aluminum has great affinity for fluorine, therefore, it retards defluorination.

The factors influencing the defluorination of the mixture are; type of calciner, calcination time & temperature, particle size, the intemacy of contact between the particles & gaseous atmosphere, particle porosity, gas velocity & water vapor atmosphere. In general the retention period of the mixture in a rotary kiln is between about 90 to 120 minutes, & in a fluidized bed reactor is between about 60 to 90 minutes.

Recommended formula for producing defluorated phosphate rock, in presence of water vapor, with high availability & P:F ratio over 100 is;

$$\frac{\text{Mols } CaO+Na_2O-3P_2O_5}{\text{Mols } SiO_2} < 1.1 \text{ (preferable between 0.4 to 0.8)}$$

Also, the compounds added to the rock should be proportioned so that the;

Na_2O/acid P_2O_5 is between 0.5-0.8

Acid P_2O_5 to the mix is 7-12% of the dry mix

Total Na_2O added to the mix is 0.3-0.7 mol per mol P_2O_5 in the rock

The SiO_2 content of the dry mix is about 2-6%

REACTION

The simplest possible mechanism of the chemical reaction involved in making defluorinated phosphate rock for animal feed supplement from the raw materials; rock, phosphoric acid & sodium hydroxide or sodium carbonate are shown below:

(1) $3Ca_3(PO_4)_2.CaF_2+H^+ \longrightarrow 3Ca_3(PO_4)_2+CaF_2$

(2) $CaF_2+H_2O \longrightarrow Ca(OH)_2+2HF$

(3) $3Ca(OH)_2+2H_3PO_4 \longrightarrow Ca_3(PO_4)_2+3H_2O$

(4) $2NaOH \longrightarrow Na_2O+H_2O$

(5) $3Ca_3(PO_4)_2+Na_2O+H_2O \longrightarrow Ca_9(PO_4)_6.(NaOH)_2$

Sodium Hydroxyapatite

From the above reactions it is evident that defluorination takes place in accordance with reactions No. (1) and (2). The factors involved in the defluorination of phosphate rock are:

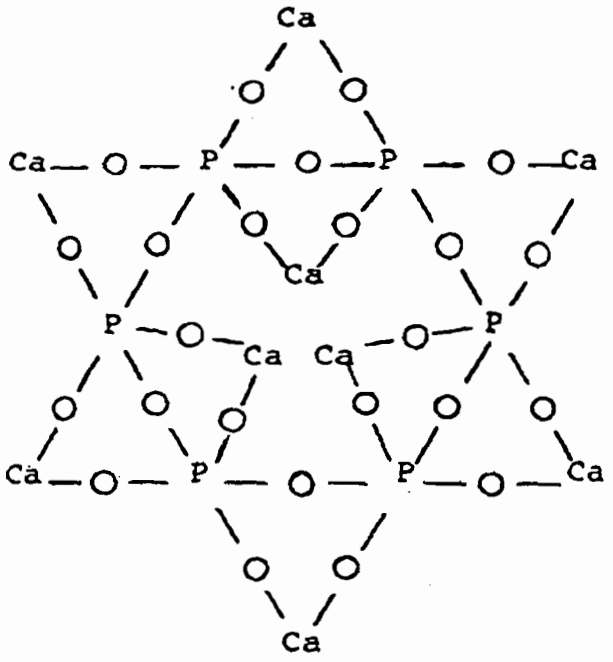
a) Break-up of crystal lattice of the apatite by H^+

b) Exposure of material to stream of hot gases in presence of H_2O, for about 1-2 hours at 2300°F to 2700°F.

c) Particle size & particle porosity.

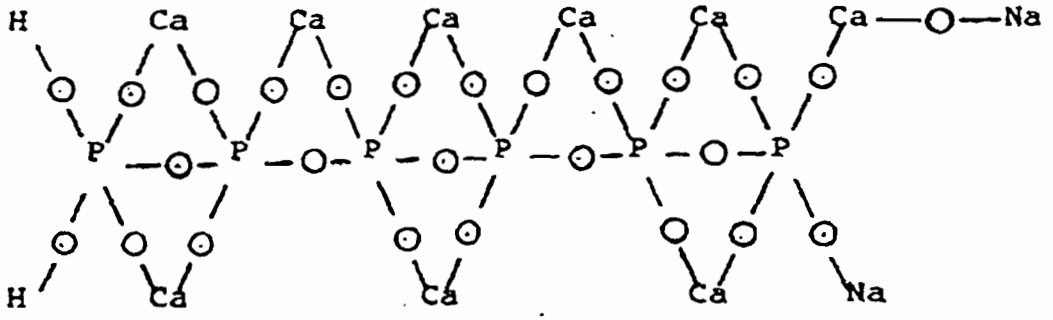
STRUCTURAL FORMULAS

a- Tricalcium phosphate $3Ca_3(PO_4)_2$



Ca/P = 1.935 wt. ratio
%P = 20.0
%Ca = 38.7

b- Sodium hydroxyapatite $Ca_9(PO_4)_6(NaOH)_2$



Ca/P = 1.935 wt. ratio
%P = 18.4
%Ca = 35.6
$\%Na_2O$ = 6.1

RECOMMENDED RAW MATERIAL PER TON PRODUCT

1- 1835 lbs. of 72 BPL rock (80%-200 mesh)

2- 393 lbs. of 52% P_2O_5 acid

3- 335 lbs. of 50% sodium hydroxide or 222 lbs of sodium carbonate. 40% P_2O_5 acid should be used when sodium carbonate is added.

Mol. ratio Calculation for rock having 32.90% P_2O_5, 48.00% CaO & 6.30% SiO_2;

$$CaO \quad 1835\frac{0.48}{56} = 15.73 \text{ mols}$$

$$P_2O_5 \quad 1835\frac{0.329}{142} + 393\frac{0.52}{142} = 5.69 \text{ mols}$$

$$Na_2O \quad 335\frac{0.5}{2x40} = 2.09 \text{ mols}$$

$$SiO_2 \quad 1835\frac{0.063}{60} = 1.93 \text{ mols}$$

$$\text{mol, ratio} = \frac{15.73+2.09-3x5.69}{1.93} = 0.39$$

PRODUCT ANALYSIS

P 18.0%, Ca 32% (min.), Na_2O 7% & Sio_2 2%

PROCESS

Defluorinated phosphate rock plant is comprised of three separate sections;

a) Feed preparation (Fig. 1)
b) Defluorionation - Fluid bed (Fig. 2) or kiln (Fig. 3)
c) Product sizing (Fig. 4)

ATTACHMENT 2

MODIFICATION DETERMINATION

As explained to FDEP, the two existing kilns will not be modified or debottlenecked. The existing mixed feed operation is capable of supplying much more material than the existing kilns can process. This surge capacity, accomodated by the storage area, is necessary to allow equipment maintenance and repair in the mixed feed operation, unlike the kilns which operate continuously. There is a definite process disconnect at storage as the material sits for a couple of days to dry. There are separate conveyors and hoppers for each kiln and these supply the kilns continuously with material from storage, for independent kiln operation. Currently, the kilns themselves are the production bottleneck. It should be noted that because the two existing kilns are not being modified, the current bottleneck will remain.

The proposed pugmill will also be operated intermittently, capable of material supply to storage well beyond the kiln capacities. This aspect of the operation will allow for the same maintenance and repair requirements. The existing kilns are not being modified and will be operated no differently as a result of the proposed project. IMC-Agrico is not opposed to recordkeeping of the material processing rates in order to document this fact. Therefore, the existing kilns are not part of the proposed modification.

This assessment is supported by guidance in mid-1980s from Wayne Aronson of EPA to Clair Fancy, Bill Thomas and Pradeep Raval, of FDEP, to exclude independent process units from modification considerations when the associated units have existing federally enforceable operation caps. While the guidance was not in the form of a letter or memorandum, this approach is logical, practical and allows for a common sense approach to PSD applicability determinations of site modifications. We are not aware of any change in EPA position on this issue.

For example, adding molten sulfur storage tanks for increased surge capacity to an existing sulfuric acid plant would not trigger PSD for the sulfuric acid plant as it would be capable of independent operation and have existing federally enforceable operation caps.

Also, in the case of a power plant with four existing coal fired units producing 1000 MW which adds an additional unit to increase site capacity to 1250 MW, the modification would address the additional unit and the

changes to the existing coal handling operation, not all five units at the site. This is because the existing four units would be capable of independent operation and have existing federally enforceable operation caps.

ATTACHMENT 3

AVAILABLE FDEP CORRESPONDENCE
ON PAST MULTIFOS PERMITTING ACTIONS

A. COPY OF PERMIT AC53-40084
B. PERMIT MODIFICATION IN 1981
C. COPY OF PERMIT AC53-267287

7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610

ITEM A.

BOB GRAHAM
GOVERNOR
~~XXXXXXXXXX~~
SECRETARY
Vicki Tschinkel
WILLIAM K. HENNESSEY
DISTRICT MANAGER

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHWEST DISTRICT

Polk County AP

Mr. T. H. Traylor, V.P. & Gen. Mgr.
International Minerals & Chemical Corp.
P.O. Box 1035
Mulberry, Fla. 33860

Dear Mr. Traylor:

Enclosed is Permit Number AC53-40084 dated May 18, 1981, to construct the subject air pollution source issued pursuant to Section 403, Florida Statutes.

Should you object to this permit, including any and all of the conditions contained therein, you may file an appropriate petition for administrative hearing. This petition must be filed within fourteen (14) days of the receipt of this letter. Further, the petition must conform to the requirements of Section 28-5.201, Florida Administrative Code, (see reverse side of this letter). The petition must be filed with the Office of General Counsel, Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32301.

If no petition is filed within the prescribed time, you will be deemed to have accepted this permit and waived your right to request an administrative hearing on this matter.

Acceptance of the permit constitutes notice and agreement that the Department will periodically review this permit for compliance, including site inspections where applicable, and may initiate enforcement action for violation of the conditions and requirements thereof.

Sincerely,

W.K. Hennessey
District Manager

cc: Record Center
C.A. Pflaum, P.E.

Enclosure

RULES OF THE ADMINISTRATION COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

PART II
FORMAL PROCEEDINGS

28-5.201 Initiation of Formal Proceedings.

(1) Initiation of formal proceedings shall be made by petition to the agency responsible for rendering final agency action. The term petition as used herein includes any application or other document which expresses a request for formal proceedings. Each petition should be printed, typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double-spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners, and an explanation of how his/her substantial interests will be affected by the agency determination;

(c) A statement of when and how petitioner received notice of the agency decision or intent to render a decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief;

(f) A demand for relief to which the petitioner deems himself entitled; and

(g) Other information which the petitioner contends is material.

****

A petition may be denied if the petitioner does not state adequately a material factual allegation, such as a substantial interest in the agency determination, or if the petition is untimely. (Section 28-5.201(3)(a), FAC)

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHWEST DISTRICT
7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610

APPLICANT:

International Minerals & Chemical Corp.
P.O. Box 1035
Mulberry, Fla. 33860

PERMIT/CERTIFICATION NO. AC53-40084

COUNTY: Polk

PROJECT: Multiphos Scrubbers

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code. The above named applicant, hereinafter called Permittee, is hereby authorized to perform the work or operate the facility shown on the approved drawing(s), plans, documents, and specifications attached hereto and made a part hereof and specifically described as follows:

For the construction/modification of the multifos kilns and dryer scrubbers to increase production from 14 TPH to 25 TPH with resulting offsets to DAP plant #1 and the GTSP storage scrubber to allow for particulate emission increase.

Located at Hwy 640, at Hillsborough/Polk County Line, Polk County.

UTM: 17-396.7E and 3079.4N

Replaces Permit NO: AO53-16903 NEDS NO: 0059 Point ID: 36

Expires: May 1, 1982

PERMIT NO.: AC53-40084
APPLICANT: International Minerals & Chemical Corp.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions:, and as such are binding upon the permittee and enforceable pursuant to the authority of Section 403.161(1), Florida Statutes. Permittee is hereby placed on notice that the department will review this permit periodically and may initiate court action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations indicated in the attached drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit shall constitute grounds for revocation and enforcement action by the department.

3. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

4. As provided in subsection 403.087(6), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. This permit is required to be posted in a conspicuous location at the work site or source during the entire period of construction or operation.

6. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Section 403.111, F.S.

7. In the case of an operation permit, permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

8. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant, or aquatic life or property and penalities therefore caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, except where specifically authorized by an order from the department granting a variance or exception from department rules or state statutes.

9. This permit is not transferable. Upon sale or legal transfer of the property or facility covered by this permit, the permittee shall notify the department within thirty (30) days. The new owner must apply for a permit transfer within thirty (30) days. The permittee shall be liable for any non-compliance of the permitted source until the transferee applies for and receives a transfer of permit.

10. The permittee, by acceptance of this permit, specifically agrees to allow access to permitted source at reasonable times by department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this permit and department rules.

11. This permit does not indicate a waiver of or approval of any other department permit that may be required for other aspects of the total project.

12. This permit conveys no title to land or water, nor constitutes state recognition or acknowledgement of title, and does not constitute authority for the reclamation of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

13. This permit also constitutes:

[ ] Determination of Best Available Control Technology (BACT)
[ ] Determination of Prevention of Significant Deterioration (PSD)
[ ] Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)

PERMIT NO.: AC53-40084
APPLICANT: International Minerals & Chemical Corp.

SPECIFIC CONDITIONS:

1. Construction of this installation shall be completed by 2/28/82. Application for Permit to Operate to be submitted by 3/30/82. (Chapter 17-4.07(7), F.A.C.)

2. This construction permit expires on 05/01/82 following an initial period of operation for appropriate testing to determine compliance with the Rules of the Florida Dept. of Environmental Regulation Commission. (Chapter 17-4.07(7), F.A.C.)

3. All applicable rules of the Department including design discharge limitations specified in the application shall be adhered to. The permit holder may also need to comply with county, municipal, federal, or other state regulations prior to construction. (Chapter 17-4.07(1), F.A.C.)

4. Test for particulates and fluorides at an input production rate of 30 TPH, raw materials per Chapter 17-2, F.A.C. At this maximum process rate, the limit of particulate emissions will be 29.83 lbs/hr and fluoride emissions not to exceed 4.2 lbs/hr (NSPS standard of 0.37 #/ton P_2O_5).

PERMIT NO.: AC53-40084
APPLICANT: International Minerals & Chemical Corp.

Expiration Date: May 1, 1982

Issued this 18th day of May, 19 81.

_____ Pages Attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Signature

W.K. Hennessey
District Manager

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

SOUTHWEST DISTRICT
7601 HIGHWAY 301 NORTH
TAMPA, FLORIDA 33610

ITEM B.

BOB GRAHAM
GOVERNOR
[redacted]
SECRETARY
ki Tschinkel
WILLIAM K. HENNESSEY
DISTRICT MANAGER

May 18, 1981

Mr. T. H. Traylor, V.P. & Gen. Mgr.
International Minerals & Chemical Corp.
P.O. Box 1035
Mulberry, Fla. 33860

Dear Mr. Traylor:

Modification of Conditions
Permit No. AO53-36916

We are in receipt of your request for a modification of the permit conditions. The conditions are changed as follows:

Condition	From	To
No. 4	particulates 36.3 lbs/hr	28.6 lbs/hr

Add: "This change is part of the required offset necessitated by the increase in production of the multifos plant."

This letter must be attached to your permit and becomes a part of that permit.

Sincerely,

for Robert R. Garrett
Air Engineer

RRG/rkt

DER Form 17-1.122(59)

Department of Environmental Protection

ITEM C.

Lawton Chiles
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

PERMITTEE:
IMC-Agrico Company
New Wales Operation
P.O. Box 2000
Mulberry, Florida 33860

PERMIT/PROJECT:
Permit: AC53-267287
County: Polk
Expiration Date: 06/01/97
Project: Multifos Product ion Plant: Dryer, Blending and Storage Operation, Kiln 'A' & Kiln 'B'

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rules 62-200 through 297 and 62-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans and other documents, attached hereto or on file with the Department and made a part hereof and specifically described as follows:

This permit is issued for a portion of the Multifos Production Plant consisting of a phosphate rock dryer, a blending operation, and two defluorination kilns designated as Kiln 'A' (North), and Kiln 'B' (South). Emissions from the dryer, the blending operation and the kilns are controlled by three separate Teller packed bed scrubbers connected to a common stack.

The dryer has the capability of processing 35 tons per hour of wet phosphate rock and is fired at a maximum heat input rate of 12.5 MMBtu per hour with either natural gas or new, No. 6 or a better grade fuel oil. The dried phosphate rock is normally stored in a hopper prior to the blending operation.

The blending operation is a batch operation which combines the dried phosphate rock with soda ash and a phosphoric acid into a mixed feed which is then sent to the mixed feed storage building for a period of time in order to age.

From storage, the mixed feed is transferred to the common kiln feed conveyor at a maximum rate of 11.35 tons per hour 100% P_2O_5 (approximately 30 tons per hour mixed feed rate). Each kiln is capable of being fired at a maximum heat input rate of 56 MMBtu per hour by either natural gas, on-specification used oil from on-site sources, only, or new, No. 6 or a better grade fuel oil.

Emissions from both the dryer and the batch blending operation are controlled by the same scrubber. Emissions from each kiln are controlled by a separate scrubber.

Location: New Wales Operations, Highway 640 and County Line Road South of Mulberry

UTM: 17-396.7 km East 3078.9 km North
NEDS No: 0059
Point ID: 36
Facility ID: 40TPA530059

Replaces Permit: AC53-40084 and AC53-5132
Modifies Permit: AO53-206083

SPECIFIC CONDITIONS:

1. A part of this permit is the attached GENERAL CONDITIONS.

2. Issuance of this permit does not relieve the permittee from complying with applicable emission limiting standards or other requirements of Chapters 62-2 through 62-297, F.A.C. or any other requirements under federal, state or local law. [Rule 62-200.300, F.A.C.]

EMISSION LIMITATIONS

3. The particulate matter emission rate from the stack common to the Multifos Production Plant dryer, batch blending operation, kiln 'A' and kiln 'B' scrubbers shall not exceed 29.83 pounds per hour. This particulate matter emission rate limitation qualifies the facility for the PM-RACT exemption per Rule 62-296.700(2)(b), F.A.C. [Permit AC53-40084, Rules 62-296.310(1) and 62-296.700(2)(b), F.A.C.]

4. The fluoride emission rate from the stack common to the Multifos Production Plant dryer, batch blending operation, kiln 'A' and kiln 'B' scrubbers shall not exceed 4.2 pounds per hour as fluorides (water soluble or gaseous atomic weight 19). At a total, combined input rate to the kilns of less than 11.35 tons per hour 100% P_2O_5 (approximately 30 tons per hour mixed feed rate), the maximum allowable fluoride emission rate is 0.37 pounds per ton 100% P_2O_5 input. [Permit AC53-40084 and Rule 62-296.403(1)(h), F.A.C.]

5. Visible emissions shall not be equal to or greater than 20% opacity. [Rule 62-296.310(2)(a), F.A.C.]

SPECIFIC CONDITIONS: (Continued)

OPERATION LIMITATIONS

6. The fuels burned shall be limited to those shown below:

A. Dryer
   i. natural gas; or
   ii. new, No. 6 fuel oil, or better grade fuel oil.(1)

B. Kilns
   i. natural gas; or
   ii. on-specification used oil(2) (generated on-site, only, see Specific Condition No. 7); or
   iii. new, No. 6 fuel oil, or better grade fuel oil.(1)

[Permit AO53-206083 and request by KOOGLER & ASSOCIATES, March 14, 1995]

7. The used oil (generated on-site, only) to be fired in the kilns shall meet the following on-specification used oil requirements:

Constituent/Property	Allowable
Cadmium	2 ppm maximum
Arsenic	5 ppm maximum
Chromium	10 ppm maximum
Lead	100 ppm maximum
Total Halogens	1000 ppm maximum *
Polychlorinated Byphenyls(PCB's)	50 ppm maximum
Flash Point	100 °F minimum

* Used oil containing more than 1000 ppm and up to a maximum of 4000 ppm total halogens can be burned only if the permittee can show that the used oil does not contain any halogenated hazardous wastes.

[Federal Specifications contained in 40 CFR 266.40].

8. Each batch of used oil collected for use as fuel shall be sampled and analyzed for all of the constituents/properties listed in Specific Condition No. 7 using EPA/DEP or ASTM approved methods. Split samples of the used oil shall be retained for 3 months after the analysis for further testing if necessary. The results of each analysis shall be retained for at least 5 years and made available to the Department of Environmental Protection upon request. If used oil is being fired during the stack test then results of the most recent batch analysis shall be submitted along with the test report. [Rule 62-4.070(3), F.A.C. and AO53-127484]

9. The sources covered by this permit are allowed to operate continuously (8760 hours per year). [Permit AC53-5132]

SPECIFIC CONDITIONS: (Continued)

10. The total, combined input rate to the kilns shall not exceed 11.35 tons per hour 100% P_2O_5 (approximately 30 tons per hour mixed feed rate). [Based on 4.2 pounds per hour maximum fluoride emission rate, permit AC53-40084]

TESTING AND COMPLIANCE REQUIREMENTS

11. Test the stack common to the Multifos Production Plant dryer, batch blending operation, kiln 'A' and kiln 'B' scrubbers, annually, for particulate matter emissions, fluoride emissions and visible emissions. The due date for the annual test will be set by the operation permit for this emission unit. [Rules 62-297.340(1)(a), and 62-297.570(3), F.A.C. and request by KOOGLER & ASSOCIATES, March 14, 1995]

12. Compliance with the emission limitations of Specific Condition Nos. 3, 4, and 5 shall be determined using EPA Methods 1, 2, 3, 4, 5, 9, and 13A or 13B as contained in 40 CFR 60, Appendix A and adopted by reference in Chapter 62-297, F.A.C. The minimum requirements for stack sampling facilities, source sampling and reporting, shall be in accordance with Chapter 62-297, F.A.C. and 40 CFR 60, Appendix A.

13. The visible emissions test shall be conducted by a certified observer and be a minimum of 60 minutes in duration. The test observation period shall include the period during which the highest opacity emissions can reasonably be expected to occur. A visible emissions test shall be conducted during the same testing period as the particulate matter test and the fluoride emission test. [Rules 62-297.330(1)(b), and 62-4.070, F.A.C.]

14. Testing of emissions should be accomplished while simultaneously operating within 90% - 100% of each of the following:

(1) the maximum total, combined input rate to the kilns of 11.35 tons per hour 100% P_2O_5 (approximately 30 tons per hour mixed feed rate).
(2) the maximum heat input rate to the dryer of 12.5 million Btu per hour.
(3) the maximum heat input rate for each of the kilns of 56.0 million Btu per hour.

(Specific Condition No. 14, Continued on Next Page)

SPECIFIC CONDITIONS: (Continued)

14. (Continued)

If it is not practical to test at the maximum rates in (1), (2) or (3), above, then the source may be tested at less than the maximum rates. In this case, subsequent source operation is then limited to 110 percent of the test rate(s) until a new test is conducted. Once the source is so limited, then operation at a higher rate is only allowed for no more than 15 consecutive days for the purpose of additional compliance testing in order to regain a maximum permitted rate in this permit. Acceptance of a test by the Department of Environmental Protection will automatically amend this permit to the new rate(s), plus 10%, but shall not exceed the maximum rates in (1) through (3), above. Failure to submit the actual rates, the type of fuel burned, or operating under conditions during testing which are not representative of normal operating conditions, may invalidate the test. [Rules 62-297.340 and 62-4.070(3), F.A.C.]

15. Compliance testing shall be conducted while firing oil, if oil of any type (new, fuel oil, or on-specification used oil), has been used in the rock dryer and/or the kilns for a sum total of more than 400 hours from the previous test. If a test is conducted while firing natural gas, and in the 12 month period following the test, oil of any type is burned for a sum total of more than 400 hours, then an additional visible emission test per Specific Condition No. 5 shall be conducted, while burning oil in that source, within 30 days of having exceeded the 400 hour oil burning limit. A compliance test submitted using a better grade of oil, than No. 6 grade, will automatically amend the operation permit to only allow subsequent operation on only that better grade oil or a higher ranked oil.
[Rules 62-297.340(2), and 62-4.070(3), F.A.C.]

NOTIFICATION REQUIREMENTS

16. In case of excess emissions resulting from a malfunction, IMC-Agrico Company shall immediately notify the Air Compliance Section of the Southwest District Office of the Department of Environmental Protection in accordance with Rule 62-4.130, F.A.C. If requested, IMC-Agrico Company shall submit a full written report on the malfunction. [Rule 62-210.700, F.A.C.]

17. The permittee shall notify the Air Compliance Section of the Southwest District Office of the Department of Environmental Protection at least 15 days prior to the date on which each formal compliance test is to begin of the date, time, and place of each test, and the test contact person who will be responsible for coordinating the test. [Rule 62-2.700(2)(a)9., F.A.C.]

SPECIFIC CONDITIONS: (Continued)

RECORDKEEPING REQUIREMENTS

18. A record log(s) shall be established and maintained to document, at a minimum, the following:

(1) the quantity of the new, fuel oil and the on-specification used oil utilized in the dryer and the kilns.

(2) the sulfur content (percent, by weight) of the new, fuel oil and the on-specification used oil utilized in the dryer and the kilns.

The log(s) shall be updated, at a minimum, on a monthly basis and shall be retained at the facility for a minimum of 5 years. The log(s) shall be made available to the Department of Environmental Protection, upon request. [Permit AO53-206083 Amendment, 06/23/94 and Rules 62-4.070(3), and 62-213.440(b)2.b., F.A.C.]

OTHER REQUIREMENTS

19. Reasonable precautions shall be taken to prevent and control generation of unconfined emissions of particulate matter in accordance with the provision in Rule 62-296.310(3), F.A.C. These provisions are applicable to any source, including, but not limited to, vehicular movement, transportation of materials, construction, alterations, demolition or wrecking, or industrial related activities such as loading, unloading, storing and handling.

REPORTING REQUIREMENTS

20. Submit to the Southwest District Office, Air Compliance Section of the Department of Environmental Protection, each calendar year, on or before March 1, completed DEP Form 62-210.900(5), *Annual Operating Report for Air Pollutant Emitting Facility*, including the "Emissions Report", for the preceding year. Include in this report the total quantity of all fuels utilized, including a summary of the range of analysis values for each constituent/property referenced in Specific Condition Nos. 7 and 8. [Rule 62-210.370(3), F.A.C.]

SPECIFIC CONDITIONS: (Continued)

21. All tests reports shall be submitted to the Air Compliance Section of the Southwest District Office of the Department of Environmental Protection within 45 days of testing. Each report shall reference, at a minimum, the "Project", "Facility ID" and "Point ID". The following information, or equivalent, shall be included in each report submitted:

Project: Multifos Production Plant: Dryer, Blending and Storage Operations, and Kiln 'A' & Kiln 'B'

Facility ID: 40TPA530059
Point ID: 36

[Rules 62-297.570(2) and 62-4.070, F.A.C.]

PERMITTING REQUIREMENTS

22. IMC-Agrico Company is subject to the permitting requirements of Rule 62-213.400 and shall apply for a Title V operation permit by submitting a completed application, DEP Form 62-210.900(1), to the Air Permitting Section of the Southwest District Office of the Department of Environmental Protection by the appropriate date referenced in Rule 62-213.420(1)(a), F.A.C.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

for Richard D. Garrity, Ph.D.
Director of District Management
Southwest District

5imc287c.pmt(2)

SPECIFIC CONDITIONS: (Continued)

DEFINITIONS:

(1) Better Grade Fuel Oil

A better grade fuel oil is defined as a fuel oil with a higher ranking in the following list:

Better Grade (Top of list)

new, No. 2 fuel oil, or No. 2 on-specification fuel oil
new, No. 3 fuel oil, or No. 3 on-specification fuel oil
new, No. 4 fuel oil, or No. 4 on-specification fuel oil
new, No. 5 fuel oil, or No. 5 on-specification fuel oil
new, No. 6 fuel oil, or No. 6 on-specification fuel oil

(2) "On-Specification" Used Oil

"On-specification" used oil is defined as used oil that meets all of the requirements in Specific Condition Nos. 7 and 8 in this permit. Used oil that does not meet all the requirements of Specific Condition Nos. 7 and 8 in this permit is defined as "off-specification" used oil and shall not be burned.

ATTACHMENT 4

SUMMARY OF MODELING RESULTS USING
NEW STACK FOR NEW KILN

ALTERNATE AIR QUALITY MODELING PARAMETERS
MULTIFOS PLANT EXPANSION

IMC-AGRICO COMPANY (NEW WALES)
POLK COUNTY, FLORIDA

Stack	Pollutant	Emissions (g/s)	Ht (m)	Dia (m)	Vel (mps)	Temp (°K)
Kiln	PM	1.80	52.4	0.91	18.00	314
	SO2	1.10				
	NOx	1.90				
Cooler	PM	0.79	26.2	0.91	32.30	394
Screen & Mills	PM	0.23	27.44	0.46	34.45	327

NOTES:

(1) Proposed alternate parameters, with a new Kiln C stack.

SUMMARY OF SIGNIFICANT IMPACT ANALYSES
FOR PM/PM10, SO2 and NOx
USING ALTERNATE AIR QUALITY MODELING PARAMETERS

MET YEAR	MAX. PREDICTED AMBIENT AIR IMPACTS (ug/m3) (1)					
	PM10		SO2			NOx
	24-hr	Annual	3-hr	24-hr	Annual	Annual
CLASS I AREA IMPACTS						
1987	0.08	0.002	0.11	0.02	0.001	0.001
1988	0.07	0.003	0.10	0.02	0.001	0.002
1989	0.07	0.005	0.11	0.03	0.002	0.003
1990	0.06	0.002	0.12	0.02	0.001	0.001
1991	0.05	0.002	0.09	0.02	0.001	0.001
EPA SIG. (2)	0.3	0.2	1.0	0.2	0.1	0.01
SIGNIFICANT?	NO	NO	NO	NO	NO	NO
CLASS II AREA IMPACTS						
1987	6.5	0.54	11.0	3.1	0.22	0.38
1988	5.2	0.35	8.9	1.9	0.14	0.24
1989	7.3	0.54	11.2	2.9	0.17	0.30
1990	7.6	0.53	10.1	3.4	0.20	0.34
1991	6.8	0.51	11.2	2.7	0.21	0.36
EPA SIG.(2)	5	1	25	5	1	1
SIGNIFICANT?	YES	NO	NO	NO	NO	NO

NOTES:(1) The above impacts represent the highest-high impacts from the proposed project.

(2) Significant impact levels proposed by EPA.

(3) Above impacts predicted when using a new Kiln C stack.

SUMMARY OF REFINED MODELING ANALYSES
FOR PM10
USING ALTERNATE AIR QUALITY MODELING PARAMETERS

MET YEAR	MAX. PREDICTED AMBIENT AIR IMPACTS (ug/m3) (1) PM10 24-hr
FAAQS ANALYSIS	
1987	59.4
1988	41.4
1989	54.7
1990	73.5
1991	64.2
MAXIMUM w/Bkgd.	94.5
FAAQS	150
STD. EXCEEDED?	NO
CLASS II PSD INCREMENT ANALYSIS	
1987	25.1
1988	15.7
1989	24.9
1990	26.6
1991	26.3
INCREMENT	30
EXCEEDED?	NO

NOTES:
(1) The above impacts represent the highest-second high impacts.
(2) A background concentration of 21 ug/m3 for PM10 is included.
(3) Above impacts predicted when using a new Kiln C stack.

THIS DISK CONTAINS SULFUR DIOXIDE (SO2) AND PARTICULATE MATTER (PM10) AND OXIDES OF NITROGEN (NOX) MODELING FILES FOR THE IMC NEW WALES PHOSPHATES FACILITY IN NEW WALES FLORIDA. THE FOLLOWING FILES ARE IN SELF EXTRACTING ARCHIVE FORMAT.

C1ASI.EXE	102,796	08-10-98	CLASS 1 SIGNIFICANT IMPACT ANALYSIS (SIA)
C2ASI.EXE	499,592	08-10-98	CLASS 2 SIGNIFICANT IMPACT ANALYSIS
C2&FQS.EXE	157,854	08-10-98	CLASS 2 INCREMENT & AIR QUALITY STANDARD
DYRNG.EXE	25,390	08-10-98	DAYS & RECEPTORS OF SIGNIFICANT IMPACT
NW-DWNWH.EXE	21,491	01-08-98	BPIP BUILDING WAKE EFFECT

TO UNARCHIVE THESE FILES COPY THEM TO A HARD DISK DRIVE AND TYPE THE FILE NAME. FOR EXAMPLE TO UNARCHIVE THE CLASS 1 SIA ISCST3 OUTPUT FILES, TYPE "C1ASI" AND PRESS ENTER. THE FILES WILL AUTOMATICALLY UNARCHIVE TO THE HARD DISK DRIVE. THESE ARCHIVED FILES CONTAIN THE MODELING AND ANALYSIS FILES IN ASCII AND LOTUS FORMAT DESCRIBED AS FOLLOWS;

IN THE FILE C1ASI.EXE IS ISCST3 MODELING OF SIGNIFICANT IMPACT (SIA) FOR CHASSAHOWITZKA NWR PSD CLASS 1 AREA.

C1N87.OUT	29,532	08-07-98	NOX MODELING FOR 1987
C1N88.OUT	29,532	08-07-98	NOX MODELING FOR 1988
C1N89.OUT	29,532	08-07-98	NOX MODELING FOR 1989
C1N90.OUT	29,532	08-07-98	NOX MODELING FOR 1990
C1N91.OUT	29,532	08-07-98	NOX MODELING FOR 1991
C1P87.OUT	45,903	08-07-98	PM10 MODELING FOR 1987
C1P88.OUT	45,903	08-07-98	PM10 MODELING FOR 1988
C1P89.OUT	45,903	08-07-98	PM10 MODELING FOR 1989
C1P90.OUT	45,903	08-07-98	PM10 MODELING FOR 1990
C1P91.OUT	45,903	08-07-98	PM10 MODELING FOR 1991
C1S87.OUT	50,514	08-07-98	SO2 MODELING FOR 1987
C1S88.OUT	50,514	08-07-98	SO2 MODELING FOR 1988
C1S89.OUT	50,514	08-07-98	SO2 MODELING FOR 1989
C1S90.OUT	50,514	08-07-98	SO2 MODELING FOR 1990
C1S91.OUT	50,514	08-07-98	SO2 MODELING FOR 1991

IN THE FILE C2ASI.EXE IS ISCST3 MODELING OF SIGNIFICANT IMPACT ANALYSIS (SIA) FOR SIA OF CLASS 2 AREA:

C2N87_4.OUT	184,300	08-07-98	NOX MODELING FOR 1987
C2N88_4.OUT	184,300	08-07-98	NOX MODELING FOR 1988
C2N89_4.OUT	184,300	08-07-98	NOX MODELING FOR 1989
C2N90_4.OUT	184,300	08-07-98	NOX MODELING FOR 1990
C2N91_4.OUT	184,300	08-07-98	NOX MODELING FOR 1991
C2P87_4.OUT	302,991	08-07-98	PM10 MODELING FOR 1987
C2P88_4.OUT	302,991	08-07-98	PM10 MODELING FOR 1988
C2P89_4.OUT	302,991	08-07-98	PM10 MODELING FOR 1989
C2P90_4.OUT	302,991	08-07-98	PM10 MODELING FOR 1990
C2P91_4.OUT	302,991	08-07-98	PM10 MODELING FOR 1991
C2S87_4.OUT	409,002	08-07-98	SO2 MODELING FOR 1987
C2S88_4.OUT	409,002	08-07-98	SO2 MODELING FOR 1988
C2S89_4.OUT	409,002	08-07-98	SO2 MODELING FOR 1989
C2S90_4.OUT	409,002	08-07-98	SO2 MODELING FOR 1990
C2S91_4.OUT	409,002	08-07-98	SO2 MODELING FOR 1991

THERE ARE RECEPTORS AT 100 METER INTERVALS ALONG THE PROPERTY LINE, DISCRETE POLAR RECEPTORS FROM 1500 METERS TO 6000 METERS AND A POLAR RECEPTOR GRID AT 7000, 8000, 9000, 10,000, 12,000, 14,000, 16,000, 18,000 METERS.
POLAR RECEPTORS ARE CENTERED AT X=0 Y=0 THE LOCATION OF THE KILN STACK OR UTMS 396,803 METERS EAST, 3,079,435 METERS NORTH. NO SIGNIFICANCE WAS FOUND FOR THE PSD CLASS 1 RECEPTORS, HOWEVER, CLASS 2 SIA INDICATED THAT INCREMENT ANALYSIS WAS REQUIRED.

IN THE FILE C1ASI.EXE IS CLASS 2 AREA INCREMENT AND FLORIDA AMBIENT AIR QUALITY STANDARD (FAAQS) ANALYSIS FOR THE 24-HOUR PM10 STANDARD:

CLASS 2:

C2PP87.OUT	101,378	08-10-98	PM10 MODELING FOR 1987
C2PP88.OUT	96,575	08-10-98	PM10 MODELING FOR 1988
C2PP89.OUT	99,776	08-10-98	PM10 MODELING FOR 1989
C2PP90.OUT	100,443	08-10-98	PM10 MODELING FOR 1990
C2PP91.OUT	98,174	08-10-98	PM10 MODELING FOR 1991

FAAQS:

FQP87.OUT	126,359	08-10-98	PM10 MODELING FOR 1987
FQP88.OUT	121,556	08-10-98	PM10 MODELING FOR 1988
FQP89.OUT	124,757	08-10-98	PM10 MODELING FOR 1989
FQP90.OUT	125,558	08-10-98	PM10 MODELING FOR 1990
FQP91.OUT	123,423	08-10-98	PM10 MODELING FOR 1991

TO DETERMINE THE DAYS AND RECEPTORS OF SIGNIFICANCE, THE FOLLOWING FILES PROVIDED IN "DYRNG.EXE" WERE ANALYZED.

C2P87_4.PRN	3,635	08-10-98	HIGH 50 TABLE FOR 1987
C2P88_4.PRN	3,635	08-10-98	HIGH 50 TABLE FOR 1988
C2P89_4.PRN	3,635	08-10-98	HIGH 50 TABLE FOR 1989
C2P90_4.PRN	3,635	08-10-98	HIGH 50 TABLE FOR 1990
C2P91_4.PRN	3,635	08-10-98	HIGH 50 TABLE FOR 1991

DYRNG.WK1	13,760	08-10-98	SORT OF DAYS & RECEPTORS
REC&DYS1.PRN	7,122	08-10-98	FINAL INPUT TO MODEL

BUILDING INPUT PROFILE PROGRAM (BPIP) FILES ARE PROVIDED IN NW-DWNWH.EXE, THESE BUILDING DOWNWASH CALCULATIONS ARE USED IN ALL MODELING. THE FOLLOWING
BPIP FILES ARE PROVIDED:

IMC2BPI	INP	1,678	11-13-97	INPUT
IMC2BPI	OUT	4,867	11-13-97	OUTPUT
IMC2BPI	SUM	86,715	11-13-97	SUMMARY

AND:

READ	ME	5,326	08-10-98	THIS FILE

IF I MAY PROVIDE ADDITIONAL FILES, OR CLARIFICATION PLEASE CONTACT ME.

AUGUST 10, 1998
MARK KOLETZKE
KOOGLER AND ASSOCIATES
(352) 377-5822
KOOGLER@WORLDNET.ATT.NET

ATTACHMENT 5

SUMMARY OF NITROGEN OXIDES MEASUREMENTS
ON EXISTING KILN B

A. TESTING CONDUCTED MAY 1998
B. TESTING CONDUCTED AUGUST 1998

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

ITEM A.

May 19, 1998

Mr. John Upton
IMC-AGRICO COMPANY
New Wales Operations
P.O. Box 2000
Mulberry, Florida 33860-1100

Re: Multiphos Stack

Dear John:

The following are the results of the nitrogen oxides (NOx) test performed on the above referenced source on May 12, 1998.

Time	NOx PPM
1525 - 1555	22

Enclosed is a copy of the strip chart and the calibration gas certifications. If you need any additional information please let me know.

Very truly yours,

SOUTHERN ENVIRONMENTAL
SCIENCES, INC.

Mark S. Gierke
Environmental Specialist

MSG/bm

Enclosures

Kiln B optg down A

Location	New Wales Multifos Plant B Kiln Operating
Date	5/12/98
Time	1525-1555

TIME	TPH	NG. CFM
1500	12.5	815
1600	12.5	815

Traverse Delta P		Sqrt Delta P	Active Pt.
1	0.78	0.883176	1
2	0.88	0.938083	1
3	0.97	0.984886	1
4	1	1	1
5	1.1	1.048809	1
6	1.2	1.095445	1
7	0.92	0.959166	1
8	0.94	0.969536	1
9	1	1	1
10	1.05	1.024695	1
11	1.2	1.095445	1
12	1.2	1.095445	1
	Avg Sqrt delta P	1.007891	12

Dry Bulb Temp	102 (F)	562 (R)	38.88889 (C)
Wet Bulb Temp	89 (F)		
Wet / Dry Bulb Diff.	13		
Percent Relative Humidity	60 % from Charts		
Sat'd Vapor Pressure of Water	0.0686		
Moisture Iws			4.12 % H2O
Cross Section As	Pi * R ^ 2	Feet	Dia 54 / LxW 15.90 Square Feet
Velocity vs	2.435 * Sqrt delta P * Ts ^1/2		58.2 Feet/sec
Flowrate (ACFM) Qa	Stack Velocity * 60 * Cross Sectional area		55491 ACFM
Dry Standard Flowrate (DSCFM) Qs	31680 *(1-Bws)*vs*As/Ts(R)		49988 DSCFM
NOX ppm			22 ppm
Emissions	ppm Nox*1.912mgNOx/ppm dscm*.02832dscm/dscf *1lb/454000mg*60mni/hr*xxxdscfm		7.9 lb/hr

ITEM B.

I.M.C. NEW WALES

MULTIFOS TEST SUMMARY

AUGUST 3, 1998

CONDITION No.	PPM NOX	LB/HR NOX	STACK FLOW (DSCFM)	COMMENT
1	32.50	10.82	46455 *	BURNER AIR 3375 CFM
2	36.44	12.14	46455 *	RED. BURNER AIR 2250 CFM
3	33.38	11.12	46455 *	INC. COMB. AIR 2730 CFM
4	31.62	10.53	46455 *	INC. COMB. AIR 3220 CFM
5	28.70	9.56	46455 *	INC. COMB. AIR 3700 CFM
6	30.49	10.15	46455 *	INC. COMB. AIR 3800 CFM
7	30.79	10.25	46455 *	INC. COMB. AIR 3170 CFM
8	67.81	14.57	29971	A FAN OFF

* = AVERAGE OF FLOWS 1 & 2

LB/HR = (STACK GAS FLOW RATE) (PPM NOX) (.0000071688)

92909 46454.5 0

11:49:59	1.00	469.31	
11:50:59	0.97	467.44	
11:51:59	1.05	326.56	
11:52:59	1.08	18.56	
11:53:59	8.61	8.35	
11:54:59	19.17	4.17	
11:55:59	20.18	3.29	
11:56:59	20.44	2.86	
11:57:59	20.51	2.53	
11:58:59	20.55	1.87	
11:59:59	20.61	2.09	
12: 0:59	20.66	1.76	
12: 1:59	20.71	5.93	burner air at 3375 cfm
12: 2:59	18.65	30.42	<<< stack, flow 1 & 2
12: 3:59	17.48	33.49	Condition 1
12: 4:59	14.82	32.61	average = 32.50 ppm nox
12: 5:59	16.96	33.05	
12: 6:59	15.98	32.72	average = 16.89 % O2
12: 7:59	17.39	28.55	
12: 8:59	16.17	29.87	
12: 9:59	15.18	30.86	
12:10:59	17.21	31.73	
12:11:59	17.06	33.16	
12:12:59	17.22	32.61	
12:13:59	17.29	31.95	
12:14:59	17.31	33.49	
12:15:59	16.94	33.38	
12:16:59	16.94	35.69	
12:17:59	17.37	33.82	
12:18:59	17.39	33.05	
12:19:59	17.01	33.38	
12:20:59	17.44	33.05	
12:21:59	17.43	32.61	
12:22:59	17.44	33.27	
12:23:59	17.46	33.82	
12:24:59	16.91	32.39	
12:25:59	16.05	31.08	
12:26:59	17.51	32.50	<<< reduced burner air - 2250 cfm
12:27:59	17.50	32.17	
12:28:59	17.50	33.93	Condition 2
12:29:59	17.49	36.89	average = 36.44 ppm nox
12:30:59	17.50	39.31	
12:31:59	17.51	39.09	average = 17.42 % O2
12:32:59	16.50	35.69	
12:33:59	17.53	34.92	
12:34:59	17.53	34.15	
12:35:59	17.54	35.36	
12:36:59	17.52	37.44	
12:37:59	17.53	37.77	
12:38:59	17.56	35.91	
12:39:59	16.72	35.58	
12:40:59	17.60	38.65	

12:41:59	17.49	41.07
12:42:59	17.60	39.09
12:43:59	17.60	37.77 <<< inc. combuston air, 2730 cfm
12:44:59	17.61	34.92
12:45:59	17.61	32.94 Condition 3
12:46:59	15.50	32.17 average = 33.38 ppm nox
12:47:59	16.94	31.18
12:48:59	17.60	33.27 average = 17.05 % O2
12:49:59	16.46	31.40
12:50:59	17.24	31.18 <<< inc. combuston air, 3220 cfm
12:51:59	17.64	31.29
12:52:59	17.64	32.39 Condition 4
12:53:59	13.80	32.61 average = 31.62 ppm nox
12:54:59	17.62	31.95
12:55:59	17.64	32.39 average = 17.10 % O2
12:56:59	17.58	30.97
12:57:59	17.65	30.20
12:58:59	15.99	30.64 <<< inc. combuston air, 3700 cfm
12:59:59	17.41	29.65
13: 0:59	17.64	28.77 Condition 5
13: 1:59	17.67	28.66 average = 28.70 ppm nox
13: 2:59	16.90	28.66
13: 3:59	17.69	28.33 average = 17.28 % O2
13: 4:59	17.68	27.45
13: 5:59	17.01	28.22
13: 6:59	17.49	27.89
13: 7:59	17.69	27.67 <<< inc. combuston air, 3800 cfm
13: 8:59	17.68	28.44
13: 9:59	17.70	28.22 Condition 6
13:10:59	17.70	29.98 average = 30.49 ppm nox
13:11:59	17.72	30.09
13:12:59	17.71	30.42 average = 17.69 % O2
13:13:59	17.70	30.53
13:14:59	17.71	30.31
13:15:59	17.70	30.31
13:16:59	17.71	31.95
13:17:59	17.70	33.38
13:18:59	17.70	32.61
13:19:59	17.58	32.50
13:20:59	17.69	32.06 <<< inc. combuston air, 3170 cfm
13:21:59	17.69	31.18 @ 50 % DAMPER
13:22:59	17.71	29.65 Condition 7
13:23:59	17.19	28.22 average = 30.79 ppm nox
13:24:59	17.72	28.00
13:25:59	17.74	29.21 average = 17.62 % O2
13:26:59	17.75	28.88
13:27:59	17.18	29.32 average O2 for all 7 conditions
13:28:59	17.74	27.67 17.33 % O2
13:29:59	17.72	27.12
13:30:59	17.73	29.54
13:31:59	17.73	30.75
13:32:59	17.64	31.84

13:33:59	17.73	32.72	
13:34:59	17.75	32.61	
13:35:59	17.73	32.39	
13:36:59	17.73	32.83	
13:37:59	17.73	33.27	
13:38:59	17.77	33.27	
13:39:59	17.77	33.16	
13:40:59	17.74	32.94	
13:41:59	17.75	31.73	
13:42:59	17.55	35.03	
13:43:59	17.58	39.20	
13:44:59	17.33	40.74	
13:45:59	16.84	38.10	
13:46:59	17.70	37.44	
13:47:59	17.41	51.06	
13:48:59	16.22	63.14	<<< A fan off, flow 3
13:49:59	15.57	68.63	
13:50:59	15.53	72.14	Condition 8
13:51:59	15.52	72.25	average = 59.75 ppm nox
13:52:59	15.37	68.96	
13:53:59	15.16	65.11	average = 15.42
13:54:59	15.47	62.81	
13:55:59	15.49	61.93	
13:56:59	15.51	62.37	
13:57:59	15.54	62.26	
13:58:59	15.53	65.33	
13:59:59	15.52	68.41	
14: 0:59	15.49	83.12	
14: 1:59	14.76	84.22	
14: 2:59	15.51	69.84	
14: 3:59	15.54	63.47	
14: 4:59	15.55	63.25	
14: 5:59	15.54	63.25	<<< end of testing
14: 6:59	15.65	85.21	
14: 7:59	16.39	0.99	
14: 8:59	17.07	0.55	<<< zero air
14: 9:59	17.50	0.44	
14:10:59	17.81	122.65	
14:11:59	18.01	501.59	
14:12:59	18.16	502.25	<<< 483 ppm nox
14:13:59	18.36	502.47	
14:14:59	18.59	510.05	
14:15:59	18.74	901.18	
14:16:59	18.84	909.08	
14:17:59	18.93	908.31	<<< 898 ppm nox
14:18:59	18.99	907.10	
14:19:59	19.05	906.67	
14:20:59	19.12	201.71	
14:21:59	19.19	101.46	
14:22:59	19.24	492.92	
14:23:59	19.27	492.48	
14:24:59	19.36	492.70	<<< 483 ppm nox, leak check
14:25:59	19.53	492.92	
14:26:59	19.67	492.48	

Company: IMC, NEW WALES
Source: MULTIFOS, FLOW 1
A & B FANS ON

Location: NEW WALES, FL
Date: AUGUST 3, 1998

vs =	54.61 FT/SEC	As =	15.90 ft^2
Q =	52116 acfm -	not corrected	
Q(stnd) =	47046 dscfm -	both temperature and moisture corrected	
Q(moist)=	49452 dcfm -	only moisture corrected	
Q(temp) =	49785 scfm -	only temperature corrected	

Moisture

Vm(Std) =45.957685
Vw(Std) = 4.89528

Bws =0.096263 | Lower Bws
Bws @sat =0.055277 | Value used

Percent Moist =5.527700

Emission Rates:

CO =	0.00	lb/hr
NOx =	10.79	lb/hr as NO2
SO2 =	0.00	lb/hr
THC =	0.00	lb/hr as Propane

EQUATIONS :

As = (PI*(Stack Dia/12)^2)/4 --- Round Stacks

or

As = (Stack L/12)*(Stack W/12) --- Square Stacks

Md = (.44*%CO2)+(.32*%O2)+(.28*(100-(%CO2+%O2)))

Ms = (Md*(1-%Moist))+(18*%Moist)

P(stack) = Pb+(Ps/13.6)

vs = (85.49)*(0.85)*(Sqrt.Dp)*(Sqrt[(T(s)+460)/(Ms*P(stack))])

Q = vs * As * 60

Q(stnd) = Q*(1-%Moist)*(528/(Ts+460))*(P(stack)/29.92)

Vm (Stnd) = 17.6471 * Vm * Y * ((Pb+(dH/13.6))/(Tm+460))

Vw (Stnd) = 0.0471 * Vlc

Bws = (Vw(Stnd) / (Vm(Stnd)+ Vw(Stnd))

Bws @ Sat = Vap. Pressure of H2O @ Dew Point Temp/Ps

CO (lb/hr) = ((PPM CO)*Q(stnd)*28.01*60)/(385*10^6)

NOx (lb/hr) = ((PPM NOx)*Q(stnd)*46.006*60)/(385*10^6)

SO2 (lb/hr) = ((PPM SO2)*Q(stnd)*64.0648*60)/(385*10^6)

THC (lb/hr) = ((PPM THC)*Q(temp)*44.0965*60)/(385*10^6)

Company: IMC, NEW WALES
MULTIFOS, FLOW 1
A & B FANS ON

Sqrt.Dp= 0.9470

T(s)= 95.00

12

Location:NEW WALES, FL
Date: AUGUST 3, 1998

Filename:
QuickFLOW
[Alt-C]
to clear input
range

Data Point	Stack Velocity Head	Stack Gas Temp.
1	1.10	95
2	1.10	95
3	1.00	95
4	0.78	95
5	0.73	95
6	0.66	95
7	0.94	95
8	0.97	95
9	0.92	95
10	0.84	95
11	0.92	95
12	0.86	95
13	0.00	0
14	0.00	0
15	0.00	0
16	0.00	0
17	0.00	0
18	0.00	0
19	0.00	0
20	0.00	0
21	0.00	0
22	0.00	0
23	0.00	0
24	0.00	0
25	0.00	0
26	0.00	0
27	0.00	0
28	0.00	0
29	0.00	0
30	0.00	0
31	0.00	0
32	0.00	0
33	0.00	0
34	0.00	0
35	0.00	0
36	0.00	0

* O2 measured by KA O2 meter
CO2 calculated O2 - 20.9
moisture assumed saturation

Pb =	30.08	in Hg
Ps =	-0.5	in H2O
%O2 =	17.33	% *
%CO2 =	3.57	% *
%Moist =	5.50	% *
Stack Dia	54	in
or		
Stack L =		in
Stack W =		in
PPM CO =		ppm
PPM NOx =	32	ppm
PPM SO2 =	0	ppm
PPM THC =		ppm
Vm =	47.31	ft3
dH =	1.84	in H2O
Tm =	90	F
Y =	1.002	
Vlc =	104	ml

Company: IMC, NEW WALES
Source: MULTIFOS, FLOW 2
A & B FANS ON

Location:NEW WALES, FL
Date: AUGUST 3, 1998

```
    vs =     53.91 FT/SEC          As =    15.90 ft^2
     Q =     51443 acfm -  not corrected
Q(stnd) =    45863 dscfm - both temperature and moisture corrected
Q(moist)=    48555 dcfm -  only moisture corrected
Q(temp) =    48790 scfm -  only temperature corrected


                  Moisture
Vm(Std) =45.957685                  Bws =0.096263 |  Lower Bws
Vw(Std) =  4.89528                Bws @sat =0.062440 |  Value used
                                             ---------
                               Percent Moist =6.244001

Emission Rates:      CO =       0.00 lb/hr
                    NOx =      10.52 lb/hr as NO2
                    SO2 =       0.00 lb/hr
                    THC =       0.00 lb/hr as Propane
```

EQUATIONS :

As = (PI*(Stack Dia/12)^2)/4 --- Round Stacks
or
As = (Stack L/12)*(Stack W/12) --- Square Stacks

Md = (.44*%CO2)+(.32*%O2)+(.28*(100-(%CO2+%O2)))

Ms = (Md*(1-%Moist))+(18*%Moist)

P(stack) = Pb+(Ps/13.6)

vs = (85.49)*(0.85)*(Sqrt.Dp)*(Sqrt[(T(s)+460)/(Ms*P(stack))])

Q = vs * As * 60

Q(stnd) = Q*(1-%Moist)*(528/(Ts+460))*(P(stack)/29.92)

Vm (Stnd) = 17.6471 * Vm * Y * ((Pb+(dH/13.6))/(Tm+460))

Vw (Stnd) = 0.0471 * Vlc

Bws = (Vw(Stnd) / (Vm(Stnd)+ Vw(Stnd))

Bws @ Sat = Vap. Pressure of H2O @ Dew Point Temp/Ps

CO (lb/hr) = ((PPM CO)*Q(stnd)*28.01*60)/(385*10^6)

NOx (lb/hr) = ((PPM NOx)*Q(stnd)*46.006*60)/(385*10^6)

SO2 (lb/hr) = ((PPM SO2)*Q(stnd)*64.0648*60)/(385*10^6)

THC (lb/hr) = ((PPM THC)*Q(temp)*44.0965*60)/(385*10^6)

Company: IMC, NEW WALES
MULTIFOS, FLOW 2
A & B FANS ON

Sqrt.Dp= 0.9305

T(s)= 99.00

Location: NEW WALES, FL
Date: AUGUST 3, 1998

12

Filename:
QuickFLOW
[Alt-C]
to clear input
range

Data Point	Stack Velocity Head	Stack Gas Temp.
1	0.91	99
2	0.90	99
3	0.84	99
4	0.82	99
5	0.82	99
6	0.83	99
7	1.10	99
8	1.10	99
9	1.05	99
10	0.76	99
11	0.67	99
12	0.66	99
13	0.00	0
14	0.00	0
15	0.00	0
16	0.00	0
17	0.00	0
18	0.00	0
19	0.00	0
20	0.00	0
21	0.00	0
22	0.00	0
23	0.00	0
24	0.00	0
25	0.00	0
26	0.00	0
27	0.00	0
28	0.00	0
29	0.00	0
30	0.00	0
31	0.00	0
32	0.00	0
33	0.00	0
34	0.00	0
35	0.00	0
36	0.00	0

* O2 measured by KA O2 meter
CO2 calculated O2 - 20.9
moisture assumed saturation

Pb =	30.08	in Hg
Ps =	-0.5	in H2O
%O2 =	17.33	% *
%CO2 =	3.57	% *
%Moist =	6.00	% *
Stack Dia	54	in
or		
Stack L =		in
Stack W =		in
PPM CO =		ppm
PPM NOx =	32	ppm
PPM SO2 =	0	ppm
PPM THC =		ppm
Vm =	47.31	ft3
dH =	1.84	in H2O
Tm =	90	F
Y =	1.002	
Vlc =	104	ml

Company: IMC, NEW WALES Location:NEW WALES
Source: MULTIFOS, FLOW 3 Date: AUGUST 3,
A FAN OFF

vs = 35.21 FT/SEC As = 15.90 ft^2
Q = 33597 acfm - not corrected
Q(stnd) = 29971 dscfm - both temperature and moisture cor
Q(moist)= 31730 dcfm - only moisture corrected
Q(temp) = 31884 scfm - only temperature corrected

Moisture

Vm(Std) =45.957685 Bws =0.096263 | Lower
Vw(Std) = 4.89528 Bws @sat =0.062401 | Value

Percent Moist =6.240183

Emission Rates:
CO = 0.00 lb/hr
NOx = 13.75 lb/hr as NO2
SO2 = 0.00 lb/hr
THC = 0.00 lb/hr as Propane

EQUATIONS :

As = (PI*(Stack Dia/12)^2)/4 --- Round Stacks
or
As = (Stack L/12)*(Stack W/12) --- Square Stacks

Md = (.44*%CO2)+(.32*%O2)+(.28*(100-(%CO2+%O2)))

Ms = (Md*(1-%Moist))+(18*%Moist)

P(stack) = Pb+(Ps/13.6)

vs = (85.49)*(0.85)*(Sqrt.Dp)*(Sqrt[(T(s)+460)/(Ms*P(stack))

Q = vs * As * 60

Q(stnd) = Q*(1-%Moist)*(528/(Ts+460))*(P(stack)/29.92)

Vm (Stnd) = 17.6471 * Vm * Y * ((Pb+(dH/13.6))/(Tm+460))

Vw (Stnd) = 0.0471 * Vlc

Bws = (Vw(Stnd) / (Vm(Stnd)+ Vw(Stnd))

Bws @ Sat = Vap. Pressure of H2O @ Dew Point Temp/Ps

CO (lb/hr) = ((PPM CO)*Q(stnd)*28.01*60)/(385*10^6)

NOx (lb/hr) = ((PPM NOx)*Q(stnd)*46.006*60)/(385*10^6)

SO2 (lb/hr) = ((PPM SO2)*Q(stnd)*64.0648*60)/(385*10^6)

THC (lb/hr) = ((PPM THC)*Q(temp)*44.0965*60)/(385*10^6)

Company: IMC, NEW WALES
MULTIFOS, FLOW 3
A FAN OFF

Sqrt.Dp= 0.6102

T(s)= 99.00

12

Location:NEW WALES, FL
Date: AUGUST 3, 1998

Filename:
QuickFLOW
[Alt-C]
to clear input
range

Data Point	Stack Velocity Head	Stack Gas Temp.
1	0.37	99
2	0.38	99
3	0.39	99
4	0.4	99
5	0.35	99
6	0.34	99
7	0.36	99
8	0.37	99
9	0.38	99
10	0.38	99
11	0.37	99
12	0.38	99
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
29	0	0
30	0	0
31	0	0
32	0	0
33	0	0
34	0	0
35	0	0
36	0	0

* O2 measured by KA O2 meter
CO2 calculated O2 - 20.9
moisture assumed saturation

Pb =	30.08	in Hg
Ps =	-0.25	in H2O
%O2 =	15.42	% *
%CO2 =	5.48	% *
%Moist =	6.00	% *
Stack Dia	54	in
or		
Stack L =		in
Stack W =		in
PPM CO =		ppm
PPM NOx =	64	ppm
PPM SO2 =	0	ppm
PPM THC =		ppm
Vm =	47.31	ft3
dH =	1.84	in H2O
Tm =	90	F
Y =	1.002	
Vlc =	104	ml

ATTACHMENT 6

MANUFACTURER'S EMISSION GUARANTEES
FOR SULFUR DIOXIDE AND FLUORIDES

A. GUARANTEE ON FLUORIDES
B. GUARANTEE ON SULFUR DIOXIDE

D.R. TECHNOLOGY, INCORPORATED
POLLUTION CONTROL & ENERGY CONSERVATION
CONSULTING • DESIGN • ENGINEERING
73 SOUTH STREET, FREEHOLD, NEW JERSEY 07728
Telephone: 732-780-4664

ITEM A.

August 6, 1998

IMC-Agrico Company
New Wales Operations
P. O. Box 2000
Mulberry, Florida 33860-1100

Attn: Mr. Richard Harrison (P:941-428-2500 x6570/F:7191)

Subject: Performance Of SO_2 Scrubber On "Fluoride"
D. R. Technology Reference: 98771
IMC A8936214

Dear Richard:

As stated, you may have up to 2 lbs./Hr. of "Fluoride" in the 25,000 ACFM of gas as well as the anticipated SO_2.

Be advised that this unit as is will remove 95+% of entering HF

Please feel free to contact the undersigned with questions, or to discuss.

Very truly yours,
D. R. TECHNOLOGY, INC.

Richard A. Schwartz,
President

RAS:dk

cc: H & B Industrial Equipment Co. (Sales Representative)
P. O. Box 6246
4406 S. Florida Ave.
Suite 220
Lakeland, Florida 33807-6246
Attn: Luis Hernandez
P:941-647-5943/F:0010

B:77116178

D.R. TECHNOLOGY, INCORPORATED
POLLUTION CONTROL & ENERGY CONSERVATION
CONSULTING • DESIGN • ENGINEERING
73 SOUTH STREET, FREEHOLD, NEW JERSEY 07728

Telephone: 732-780-4664

August 11, 1998

IMC-Agrico Company
New Wales Operations
P. O. Box 2000
Mulberry, Florida 33860-1100

Attn: Mr. Richard Harrison (P:941-428-2500 x6570/F:7191)

Subject: Performance of SO_2 Scrubber
D. R. Technology Reference: 98771
IMC A8936214

Dear Mr. Harrison:

Per our conversation, we have reviewed the process requirements for 98% SO_2 removal.

Be advised that this unit with additional packing will remove 98% of the entering SO_2.

Please feel free to contact the undersigned with questions, or to discuss.

Very truly yours,
D. R. TECHNOLOGY, INC.

Richard A Schwartz /MCS
Richard A. Schwartz,
President

RAS:dk

cc: H & B Industrial Equipment Co. (Sales Representative)
P. O. Box 6246
4406 S. Florida Ave.
Suite 220
Lakeland, Florida 33807-6346
Attn: Luis Hernandez
P:941-647-5943/F:0018

B:771L8118