NEW WALES OPERATIONS
P.O. Box 1035 • Mulberry, Florida 33860
Telephone: (813) 428-2531

Postmark 3/27/86
Jacksonville

DER
MAR 31 1986
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INTERNATIONAL MINERALS & CHEMICAL CORPORATION

March 31, 1986

Mr. Clair Fancy
State of Florida
Department of Environmental Regulations
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Dear Mr. Fancy:

On Thursday, March 27, Jerry Girardin of my staff spoke with Willard Hanks regarding the permitting of our #2 DAP Plant. This plant is currently operating under Construction Permit #AC53-23546 and the plant has been tested for compliance for all applicable emission limits. During the testing, it was discovered that the NO_x emissions were in excess of the permitted levels. IMC immediately contracted with a consultant, John Koogler, to investigate this matter and determine what would be necessary to resolve the problem.

Due to the NO_x emissions, IMC has not been able to file for an operating permit on the #2 DAP Plant. IMC has been testing emissions from this source since the original compliance tests were performed. These tests have been run at normal intervals and will continue to be performed to insure compliance with limits as specified in the Construction Permit.

In November 1985, IMC submitted a request for an extension of the Construction Permit until June 30, 1986. In Jerry's conversation with Willard, Willard believes that NO_x review will be subject to a full PSD review. This requires a new Construction Permit application which will be submitted to your office on April 7, 1986. Assuming that a letter of incompleteness might be required, the current permit will expire before the new one can be issued. Willard is, therefore, suggesting that IMC write and request that your office grant another extension to the existing Construction Permit.

In line with Willard's recommendation, IMC is hereby requesting that the Department grant us an extension of AC53-23546. It would be appreciated if the expiration date date could be extended until December 31, 1986. With this extension, you would have ample time to review the new Construction Permit application without our being concerned about the current permit expiring.

We will be happy to answer any questions you may have. Thank you for your consideration regarding this request.

Sincerely,

J. M. Baretincic
Manager - Environmental Services
and Quality Control

JMB/bs
028
Enclosure

cc: W. C. Thomas - DER Tampa
J. B. Koogler - Tampa
W. Hanks - DER Tallahassee

Post Mark 12/20/85
Gainesville

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

SKEC 124-85-01

December 20, 1985

Mr. Willard Hanks
Florida Department of
Environmental Regulation
Northwest District Branch Office
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Subject: Polk County-AP
IMC - New Wales
No. 2 DAP Plant
Permit No.'s AC53-23546 and PSD-FL-034

Dear Willard:

In response to your recent telephone call inquiring about the status of the permit modification package for the IMC-New Wales No. 2 DAP Plant, we are still in the process of developing the necessary information to support the request for permit modification. I met with New Wales personnel on December 17, 1985 to discuss the characteristics and operation of the burner in the dryer of the No. 2 DAP Plant and to compare the characteristics of this dryer with the dryers in other DAP and granular products plants at New Wales. We also discussed the possibility of conducting additional NOx emission measurements to further define the operational characteristics of the dryer burners.

If additional nitrogen oxides emission measurements are to be conducted, the tests will be conducted in early January 1986. I anticipate being able to compile all the necessary information into a permit application requesting a revision to the nitrogen oxide emission limit for the No. 2 DAP Plant and having this information in your office by the end of January 1986.

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If you have any additional questions regarding the status of this project, please do not hesitate to contact me.

Very truly yours,

SHOLTES & KOOGLER,
ENVIRONMENTAL CONSULTANTS

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

JBK:pdt
cc: Mr. A.L. Girardin

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 14, 1985

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Dr. John B. Koogler, P.E.
Sholtes and Koogler, Environmental Consultants
1213 Northwest 6th Street
Gainesville, Florida 32601

Dear Dr. Koogler:

RE: IMCC's No. 2 DAP, AC53-23546 and PSD-FL-034

Your August, 1985 tests confirm that the nitrogen oxides emissions from IMCC's No. 2 DAP plant may be as high as 36 lb/hr which is equivalent to 144 TPY. The federal construction permit for this source limits the nitrogen oxides emissions to 4.3 lb/hr/train (8.6 lb/hr total) which is equivalent to 34 TPY. Thus, you are requesting a significant net emissions increase of over 40 TPY in the permitted nitrogen oxides emissions from a major source.

Because of the magnitude of the requested increase in emissions and because nitric oxides emissions were not given an indepth review and regulated by the state construction permit (low NO_x emissions were predicted by the company) both EPA and the department will require a complete, new application for a construction permit to process this request.

The increase in emissions being requested will be subject to review under the PSD regulations. For the BACT section of the application, please evaluate the use of low NO_x burners and the burner design used on IMCC's No. 1 DAP plant.

If you have any question in this matter, please call Willard Hanks at (904) 488-1344 or write me at the above address.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CF/WH/p

Attachment: EPA 10/22/85 letter

cc: Mr. Jerry Giradin
Mr. Bill Thomas
Mr. Bruce Miller

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

REF: 4APT-AP OCT 22 1985

Mr. Clair H. Fancy. P. E.
Deputy Chief
Bureau of Air Quality Management
Florida Department of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, FL 32301

RE: PSD-FL-034, International Minerals & Chemical Corporation

Dear Mr. Fancy:

This is in regard to your letter dated August 7, 1985, to Dr. John B. Koogler concerning the above referenced facility. In that letter, the Florida Department of Environmental Regulation (DER) responded to a request from IMC to revise the NO_x emission limit for the diammonium phosphate dryer. In your letter to Dr. Koogler, you stated that the state and federal construction permits would be modified if approved by the Department, and if EPA evaluated the request to modify Federal PSD permit PSD-FL-034 and found it justified.

It is EPA's policy that PSD construction permits may be modified for sources which are in operation, if the changes are of an administrative nature, or if the proposed emission increases are less than the significant levels as specified in 40 CFR 52.21(b)(23). However, a significant increase for a source which is operating qualifies the change as a major modification and requires that a new permit be issued. In the letter from Dr. John B. Koogler (Sholtes & Koogler, Environmental Consultants for IM & C) dated July 3, 1985, the requested NO_x emission limit revision from 0.21 lbs/mm BTU heat input, 8.6 lbs per hour (whichever is less) to 35 lbs. per hour would increase emissions of NO_x by approximately 110 tons per year. The significance level for NO_x is 40 tons per year and will qualify this change in emissions as a major modification. The source is therefore obligated to submit a new application for a PSD permit to accommodate this change. Since Florida now has a SIP in place to issue federally enforceable PSD permits for this facility, the DER has responsibility for requesting that an application be submitted for a new PSD permit and for the permit issuance.

If you have any questions or comments regarding this letter, please contact me or Mr. Wayne J. Aronson at 404/881-4901.

Sincerely yours,

Bruce P. Miller

Bruce P. Miller, Acting Chief
Air Programs Branch

cc: Sholtes & Koogler (Environmental Consultants)
1213 N. W. 6th Street
Gainesville, FL 32601

NEW WALES OPERATIONS
P.O. Box 1035 • Mulberry, Florida 33860
Telephone: (813) 428-2531

IMC

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

November 4, 1985

Mr. Clair Fancy
Florida Department of Environmental
Regulation
2600 Blair Stone Rd.
Tallahassee, FL 32301

Dear Mr. Fancy:

John Koogler, acting on our behalf, is currently engaged in conversation with your office regarding higher than expected NO_x emissions from our #2 DAP Plant, AC53-23546.

Based on conversations with DER, SW District and John Koogler, it appears that the discussions will extend into early 1986.

Since the Construction Permit will expire on 12/31/85, IMC New Wales Operations is hereby requesting that the Construction Permit be extended until 6/31/86. John feels that the additional 6 month extension will be sufficient to resolve the NO_x problem.

The plant is currently operating and compliance tests have been completed which show that both 2E and 2W units are in compliance with permitted Fluoride and Particulate emission levels.

Thank you for your consideration in this matter.

Sincerely,

A. L. Girardin III

A. L. Girardin, III
Environmental Services Supervisor

ALG:rc
(063)

cc: J. M. Baretincic - New Wales
J. A. Brafford - New Wales
Willard Hanks - DER, Tallahassee
J. B. Koogler - Sholtes & Koogler
D. K. Larsen - Mundelein
C. A. Pflaum - New Wales
W. C. Thomas - DER, Tampa

Post mark 10/21/85
Gainesville

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

SKEC 124-85-01

October 21, 1985

Mr. Willard Hanks
Florida Department of Environmental Regulation
Northwest District
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Mr. Hanks:

Enclosed you will find a more legible copy of the NOx data that were hand-delivered to you on Friday, October 18, 1985.

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Very truly yours,

SHOLTES & KOOGLER,
ENVIRONMENTAL CONSULTANTS

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

JBK:pdt
Enclosure
cc: A.L. Girardin w/enclosure

DER

OCT 23 1985

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IMC/New Wales:
Summary NOx Emission Tests

5/29/85 #2 DAP - East

Production - 124 tph
Fuel - 1.57 gal/ton
- 195 gal/hr @ 145,900 BTU/gal
- 28.45 x 10^6 BTU/hr
NOx - 20.2 lb/hr (14.4 lb/hr potential from fuel @ 0.28% N in fuel)
- 0.71 lb/10^6 BTU
- 0.16 lb/ton DAP
- 103.6 lb/1000 gal

8/28/85 #2 DAP - East

Production - 77 tph
Fuel - 1.2 gal/ton
- 92.4 gal/hr @ 145,900 BTU/gal
- 13.48 x 10^6 BTU/hr
NOx - 10.7 lb/hr (6.8 lb/hr potential from fuel)
- 0.80 lb/10^6 BTU/hr
- 0.14 lb/ton DAP
- 115.8 lb/1000 gal

8/28/85 #2 DAP - West

Production - 77 tph
Fuel - 1.5 gal/ton
- 115.5 gal/hr @ 145,900 BTU/gal
- 16.85 x 10^6 BTU/hr
NOx - 14.9 lb/hr (8.5 lb/hr potential from fuel)
- 0.88 lb/10^6 BTU
- 0.19 lb/ton DAP
- 129.0 lb/1000 gal

8/28/85 #1 DAP

Production - 99 tph
Fuel - 1.6 gal/ton
- 158.4 gal/hr @ 145,900 BTU/gal
- 23.11 x 10^6 BTU/hr
NOx - 7.8 lb/hr (11.7 lb/hr potential from fuel)
- 0.34 lb/10^6 BTU
- 0.08 lb/ton DAP
- 49.2 lb/1000 gal

SHOLTES & KOOGLER

8/28/85 GTSP

Production - 60 tph
Fuel - 3.4 gal/ton
- 204.0 gal/hr @ 145,900 BTU/gal
- 29.76 x 10^6 BTU/hr
NOx - 15.9 lb/hr (15.0 lb/hr potential from fuel)
- 0.53 lb/10^6 BTU
- 0.27 lb/ton GTSP
- 77.9 lb/1000 gal

Phosphate Rock Dryer #1 (Brewster)

Production - 333 tph (estimated)
Fuel - 2.53 gal/ton
- 842 gal/ hr
- 122.8 x 10^6 BTU/hr
NOx - 42.5 lb/hr (62.0 lb/hr potential from fuel)
- 0.35 lb/10^6 BTU
- 0.13 lb/ton rock
- 50.5 lb/1000 gal

Phosphate Rock Dryer #2 (Mobil)

Production - 350 ton/hr
Fuel - 1.43 gal/ton
- 500 gal/hr
- 72.9 x 10^6 BTU/hr
NOx - 28.6 lb/hr (36.8 lb/hr potential from fuel)
- 0.39 lb/10^6 BTU
- 0.08 lb/ton rock
- 57.2 lb/1000 gal

Summary of Emissions

Source	NOx (as NO2) (lb/MMBTU)	(lb/ton Prod.)	(lb/1000 gal fuel)	(lb/hr)	(ppm)	Potential NOx from fuel (lb/hr)	(act/pot)*
IMC #2 DAP-E	0.71	0.16	103.6	20.2	35.4	14.4	1.4
IMC #2 DAP-E	0.80	0.14	115.8	10.7	17.0	6.8	1.6
IMC #2 DAP-W	0.88	0.19	129.0	14.9	21.3	8.5	1.8
IMC #1 DAP	0.34	0.08	49.2	7.8	9.2	11.7	0.7
Rock Dryer #1	0.35	0.13	50.5	42.5	61.0	62.0	0.7
Rock Dryer #2	0.39	0.08	57.2	28.6	46.2	36.8	0.8
IMC GTSP	0.53	0.27	77.9	15.9	26.6	15.0	1.1

* Actual NOx Emissions/Potential NOx emissions from fuel.

SK SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

SKEC 124-85-01

October 18, 1985

Mr. Clair Fancy
Deputy Bureau Chief
Bureau of Air Quality Management
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Subject: Summary of NOx Emission Measurements
IMC/New Wales Chemical Complex
Polk County, Florida

Dear Mr. Fancy:

On the two attached sheets I have summarized the results of NOx emission measurements made at the IMC/New Wales Chemical Complex plant on May 29 and August 28, 1985 and measurements made on two phosphate rock dryers in Polk and Hillsborough County at earlier dates. The NOx emission data for the phosphate rock dryers were obtained from information in the DER files.

The NOx data are summarized in terms of pounds per hour, pounds per million BTU heat input, pounds per ton of product, pounds per thousand gallons of fuel and parts per million (volume). I have also calculated the amount of NOx in each case that potentially could have been contributed by 0.28 percent nitrogen in the fuel oil. The NOx emission rate expressed as pounds per hour is dependent upon the size of the unit being tested and the amount of fuel being burned and hence, shows no trend. Likewise, the potential NOx from the fuel is dependent upon the amount of fuel burned per hour (related to the size of the unit and the product produced) and similarly shows no trend. The ratio of actual NOx emissions to potential for NOx does show a rather interesting trend however. This ratio shows that the actual NOx emissions are greater than the potential fuel contributed NOx emissions in the IMC/New Wales No. 2 DAP plant by 40 to 80 percent. This compares to a ratio of actual to potential NOx emissions of 0.7

DER
OCT 18 1985
BAQM

to 0.8 (lower actual emissions than potential fuel NOx) for the IMC/New Wales No. 1 DAP plant and the two rock dryers and a ratio of 1.1 for the IMC/New Wales GTSP plant.

The ratio of actual NOx emissions to potential NOx emissions indicates that more nitrogen is being converted to NOx in the No. 2 DAP plant than is contributed by the fuel. The additional NOx could be formed either by the fixation of atmospheric nitrogen or the combustion of free ammonia. I would say it is more probable that the additional NOx is formed by the fixation of atmospheric nitrogen.

The NOx emission rate expressed as parts per million (volume) shows no trend. The NOx concentration in the stack gases range from approximately 10 to 60 parts per million. As a point of comparison, the expected NOx concentration in the flue gas from an oil-fired boiler is in the range of 400 to 500 parts per million.

The NOx emissions in pounds per ton of product is probably more related to the drying requirements of a typical product than to combustion technology. It appears that burner design may be a secondary function in this relationship. The highest NOx emission rate (pounds per ton of product) was observed in the GTSP plant. This plant also had the highest fuel use per ton of product; 3.4 gallons fuel per ton. The fuel use in the rock dryers and DAP plants ranged from 1.2 to 2.5 gallons per ton of product and the NOx emissions ranged from 0.08 to 0.19 pounds per ton of product. The NOx emissions (pounds per ton of product) were higher in the No. 2 DAP plant than in the No. 1 DAP plant and one of the rock dryers, indicating the influence of burner design.

The last two relationships, pounds of NOx per million BTU and pounds NOx per thousand gallons of fuel, are directly related through the heating value of fuel (145,900 BTU per gallon assumed). These data show that significantly more NOx is generated per million BTU heat input in the No. 2 DAP plant than in the other four sources. This appears strictly to be a function of burner design. The NOx emissions per million BTU heat input are lowest in the No. 1 DAP plant and the two rock dryers with the NOx emissions from the GTSP plant being intermediate between these three sources and the No. 2 DAP plant.

The NOx emissions expressed in pounds per thousand gallons of fuel are presented for comparison with emission factors published by EPA in the document <u>Compilation of Air Pollutant Emission Factors</u> (publication AP-42). As I stated in my August 19, 1985 letter to you, the NOx emissions reported by EPA generally range from 40 to 70 pounds per thousand gallons of fuel with an upper limit of 105 pounds per thousand gallons. The NOx emissions from the IMC/New Wales No. 1 DAP plant and the two rock dryers range from 50 to 57 pounds per thousand gallons of fuel and emissions from the GTSP plant are approximately 78 pounds per thousand gallons of fuel; all within the general range of NOx emissions that EPA has published for oil-fired boilers. The NOx emissions from the No. 2 DAP plant expressed in pounds per thousand gallons of fuel range from approximately 105 to 130 pounds per thousand gallons; significantly higher than what would generally be expected from an oil-fired boiler.

Since the NOx emissions from the No. 1 DAP plant are relatively low, indicating that NOx emissions are not necessarily a function of free ammonia in the system, and the fact that the NOx emissions from the No. 1 DAP plant, the rock dryers and GTSP plants are in the range of emission factors quoted by EPA, indicates that the higher than normal emissions from the No. 2 DAP plant are probably a function of burner design. Since the NOx emissions (pounds per thousand gallons of fuel) from the No. 2 DAP plant were in the same range both in May 1985 when the plant was running 124 tons per hour and in August when the plant was running at 77 tons per hour indicate that the generation of NOx is not a function of the fuel firing rate to the burner.

I trust that the information contained herein will provide you with the information that you will need to complete your re-evaluation of BACT for NOx emissions from the IMC/New Wales No. 2 DAP plant. If there are any questions, oir if additional information is required, please do not hesitate to contact me.

Very truly yours,

SHOLTES & KOOGLER,
ENVIRONMENTAL CONSULTANTS

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

JBK:pdt
Enclosures

cc: Mr. Willard Hanks
Mr. A. L. Girardin

IMC New Wales:

Summary NOx Emission Tests

5/29/85 #2 DAP - East

Production - 124 tph

Fuel - 1.57 gal / ton

- 195 gal / hr @ 145,900 BTU/gal
- 28.45 x 10⁶ BTU / hr

NOx - 20.2 lb/hr (14.4 lb/hr potential from fuel @ 0.25% N in fuel)

- 0.71 lb / 10⁶ BTU
- 0.16 lb / ton DAP
- 103.6 lb / 1000 gal

8/28/85 #2 DAP - East

Production - 77 tph

Fuel - 1.2 gal / ton

- 92.4 gal / hr @ 145,900 BTU/gal
- 13.48 x 10⁶ BTU / hr

NOx - 10.7 lb/hr (6.5 lb/hr potential from fuel)

- 0.80 lb / 10⁶ BTU
- 0.14 lb / ton DAP
- 115.8 lb / 1000 gal

8/28/85 #2 DAP - West

Production - 77 tph

Fuel - 1.5 gal / ton

- 115.5 gal / hr @ 145,900 BTU/gal
- 16.85 x 10⁶ BTU / hr

NOx - 14.9 lb / hr (8.5 lb/hr potential from fuel)

- 0.88 lb / 10⁶ BTU
- 0.19 lb / ton DAP
- 129.0 lb / 1000 gal

8/28/85 #1 DAP

Production - 99 tph

Fuel - 1.6 gal / ton

- 158.4 gal / hr @ 145,900 BTU / gal
- 23.11 x 10⁶ BTU / hr

NOx - 7.8 lb / hr (11.7 lb/hr potential from fuel)

- 0.34 lb / 10⁶ BTU
- 0.05 lb / ton DAP
- 49.2 lb / 1000 gal

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3/28/85 GTSP

Production – 60 tph

Fuel – 3.4 gal/ton
- 204.0 gal/hr @ 145,900 BTU/gal
- 29.76 x 10^6 BTU/hr

NO_x – 5.9 lb/hr (15.0 lb/hr potential from fuel)
- 0.53 lb/10^6 BTU
- 0.27 lb/ton GTSP
- 77.9 lb/1000 gal

Phosphate Rock Dryer (Brewster)

Production – 333 tph (estimated)

Fuel – 2.53 gal/ton
- 842 gal/hr
- 122.8 x 10^6 BTU/hr

NO_x – 42.5 lb/hr (62.0 lb/hr potential from fuel)
- 0.35 lb/10^6 BTU
- 0.13 lb/ton rock
- 50.5 lb/1000 gal

Phosphate Rock Dryer (Mobil)

Production – 350 ton/hr

Fuel – 1.43 gal/ton
- 500 gal/hr
- 72.9 x 10^6 BTU/hr

NO_x – 28.6 lb/hr (36.8 lb/hr potential from fuel)
- 0.39 lb/10^6 BTU
- 0.08 lb/ton rock
- 57.2 lb/1000 gal

Summary of Emissions

SOURCE	NO_x (as NO_2) (lb/MMBTU)	(lb/ton prod)	(lb/1000 gal fuel)	(lb/hr)	(PPM)	Potential NO_x from fuel (lb/hr)	act/Po[illegible]
IMC #2 DAP-E	0.71	0.16	103.6	20.2	35.4	14.4	1.4
IMC #2 DAP-E	0.80	0.14	115.8	10.7	17.0	6.8	1.6
IMC #2 DAP-W	0.88	0.19	129.0	14.9	21.3	8.5	1.8
IMC #1 DAP	0.34	0.08	49.2	7.8	9.2	11.7	0.7
Brewster Rock Dryer	0.35	0.13	50.5	42.5	61.0	62.0	0.7
Mobil Rock Dryer	0.39	0.08	57.2	28.6	46.3	36.8	0.8
IMC GTSP	0.53	0.27	77.9	15.9	26.6	15.0	1.1

* Actual NO_x Emissions ÷ Potential NO_x emissions from fuel

To: Files

From: Lind

Subject: IMCC / NO_x Increase

Date: 10-8-85

Mike Brandon says EPA policy requires an applic permit to Const to increase NOx emissions by the amount projected by IMCC. He is writing a letter to DER, copy IMCC, saying same.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

For Routing To District Offices And/Or To Other Than The Addressee	
To:	Loctn.:
To:	Loctn.: SEP 16 1985
To:	Loctn.:
From:	Date:
Reply Optional [ ]	Reply Required [ ] Info. Only [ ]
Date Due:	Date Due:

DER
BAQM

TO: C. H. Fancy

FROM: Bill Thomas

DATE: September 11, 1985

SUBJECT: IMCC, New Wales, AC53-23546, PSD-FL-034, NO_x Emissions From No. 2 DAP Plant

Attached are observations and calculations concerning NO_x emissions as assembled by Jack Prendergast, which you will find interesting.

The above subject DAP plant is the only DAP plant in central Florida required to comply with a NO_x standard. The W.R. Grace DAP plant was permitted about the same time and is not required to meet a NO_x standard.

Neither Chapter 17-2 (F.A.C.) or NSPS rules set a NO_x standard for steam generators consuming less than 250 x 10^6 BTU/hr. in fuel. IMCC's plant producing DAP at the maximum rate of 140 TPH and consuming a maximum of 280 gal./hr. of No. 6 oil will generate a maximum of 42 x 10^6 BTU/hr.

I suggest, in order of preference, the following:

(1) Scratch the NO_x emission standard requirement. Adequate DAP plant data is not available to establish a standard.

(2) Set the NO_x emissions allowance high enough so that it will not be a problem, say 0.75 lbs./10^6 BTU. (Seems a bit redundant)

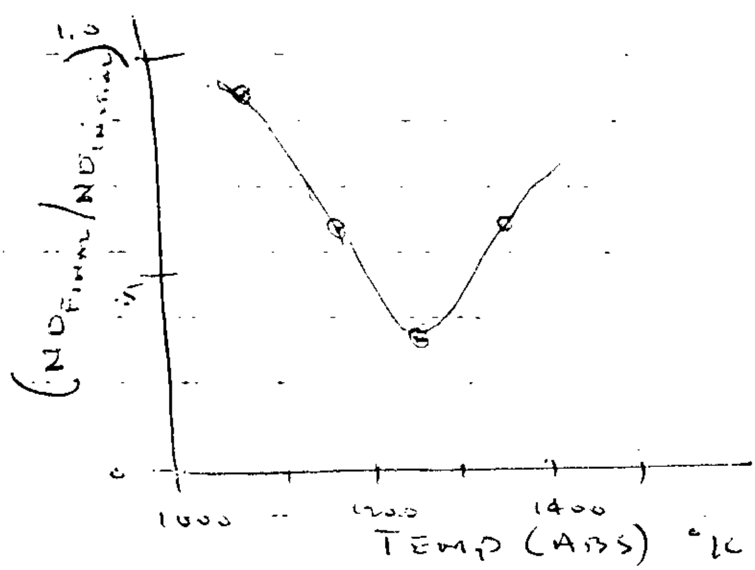
WCT/js

Attachment

(1974 DATA)

FUEL TYPE VERSUS NO_x EMISSIONS:

	EQ'MT TYPE	FUEL TYPE	EMISSION FACTORS. LB $NO_2/10^6$ BTU
$>100 \times 10^6$ BTU/HR	WATER-TUBE BOILER (TANGENTIAL FIRING)	COAL	0.64
		OIL (RESIDUAL)	0.36
		GAS	0.30
$10-100 \times 10^6$ BTU/HR	WATER-TUBE BOILER (WALL FIRING)	COAL	—
		OIL (RESIDUAL)	0.43
		GAS	0.23



EPA STANDARDS (1/78); UTILITY BOILERS

NO_x ppm (DRY BASIS @ 3% EXCESS O_2)

GAS FIRED ≃ 190 ppm

RES. OIL FIRED ≃ 230 ppm

COAL FIRED ≃ 500 ppm.

9/4/85
WJP

RE: ① 8/15 MEMO: SHOLTES & KOOGLER / CHFANCY.
② AC53-23546
③ PSD-FL-034

SUBJECT: BASIS FOR SUGGESTING NOx STANDARD FOR DAP PLANTS

PROBLEM DEFINITION: REEVALUATION OF B.A.C.T. FOR NOx EMISSIONS FOR D.A.P. FERTILIZER PLANT.

PER SHOLTES & KOOGLER, DATA IS VERY LIMITED

ONLY DATA SOURCES:
① BREWSTER PHOSPHATES (PHOSPHATE ROCK DRYER)
② MOBIL CHEM. CO. (PHOSPHATE ROCK DRYER)

BREWSTER: 42.5 LBS/HR NO_2 USING 842 GAL/HR NO. 6 FUEL OIL @ 0.28% N_2
OR ≈ 50.5 LBS NO_2 / 1000 GALS #6

MOBIL: 28.6 LBS/HR NITROGEN OXIDES USING 500GPH NO. 6 FUEL OIL ? % N_2
OR ≈ 57.2 LBS NITR. OXIDES/1000 GALS #6.

AP-42: RE RESIDUAL FUEL OIL COMBUSTION, 42 TO 67 LBS / 1000 GALS. FUEL.
OR AVG ≈ (42+67)/2 = 54.5

∴ GOOD AGREEMENT W. BREWSTER & MOBIL
> 0.28% ⟹ 53.4 LBS NITR. OXIDES/1000 GAL R.FUEL.

NO. 2 DAP @ IMC ≈ 104 LBS NITR. OXIDES/1000 GALS

POINT STRESSED THAT —

* DAP DRIERS ARE NOT PHOSPHATE ROCK DRYERS

DAP FUEL CONSUMPTION = 140 GALS #6 / TRAIN

TRAIN ≡ RX, GRAN. & DRYER.

RE {PSD-FL-034} NO_2 ALLOWED = 4.3 LB/HR – TRAIN

$\left(\frac{140}{1000}\right)\left(53.4 \text{ LBS}\right) = 7.48 \text{ LBS } NO_2/\text{TRAIN-HR}$

BASED UPON AP-42

IF WE NOW ALLOW FOR MAX 0.4% N_2 IN NO. 6 FUEL @ IMC —

$(7.48 \text{ LBS})(0.4/0.28) = 10.7 \text{ LBS } NO_2/\text{HR-TRAIN}$

MAY APPROX PER AP-42

10.7 LBS/HR ⟹ 76.4 LBS/1000 GALS.

∴ 4.3 LBS/HR – TRAIN NO_x ALLOWABLE LOOKS UNREASONABLY LOW. !

104 LBS NO_x / 1000 GAL #6 > 76.4 LBS/1000 GAL #6

104 LBS NO_x / 1000 GALS #6 @ IMC IS PROBABLY EXPLAINABLE BASED ON THEIR USE OF HIGH EXCESS AIR – (SEE ATTCH'D MEMO)

DISCUSSION TOPICS. — IMC COULD CONSIDER;

(1) SWITCHING FUEL TYPES / NO. 6 TO NO. 2 ?

(2) REDUCING EXCESS AIR ? EVOP WISE ?

(3) LOWERING COMBUSTION TEMP.?, (4) FLUE GAS TREATMENT ?

USING 17-2.600(5)(c) 4. a. BASIS:

0.3 LBS / 10^6 BTU INPUT & MAXIMUM 2 HOUR AVG.

BTU HEAT INPUT = (150000 BTU/GAL)(140 GAL/TRAIN-HR)

" " " = 21 MM BTU/HR ⟹ 6.3 LBS/HR-TRAIN

LIMIT FOR 250 MMBTU/HR

& TECO'S BIG BEND #3: 0.7 LBS NO_x/10^6 BASIS

(21 M)(0.7 LBS/M) = 14.7 LBS NO_2/HR-TRAIN.

14.7 LBS NO2/HR-TRAIN @ 140 GAL [illegible]

1000 GAL EQUIV = $\left(\frac{1000}{[illegible]}\right)(14.7)$ = 105 LBS NO2/1000 GAL [illegible]

∴ TECO BIG BEND NO. 3 HAS NOx EMISSION TRAIT THAT IS CONSISTENT WITH MEASURED NO2 AT [illegible] OF [illegible] NO2/1000 GAL [illegible]

I ALSO BELIEVE THAT IMC BE CONSULTED AS TO OTHER DISCUSSION TOPICS & RESULTS OF SPECIFIC COMPLAINTS EMISSION TESTING.

SINCE H_2SO_4 PLANTS APPEAR TO BE BIG NO_x EMISSION POINTS BY CONTRAST WITH DAP DRYERS & THEY EMPLOY "GOOD ENGINEERING PRACTICES" - REALISTIC LIMITS FOR DAP SHOULD ACKNOWLEDGE THIS.

TECO SEEMS TO HAVE ESTABLISHED THE PRECEDENT FOR MAXIMUM NO_x EMISSIONS - SO IT APPEARS INCONSISTENT TO PENALIZE THE PHOSPHATE INDUSTRY BY REQUESTING LOWER RATES IF THE COST IS GREAT.

WJP.

EXTRACTED FROM EPA COMBUSTION EVALUATION COURSE BOOK.

Formation of "Fuel NO_X"

Nitrogen of differing amounts is contained in the chemical composition of fuels. Coal may contain nitrogen from 0.5 to 2.0% by weight, whereas No. 6 fuel oil may contain from 0.1 to 0.5% and No. 2 contains approximately 0.01%.

When fuel is burned, 10 to 60% of the nitrogen may be oxidized to NO (5). This fraction depends on the amount of oxygen available after the fuel molecules decompose. If combustion zone is fuel rich, the fuel molecules may crack and much of nitrogen will form N_2. On the other hand, if combustion zone is lean, that is, oxygen is available, more fuel nitrogen oxides to NO.

High fuel volatility and intensive fuel/air mixing also increase the fuel nitrogen fraction which oxidizes to NO.

Changing fuels can be an effective method for reducing NO_X. For example, one might change from a high nitrogen content No. 6 fuel oil to No. 2 fuel oil. If it is available, one might specify a low-nitrogen content No. 6 fuel oil. The nitrogen content is influenced by refining processes, blending, and the original crude stock.

Changing from coal to oil or oil to gas usually is controlled by factors such as furnace adaptability, fuel availability, and costs. Because of fuel availability, it is expected that more coal rather than less will be used as boiler fuel in the future, so other techniques of fuel NO_X control will be required.

NO_X Control Theory

The three methods for reducing NO_X are to change the fuel, to modify the combustion system, and to treat or clean the flue gas.

Excess air reduction is an obvious combustion modification control technique, as may be seen from the simplified model of "thermal" NO_X formation. Excess air reduction is very effective for "fuel NO_X" because the reduced availability of oxygen encourages fuel nitrogen to form molecular nitrogen (5). Note that the high chemical reactivity of oxygen with fuel assures that most of the theoretical oxygen will react with fuel. It is the excess oxygen which reacts with nitrogen.

Limits on excess oxygen in coal and oil combustion is important, not only for NO_X control, but also to limit the conversion of SO_2 to SO_3. The formation of SO_3 causes dew point and corrosion problems in furnaces. Because of this fact, oil-fired units, which formerly operated with excess air values from 10 to 20% excess air (2 to 4% excess O_2), typically have been modified to operate at 2 to 5% excess air (0.4 to 1% excess O_2). In gas-fired boilers, it appears that a minimum desirable value of excess O_2 exists for many units, as shown in Attachment 16-8. As the excess air is reduced below this minimum, the temperature increases enough to increase the NO_X emissions (5). In coal combustion, burning with very low values of excess oxygen may present operational problems.

NO_X control has been achieved by designing for two-stage combustion, as illustrated in Attachment 16-9. In the first stage fuel-rich combustion occurs with less than stoichiometric oxygen. Energy is transferred to heat exchange surfaces, and the combustion product gases move to the second stage. Excess air is introduced (lean combustion in this stage), so that adequate oxygen is available for complete combustion. NO_X emissions are reduced, partly because NO is not formed when the combustion is rich. The other reason is because of the energy extraction prior to lean combustion, which results in lower peak temperatures than would occur under normal combustion. Two-stage combustion may be applied through use of overfire air ports, as shown in Attachment 16-10, or through burner redesign. In each case the fuel and air delivery to the combustion zone is designed to delay the mixing of the secondary air.

As previously indicated, the other significant fundamental concept in NO_X control is to limit the maximum combustion temperature. This effectively limits the value of the forward reaction rate coefficient, K_F. For temperatures above 2,800°F, the value of K_F is said to essentially double for each additional 70°F temperature increase.

One should note that in most combustion equipment, the combustion reactions occur so quickly that equilibrium behavior associated with a peak temperature is not achieved. Typically, less NO is formed than would be expected for a given peak temperature. However, the combustion gases cool down so rapidly that the NO formed does not dissociate but is said to "freeze" and be emitted with the flue gases.

One method for reducing the maximum combustion temperature is to eliminate the development of "hot spots" in the combustion gases. These are locations where very rapid mixing of fuel and air occur. By slowing the mixing or swirl of gases, a more uniform flame temperature may result and lower NO_X will be formed.

The type of firing design of the furnace also influences the fuel/air mixing, the proximity of the flames to the heat exchange surface, and the influence of combustion energy from one burner on an adjacent burner.

Cyclone furnaces used for coal combustion have the largest uncontrolled NO_X emissions. Front wall (horizontal) and opposed wall furnaces have somewhat less, and tangential-fired furnaces have considerably less emissions, as illustrated in Attachment 16-11.

Flue gas recirculation is a technique for lowering the peak temperature, as illustrated in Attachment 16-12. Flue gas acts as a heat sink. It also acts to slow the rate of combustion, by reducing the frequency of successful oxidation collisions between the fuel and oxygen molecules. Proper heat exchange design is required to prevent a considerable loss of efficiency due to the lower combustion temperatures.

Reducing the rate of combustion by reducing the fuel rate or load also will reduce the peak temperatures and NO_X emissions. The load reduction may be achieved by energy conservation (lower demand) or by installing or using additional combustion units. The effect of load reduction is shown in Attachment 16-13.

Scheduling frequent soot blowing will provide cleaner heat exchange surfaces around the flame and thereby will limit the peak combustion temperature.

Water injection, as shown in Attachment 16-14, is an accepted NO_X control technique for use in stationary gas turbines. Water acts as a heat sink, similar to the water injection which was used in supercharged aircraft engines in the 1940s (to provide controlled combustion with increased power). Water injection in piston engines was terminated with the adoption of tetraethyl-lead as a more convenient heat sink material.

Flue Gas Treatment

Dry flue gas treatment with gases from 100 to 700°F is used widely in Japan for NO_X control in oil and gas furnaces (7). This technique requires a reducing atmosphere (typically with ammonia injection) and a catalyst. Developmental work is underway to apply this concept to the particulate and SO_2-laden gas streams from coal combustion. If ammonia is injected as the combustion gases reach the convection zone of a large boiler, up to 70% NO_X reduction can be demonstrated (5). However, the convection zone temperature must be controlled carefully to around 1,300°F, as illustrated in Attachment 16-15.

Wet flue gas techniques involve a strong oxidant, such as ozone or chlorine dioxide to convert NO to NO_2 and N_2O for subsequent absorption by a scrubbing solution. These scrubbers are operated at 100 to 120°F, the same operating temperature for SO_X scrubbers. This technique is very expensive, because of the cost of chlorine dioxide and ozone, in addition to the cost of disposing of the chlorine containing discharges. However, hope is expressed for the possibility of this technique being effective for controlling NO_X, SO_X, and particulates from coal-fired power plants.

VERY EXPENSIVE

Fluidized Bed Combustion

A non-traditional combustion scheme is that of fluidized bed combustion. It appears promising for future low NO_X applications, mainly because combustion occurs with low temperatures and because SO_X control can be achieved also (5). Various fluidized bed applications are being demonstrated, such as for:

1. Solid waste and sewage sludge incineration;
2. Hog fuel combustion;
3. Coal in a utility boiler (30 MW electricity by Monongahela Power Co., Rivesville, West Virginia); and
4. Coal in a similar fired industrial boiler (100,000 lb. steam/hr. by Georgetown University, Alexandria, VA).

REFERENCES

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5. "Control Techniques for Nitrogen Oxide Emissions from Stationary Sources," Second Edition, EPA-450/1-78-001, U.S. Environmental Protection Agency (January 1978).
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7. Muzio, L. J., et al., "Gas Phase Decomposition of Nitric Oxide in Combustion Products," paper No. P-158, 16th Symposium (International) on Combustion, Cambridge, Mass. (August 15-21, 1976).

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

September 9, 1985

Dr. John B. Koogler
Sholtes & Koogler
1213 North West 6th Street
Gainesville, Florida 32601

Reference: IMCC - No. 2 DAP Plant

Dear Dr. Koogler:

Based on your August 19 letter, the only nitric oxides emission data you were able to locate was the emission factors in AP-42 and the test results from two phosphate rock dryers. This data implies that the nitric oxides emissions rate from IMCC's No. 2 DAP plant should be lower than the rate reported.

We do not believe it is prudent to establish a new emission standard for the No. 2 plant based on the limited data submitted. More emission data is needed before we can evaluate IMCC's request. We request you investigate the use of alternate test methods, including continuous emission monitors, to measure the nitric oxide emissions from a DAP plant, have the most appropriate procedure for this plant approved by the Bureau, and retest the emissions from IMCC's No. 2 DAP plants for nitric oxides. Once we review the test reports, we should be able to make a recommendation in this matter.

Sincerely,

Clair Fancy, P. E.
Deputy Chief
Bureau of Air Quality
Management

WH/ps

cc: Bill Thomas
Jerry Girardin

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

SKEC 124-85-01

August 19, 1985

Mr. C.H. Fancy
Deputy Chief, Bureau of Air Quality Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Subject: Polk County - AP
IMC/New Wales Operation
No. 2 DAP Plant
AC53-23546/PSD-FL-034

Dear Mr. Fancy:

In response to your letter of August 7, 1985, I am providing the following information to assist the Department in the reevaluation of the Best Available Control Technology for nitrogen oxides emissions from a diammonium phosphate (DAP) fertilizer plant. In your August 7, 1985 letter you requested any NOx emission test data available for DAP plants and other similar sources (granular triplesuperphosphate [GTSP] plants and/or phosphate rock dryers) associated with the phosphate fertilizer industry. To the best of my knowledge nitrogen oxide emission data for sources in the phosphate fertilizer industry are very limited due to the fact that these data have not been required in the past as permit conditions. The only nitrogen oxides emission data for sources in the phosphate fertilizer industry that I am aware of are data on two phosphate rock dryers; one operated by Brewster Phosphates and the other by the Mobil Chemical Company. Test data from both of these facilities are in the files of the Department. The Brewster data were submitted in support of PSD Application PSD-FL-088 and the Mobil data were submitted in support of Construction Permit Application AC53-090634.

The Brewster data show a nitrogen oxides emission rate of 42.5 pounds of NO_2 per hour resulting from the combustion of 842 gallons per hour of No. 6 fuel oil with a 0.28 percent nitrogen content. This

DER
AUG 22 1985
BAQM

nitrogen oxides emission rate is equivalent to 50.5 pounds of nitrogen oxides per 1000 gallons of fuel.

The Mobil data show a nitrogen oxides emission rate of 28.6 pounds of nitrogen oxides per hour resulting from the combustion of 500 gallons per hour of No. 6 fuel oil. This is equivalent to a nitrogen oxides emission rate of 57.2 pounds per 1000 gallons of fuel.

Nitrogen oxides emission factors reported in AP-42 for the combustion of residual fuel oils range from 42 to 67 pounds per 1000 gallons fuel. The AP-42 nitrogen oxides emission factor rate for residual fuel oil with 0.28 percent nitrogen content fired into an industrial boiler is 53.4 pounds per 1000 gallons of fuel. Both the Brewster and Mobil nitrogen oxides emission rates are in the range of those reported in AP-42. Furthermore, these emission rates are approximately half of the NOx emission rates measured from the No. 2 DAP plant at IMC/New Wales; 104 pounds of nitrogen oxides per 1000 ~~pounds~~ 1,000 gallons of fuel. To the best of my knowledge, no other nitrogen oxide emission data exists for DAP plants, GTSP plants or rock dryers in the phosphate fertilizer industry.

The nitrogen content of the No. 6 fuel oil burned in the No. 2 DAP plant at IMC/New Wales when the nitrogen oxides reported in my July 3, 1985 letter were made was 0.2-0.3 percent. The maximum nitrogen content of No. 6 fuel oil burned by IMC/New Wales is 0.4 percent.

Regarding reasons for the unexpectedly high nitrogen oxides emission rates from the IMC/New Wales DAP plant, Willard Hanks mentioned the possible role that free ammonia in the dryer might play. On that matter I offer the following comments. The ammonia (NH_3) will decompose, or burn, at high temperatures to produce water vapor, elemental nitrogen and possibly nitrogen oxides. At temperatures below approximately 2700°F ammonia will more than likely decompose to elemental nitrogen and water vapor. At temperatures above the 2700°F range, it is likely ammmonia will decompose to produce nitrogen oxides and water vapor. The reactions discussed thus far are reactions that will occur in an oxygen rich environment.

?

The only place in a DAP dryer where temperatures of 2700°F are reached are in the burner flame. Temperatures of this magnitude elsewhere in the dryer will decompose the DAP product. It is likely that some free ammonia will be present in the burner flame however, the amount of free ammonia in this zone will certainly not be sufficient to increase the nitrogen oxides emission rate from 50 to 55 pounds of nitrogen oxides per 1000 gallons of fuel to 104 pounds per 1000 gallons of fuel. In all likelihood, the majority of free ammonia that is decomposed in the DAP dryer results in the formation of elemental nitrogen and water vapor; and not nitrogen oxides.

It should further be recalled, that the injection of ammonia into the combustion zone of boilers (in an oxygen starved environment) is a recognized means of reducing nitrogen oxides emissions. In this situation, the ammonia reacts with nitrogen oxides to produce elemental nitrogen and water vapor. It is doubtful that this reaction will occur in DAP dryer because of the high amount of excess air in these dryers.

In reviewing the data herein, it should be recognized by the Department that phosphate rock dryers, the only sources for which nitrogen oxides emission data are available, are not DAP dryers. Hence, parallels should not be drawn between nitrogen oxides emission rates from the rock dryers and expected nitrogen oxides emission rates from DAP dryers.

If additional data are required to continue your review of this matter, I will look into the possibility of conducting additional nitrogen oxides emission measurements on the No. 2 DAP plant at IMC/New Wales and possibly conducting emission measurements on the No. 1 DAP plant at that facility. Please contact me if we can be of further assistance to you.

Very truly yours,

SHOLTES & KOOGLER,
ENVIRONMENTAL CONSULTANTS

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

JBK:pdt
cc: Mr. Jerry Girardin
Bill Thomas, Tampa

Mobil Chemical Company AC53-090634

NOx
Fuel - 500 gal/hr
NOx by test - 28.6 lb/hr

NOx = 57.2 lb/1000 gal

Brewster (PSD FL-088)

NOx
Fuel - 842 gal/hr @ 0.28% Nitrogen
NOx by test - 42.5 lb/hr

NOx = 42.5/0.842
= 50.5 lb/1000 gal

AP-42 NOx from Fuel Combustion

53.4 lb/1000 gal w/0.28%N fuel oil
55.0 lb/1000 gal Individual Boilers
42.0 lb/1000 gal Tangentially Fired Utility
105.0 lb/1000 gal Vertically Fired Utility
67.0 lb/1000 gal Other Utility

SHOLTES & KOOGLER, ENVIRONMENTAL CONSULTANTS
1213 N.W. 6th Street Gainesville, Florida 32601 (904) 377-5822

7/10 Bill T. please assign to an engineer to write brief letter acknowledging receipt. Clair

SKEC 124-85-01

DER
JUL 1985
BAQM

July 3, 1985

Mr. Clair H. Fancy
Deputy Bureau Chief
Bureau of Air Quality Management
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Subject: International Minerals & Chemical Corporation
New Wales Operations
Polk County, Florida
PSD-FL-034
DAP Plant NOx Emissions

Dear Mr. Fancy:

International Minerals & Chemical Corporation (IMC) owns and operates the New Wales Chemical Complex in Polk County, Florida; a phosphate fertilizer complex. IMC was permitted under Federal PSD Review (PSD-FL-34) to construct and operate the No. 2 Diammoniam Phosphate (DAP) Fertilizer plant at this chemical complex. The air pollution emission limits from the DAP plant were recently modified by the attached letter from EPA dated February 27, 1985.

The purpose of this letter is to request a modification to the nitrogen oxides (NOx) emission limits established by the initial PSD approval and modified by the EPA letter dated February 27, 1985.

When preparing the initial application for PSD review, a proposed NOx emission limit for the DAP dryer was proposed based on emission rates determined from emission factors for fossil fuel fired boilers published in the document, Compilation of Air Pollutant Emission Factors, EPA Publication AP-42, U.S. Environmental Protection Agency.

Fuel firing practices in a DAP dryer are considerably different from fuel firing practices in fossil fuel fired boilers. In boilers, the objective is to generate the maximum amount of heat and to transfer this heat to boiler feed water and steam circulating through tubes surrounding the combustion chamber. Because of this, it is advantageous to introduce as little excess combustion air as possible since heat will be lost heating the excess air. In a DAP dryer, the objective is to transfer the heat of combustion to air which, in turn, is used to dry a granular DAP product in a rotary dryer.

In boilers fired with oil, it is common practice to introduce 15-20 percent excess air. In a DAP dryer in contrast, approximately 50 percent excess air is fired through the burner and immediately downstream of the burner nozzle additional quench air is added resulting in a total air flow that is equivalent to 300-500 percent excess air. The additional excess air in a DAP dryer is expected to quench the flame temperature and reduce the formation of NOx in the manner of a low-NOx burner; a burner designed specifically to minimize NOx emissions.

Because of the inherent operation of the burner in the DAP dryer, an NOx emission factor from the lower range of those published in AP-42 was selected when estimating NOx emissions during the preparation of the initial application for PSD review. The emission factor selected was 20 pounds of NOx per 1,000 gallons of fuel fired. At a DAP production rate of 140 tons per hour and fuel firing rate of two gallons per ton (280 gallons per hour of fuel in the DAP dryer) an NOx emission rate 5.6 pounds per hour or 23 tons per year (with a 0.95 annual operating factor) was calculated and proposed as an emission limiting standard for the DAP dryer.

In the modification to the approval granted under PSD-FL-034, dated February 27, 1985, EPA modified the NOx emission limiting standard to 0.21 pounds of NOx per million BTU input to the dryer or 8.6 pounds of NOx per hour, whichever is less. At design operating conditions, the 8.6 pounds per hour emission limit is equivalent to a NOx emission factor of 30.7 pounds of NOx per thousand gallons of fuel fired.

On May 29, 1985, an NOx emission test was run on the DAP dryer. At the time of the test, the plant was operating at a production rate of 124 tons of DAP per hour and No. 6 fuel oil was being fired to the dryer at the rate of 195 gallons per hour; 1.6 gallons per ton of product. The NOx emission rate (expressed as NO_2) averaged 20.2 pounds per hour. This is equivalent to a concentration of 36 ppm in a stack gas flow rate of 78,907 dry standard cubic feet per minute. This NOx emission rate corresponds to an emission factor of 104 pounds of NOx per 1,000 gallons of fuel fired; an emission factor that is almost twice as high as the highest factor reported in AP-42 for oil fired boilers, and a rate of 0.71 pounds per million BTU heat input.

There is no apparent explanation for the high NOx emission rate from the New Wales DAP dryer. The dryer is operated as described in the application for PSD approval; that is with approximately 50 percent excess air fed through the burner and additional quench air added downstream of the burner resulting in a total air flow equivalent to 300-500 percent excess air. Nothing more can be modified in the operation of the dryer to effect the formation and emission rate of nitrogen oxides.

By this letter, we are requesting the reopening of the Best Available Control Technology (BACT) determination file for the subject source and a revision to the NOx emission limit. Based upon the test data provided herein, New Wales is requesting a NOx emission limit equivalent to NOx emission rate of 125 pounds of NOx per 1,000 gallons of fuel fired. Under the referenced emission test conditions, this limit would have resulted in an emission rate of 24.4 pounds per hour. At maximum plant operating rate (a 140 tons per hour production rate and a fuel firing rate of two gallons per ton of product) the maximum allowable NOx emission rate would be 35.0 pounds per hour.

In reviewing this request the following factors should be taken into consideration:

1. There is nothing that can be changed in the operation of the DAP dryer that will further reduce the formation and emissions of NOx. The dryer is operating under procedures that are common to the operation of all DAP dryers in the industry. There is no apparent explanation as to why the measured nitrogen oxide emission rate is so much greater than the expected nitrogen oxide emission rate resulting from the combustion of the same quantity of fuel in an oil fired boiler.

2. The requested increase in NOx emissions to 35.0 pounds per hour from 8.6 pounds per hour (See EPA letter dated February 27, 1985), will result in an increase of NOx emissions of 26.4 pounds per hour or 110 tons per year, assuming a 0.95 annual operating factor.

3. The impact of these additional nitrogen oxides are not expected to be significant. Based upon the air quality impact analysis submitted with the original application for PSD approval (see attached) the NOx from the DAP plant (23 tons per year) represented 18 percent of the NOx emitted from the expansion addressed by the PSD application. The total NOx emitted from the proposed new sources was less than four percent of the sulfur dioxide emission rate from the proposed sources.

   If the requested increase in the NOx emission limit for the DAP dryer is granted, the annual NOx emission rate will be 146 tons per year or 58 percent of the NOx emitted from the proposed new sources. The total NOx emissions from the new sources will then be approximately eight percent (rather than four percent) of the sulfur dioxide emissions from the sources.

   Since, according to the original air quality review, the annual impact of sulfur dioxide emissions was only five micrograms per cubic meter, the impact of the nitrogen oxides emissions will be approximately eight percent of this or less than 0.5 micrograms per cubic meter. Since the annual standard for nitrogen oxides is 100 micrograms per cubic meter, it is apparent that the requested increase in the NOx emission rate to 35 pounds per hour maximum will not result in a significant impact on ambient air quality.

Based upon the information provided herein, IMC requests that the Department review the BACT determination for NOx emissions from the No. 2 DAP plant dryer operated at the IMC/New Wales Chemical Complex and increase the allowable emissionlimit of NOx to 35.0 pounds per hour or 0.71 pounds per million BTU heat input. If there are any questions regarding this request or if additional information is required please do not hesitate to contact me.

Very truly yours,

SHOLTES & KOOGLER,
ENVIRONMENTAL CONSULTANTS

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

JBK:ssc
Attachments

cc: Mr. A. L. Girardin

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET
ATLANTA, GEORGIA 30365

FEB 2 7 1985

REF: 4AW-AM

RECEIVED BY
JOHN A. BRAFFORD
MAR - 4 1985
COPIES
ROUTE TO JWB

Mr. Thomas L. Craig
Vice President and General Manager
International Minerals and Chemical Corp.
P. O. Box 1035
Mulberry, Florida 33860

RE: PSD-FL-034 - New Wales Chemical

Dear Mr. Craig:

We have received the determination from the Florida Department of Environmental Regulation, dated January 25, 1985, concerning your request of December 12, 1984, to modify emission limits within your May 23, 1980, PSD construction permit for the operation of your diammonium phosphate production train. We have reviewed this determination and find that the requested changes will affect neither the emission rates on a mass per unit of production basis, total emissions in tons per year, nor compliance with New Source Performance Standards. We hereby modify the portions of Specific Condition 9 of your May 23, 1980, PSD permit regarding emissions from the diammonium phosphate production train as follows:

> Sulfur dioxide emissions from the dual train DAP reactor, granulator, and dryer shall not exceed 1.1 lbs/10^6 Btu input or 44 lbs/hr (whichever is less).
>
> NO_x emission from the dual train DAP reactor, granulator, and dryer shall not exceed 0.21 lbs/10^6 Btu input or 8.6 lb/hr (whichever is less).
>
> Fluoride emissions from the dual train DAP reactor, granulator, and dryer shall not exceed 0.06 lbs/ton of equivalent P_2O_5 feed or 4.2 lbs/hr (whichever is less).
>
> Particulate emissions from the dual train DAP reactor, granulator, and dryer shall not exceed 0.5 lb/ton of equivalent feed or 29.6 lbs/hr (whichever is less).

NOW WANT 25 [illegible] 125 [illegible]

This permit modification is effective as of the date of this letter. As this revision does not affect emission rates, total emissions, air quality, or pollution control costs, a <u>Federal Register</u> notice will not be published for the change.

Attachment 2

SUPPLEMENTAL DATA FOR PSD REVIEW

NEW WALES CHEMICAL COMPANY
POLK COUNTY, FLORIDA

OCTOBER 1979

SHOLTES & KOOGLER
ENVIRONMENTAL CONSULTANTS
1213 NW 6TH STREET
GAINESVILLE, FLORIDA 32601

(904) 377-5822

SHOLTES & KOOGLER

LONG-TERM IMPACT ANALYSIS

The long-term impact is defined as the annual average impact of pollutants emitted from sources within the study area. The long-term impact analysis was conducted with the AQDM. The input data to the AQDM included emission data for sulfur dioxide and particulate matter resulting from all sources within 50 km of the New Wales Chemical Complex. This includes sources outside the area of significant impact of the proposed New Wales sources.

The meteorological data input to the AQDM was for the 1970-1974 period from Tampa, Florida. These data were in the STAR format with five stability classes.

Receptor spacing used in the AQDM was 1.0 km except that near the New Wales Chemical Complex, 0.5 km spacings were used.

Particulate Matter Impact Analysis

The AQDM was run once to determine baseling particulate matter levels and a second time to determine the impact of new and proposed sources. These model runs are Nos. 100 and 101, respectively. The impact of existing and new sources was determined by summing the impacts of the existing and new sources (Model Run 100 + Model Run 101).

The annual average particulate matter levels for all sources, baseline sources and new and proposed sources are summarized in Figures 5-10 through 5-12, respectively.

Sulfur Dioxide Impact Analysis

The AQDM runs described for the particulate matter impact analysis also included sulfur dioxide emission data. Additionally; however, the AQDM was run a second series of times with receptors shifted eastwardly to fully cover the major impact area of the proposed New Wales Sources. The AQDM runs with the easterly receptor grid are Model Runs 102 and 103.

The output of these model runs for sulfur dioxide are summarized in Figures 5-13 through 5-15 respectively.

Other Pollutant Impact Analysis

The other major pollutant emitted from the proposed sources for which a long-term ambient air standard exists is nitrogen oxides. The annual average ambient air quality standard for nitrogen oxides is 100 ug/m^3.

The impact of nitrogen oxides emissions from the proposed sources was estimated by proportioning the impact of sulfur dioxide emissions. This was done since sulfur dioxide and nitrogen oxides are emitted from the same sources; the proposed sulfuric acid plants and the proposed DAP plant. The sulfuric acid plant emits 86 percent of the sulfur dioxide emitted from the proposed sources and 82 percent of the nitrogen oxides.

The remainder of both pollutants is emitted from the proposed DAP plant. The nitrogen oxides emission rate is less than four percent of the sulfur dioxide emission rate. From Figure 5-15 it can be seen that the maximum annual average sulfur dioxide impact from the proposed sources is only 5 ug/m^3. The nitrogen oxides impact by proportion will be only four percent of the 5 ug/m^3 or less than one ug/m3. This impact is less than one percent of the ambient air quality standard and does not justify modeling specifically for nitrogen oxides.