

10-22-79

I. Applicant

New Wales Chemicals, Inc.
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PSD-FL-003 4
NEW WALES CHEM., DAP
POLK CO.

II. Project Location

The plant site is in western Polk County, Florida, at Highway 640 and County Line Road. UTM coordinates are 396.6km east and 3078.9km north.

III. Project Description

The existing New Wales plant manufactures several fertilizer products using both wet and dry phosphoric acid processes. The dry process, with its existing facilities, is to be eliminated.⁺ Production of phosphoric acid (P_2O_5) will be increased by 50% or 500,000 tons/year (as 54% concentrate) using the wet process exclusively. Sulfuric acid for the wet process will be provided from two new sulfuric acid plants producing 2000 tons/day H_2SO_4 each. A dual train diammonium phosphate (DAP) plant will produce 140 tons/hour of DAP by reacting anhydrous ammonia with the P_2O_5 produced at the plant.* A third product loadout system will separately handle granular triple super phosphate (GTSP) from the existing complex.

Phosphate rock, as a raw material, is mined and shipped by truck and rail to the New Wales plant from mines within Polk County. These include Kingsford, Phosphoria, Noralyn, and Clear Springs.

Plans are to begin construction in early 1980 with completion by January, 1982. Startups will be phased throughout the interim as construction is completed.

+(The trend towards the increasing use of the wet process is not because of improved technology, but is, instead, because the increasingly expensive fuel costs and air emission regulations are forcing the industry to abandon the dry process)⁽⁷⁾.

*A liming station will be built for water treatment.

IV. Source Impact Analysis

Prevention of Significant Air Quality Deterioration (PSD) Regulations require a full preconstruction permit review of the following for major sources and major modifications with allowable emission increases of 50 tons/year or more:

- 1) Determination of Best Available Control Technology for control of each facility emitting any quantity of a major pollutant.
- 2) An Air Quality Review of each major pollutant for source impact on National Ambient Air Quality Standards.
- 3) An Air Quality Review of source impact on allowable increments for SO₂ and TSP, if SO₂ and particulate emissions are major.
- 4) An Air Quality Review of source impact on Class I areas for major pollutants with any increase in allowable emissions.
- 5) An Air Quality Review of source-related Growth Impacts.
- 6) An Air Quality Review of source impact on Soils, Vegetation, and Visibility.

"Phosphate rock processing plants" have been determined to be an important contributor to national air pollution. Therefore, as a named source, potential emissions for the proposed project in excess of 100 tons/year define the major pollutants, 40CFR52.21(b)(1)(i). From Table 1 the major pollutants are particulate matter (PM), sulfur dioxide (SO₂), "total fluorides", nitrogen oxides (NO_x), and acid mists.

Full PSD preconstruction review applies to those major pollutants with net increases in proposed allowable emissions in excess of 50 tons/year, including accumulative increases since the date of any previous PSD permit or August 7, 1977, whichever is more recent, 40CFR52.21 (b)(2). The accumulative increase in total fluoride allowable emissions is less than 50 tons/year under the proposed project. Therefore, total fluoride emissions are exempt from control technology review, 40CFR52.21 (j)(2). Also, the net increase in

total fluoride emissions is less than 50 tons/year, meaning these are also exempt from PSD impact analyses, 40CFR52.21 (k)(1)(ii).

Emissions data from Tables 1 through 4 is used to determine applicability of PSD regulations. In Tables 1 and 2, SO_2 emissions from the proposed H_2SO_4 plants result when sulfur burned in the furnaces to form SO_2 is not completely oxidized to SO_3 by the catalytic converter. Acid mists of H_2SO_4 result from carryover of liquid when SO_3 is passed through a water solution of H_2SO_4 in making the concentrated H_2SO_4 final product. NO_x emissions occur from fixation of atmospheric nitrogen (N_2) under the extreme heat conditions in the sulfur burners.

"Total fluorides" means elemental fluorine and all fluoride compounds as measured by Methods 13A or 13B. Fluorides naturally present in phosphate rock (about 4%) are vaporized and emitted by the heat of reaction between H_2SO_4 and phosphate rock in P_2O_5 production.* A portion of these fluoride contaminants are also emitted as fugitives from the gypsum pond, with HF being the predominant species in this instance. Heat of reaction between ammonia (NH_3) and P_2O_5 in the DAP plant causes fluoride compounds to be vaporized and emitted in this facility, with SiF_4 being the predominant species here.

SO_2 and NO_x emissions in the DAP plant occur from fuel oil burning in the product dryer. The DAP product is dried so it may be handled as a solid.

PM emissions from the GTSP loadout system will consist of air-borne GTSP arising from truck and rail car loading. PM emissions from the new liming station will consist of lime (CaO) and limestone (CaCO_3). These materials will be trucked into New Wales daily and will be pneumatically transferred to storage bins for use in treating process waters for recycling within the plant.

*These are silicon fluoride compounds, and to a lesser extent, HF.

TABLE I

POTENTIAL AIR EMISSIONS FOR THE PROPOSED PROJECTS (tons/year)

<u>Facility</u>	<u>PM</u>	<u>CO</u>	<u>SO₂</u>	<u>Total Fluorides</u>	<u>NO_x</u>	<u>HC</u>	<u>Acid Mist</u>
No. 4 H ₂ SO ₄ plant	0	0	1387	0	52	0	520
No. 5 H ₂ SO ₄ plant	0	0	1387	0	52	0	520
No. 3 P ₂ O ₅ plant	0	0	0	124	0	0	0
DAP plant	8916	6.1	491	436	23	1.2	0
GTSP product loadout	36	0	0	0	0	0	0
Liming station	60	0	0	0	0	0	0
Gypsum pond (fugitive emissions)	<u>0</u>	<u>0</u>	<u>0</u>	<u>17.5</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	9012	6.1	3265	577.5	127	1.2	1040

TABLE II

ALLOWABLE EMISSIONS FOR THE PROPOSED PROJECTS (tons/year)

<u>Facility</u>	<u>PM</u>	<u>CO *</u>	<u>SO₂</u>	<u>Fluorides</u>	<u>NO_x</u>	<u>HC *</u>	<u>Acid Mist</u>
No. 4 H ₂ SO ₄ plant	0	0	1387	0	52	0	52
No. 5 H ₂ SO ₄ plant	0	0	1387	0	52	0	52
No. 3 P ₂ O ₅ plant	0	0	0	5.0	0	0	0
DAP plant	64.8	6.1	193 ^{8760 lbs}	17.4	23	1.2	0
GTSP product loadout	6.0	0	0	0	0	0	0
Liming station	0.6	0	0	0	0	0	0
Gypsum pond (fugitive emissions)	<u>0</u>	<u>0</u>	<u>0</u>	<u>17.5</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	73.4	6.1	2967	39.9	127	1.2	104

*CO and HC are not major pollutants, and are therefore not regulated by this PSD permit.

TABLE III

POTENTIAL EMISSIONS OF FACILITIES CONSTRUCTED

SINCE AUGUST 7, 1977 (TONS/YEAR)

<u>Facility</u>	<u>PM</u>	<u>CO</u>	<u>SO₂</u>	<u>Total Fluorides</u>	<u>NO_x</u>	<u>HC</u>	<u>Acid Mist</u>
2nd Product Loadout	36	0	0	0	0	0	0
Uranium Rec. Solvent Ext.	0	0	0	1	0	34	0
Uranium Rec. Refining	<u>48</u>	<u>0</u>	<u>13</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	84	0	13	1	1	34	0

TABLE IV

ACTUAL EMISSIONS FROM FACILITIES BEING PHASED
OUT IN CONJUNCTION WITH THIS PERMIT
(ton/year)

<u>Facility</u>	<u>PM</u>	<u>SO₂</u>	<u>NO_x</u>
Dry Rock Silo	3.9	0.0	0.0
Rock Grinding-west	12.3	0.0	0.0
Dry Rock Load-out (never used)	0.0	0.0	0.0
Rock Grinding-east	12.2	0.0	0.0
Dry Rock Silo bottom	0.0	0.0	0.0
Dryer Prod. Belt. Trans.	3.9	0.0	0.0
Wet Rock Dryer*	100.9	1,576.80	88.
Phos. Acid Rock Bin-west	3.9	0.0	0.0
Phos. Acid Rock Bin-east	<u>3.9</u>	<u>0.0</u>	<u>0.0</u>
Total	140.9	1,576.80	88.

*This dryer consumes 1,000 gallons of No. 6 oil per hour, and is being shutdown.

360 lbs/hr (8760 hrs/year)

A. Control Technology Review

PSD regulations require Best Available Control Technology (BACT) be applied to major pollutants where allowable emissions are to exceed 50 tons/year, 40CFR52.21 (j)(2).

NSPS specifies SO_2 and acid mist emission limitations for the two proposed H_2SO_4 plants. These serve as a starting point for defining BACT. A recent review of NSPS for sulfuric acid plants sponsored by EPA concluded the current emission limitations not be made more stringent.⁽²⁾ Therefore, the applicant proposed NSPS levels as BACT. EPA agrees with the proposed limits as case by case BACT for these sulfuric acid plants.

Proposed BACT for control of H_2SO_4 plant SO_2 emissions is the double absorption process. The typical single absorption process is not capable of meeting current SO_2 emission standards when considering the economics of converter design. A platinum/vanadium pentoxide catalyst converts SO_2 to SO_3 in the converter. Catalyst changeover will be once every five years in the first 3 of 4 beds to ensure SO_2 is converted to SO_3 in high yield, avoiding unnecessary SO_2 emissions. A 3-year changeover interval is not recommended because it would cut pre-tax profits by 20%.⁽²⁾ The sodium sulfite/bisulfite scrubber and the ammonia scrubber systems were considered feasible, but were rejected as SO_2 control measures because these systems introduce complex technology, they are relatively untested, and the SO_2 emission control would not be significantly greater than that obtainable through double absorption alone. Since NSPS promulgation, only one H_2SO_4 plant has used an alternate molecular sieve control technology, and this system has since been retrofitted due to operational difficulties.

Acid mists from H_2SO_4 plants have historically been controlled by use of electrostatic precipitators (ESP). Power and maintenance costs are high and ESP's are bulky in size. In general, ESP's have been superseded by fiber-type mist eliminators for tail gas cleanup. New Wales intends to use the Brink HV (high velocity) mist eliminators. HE (high efficiency) mist eliminators are an alternate consideration. The HV types work just as well, require less space, and can be built at a lower cost than HE types. Therefore, HE mist eliminators are rejected. Acid mists of H_2SO_4 are also controlled in part by a 10%

visible emissions standard imposed by the NSPS. Acid mists form a blue-white plume where emitted.

NO_x emissions from combustion sources are commonly controlled by reducing the nitrogen content of the fuel, reducing the air/fuel ratio, and reducing the peak flame temperature. None of these methods are applicable to sulfur burners in H_2SO_4 plants. The sulfur (fuel) in the sulfur burners is essentially nitrogen-free. At reduced burner air/fuel ratios, the converter temperature increases and the absorber efficiency drops off resulting in increased SO_2 emissions. Also, combustion air in a sulfur burner is introduced adjacent to the sulfur nozzle, meaning the concept of a "low NO_x " burner is not applicable because no air is mixed with the sulfur in the burner to begin with. Steam injection would foul the converter catalyst and cause excessive acid mist emissions. As a point of comparison, however, a 2000 TPD H_2SO_4 plant will produce 200,000 lb/hr of useful steam and emit 13 lb/hr NO_x while an oil-fired boiler producing 200,000 lb/hr steam will emit 80-170 lb/hr NO_x . Proposed allowable emissions are based on New Wales' stack testing results of an identical existing 2000 TPD H_2SO_4 plant. The emission factor developed was 2.1×10^{-6} lb NO_x /dscf, or 18ppm. No literature value can be found for reference. By comparison, however, NO_x concentrations in power boiler flue gases average 100-200ppm.

Exclusive use of the wet rock process (wet rock has 12% moisture) eliminates the fugitive PM dust problem associated with dry rock handling.⁽⁷⁾ Therefore, the proposed P_2O_5 plant will have only fluoride emissions. NSPS requires total fluoride emissions from this source category be no greater than 0.020 lb/ton of equivalent P_2O_5 feed. Gaseous fluoride compounds generated from the digester and the filter will be vented to a common spray crossflow packed scrubber. Scrubbers identical to this are installed in the New Wales No. 1 and 2 P_2O_5 plants, and these have successfully complied with NSPS emission limitations.

Emissions control is more elaborate for the DAP plant because of the greater potential for PM to plug scrubber packings and spray nozzles. The ammonia used in DAP manufacturing neutralizes the process flow medium such that SiF_4 contaminants form gelatinous deposits of polymeric silica ($\text{Si}(\text{OH})_4$ and H_2SiF_6) responsible for

plugging. This problem is avoided by placing a coaxial venturi scrubber in series and preceding a secondary scrubber. This primary scrubber removes excess PM and ammonia by using acidic pond water as the scrubbing solution. It is designed to be self-cleaning to avoid plugging. The secondary scrubber is a packed type similar to the one to be used in the P₂O₅ plant except that the flow of scrubbing medium (pond water) is countercurrent to tail gas flow instead of "crossflow" or normal (A crossflow scrubber may be described as a compromise between a concurrent and a countercurrent flow scrubber.) In spite of the use of a dual scrubber system, however, it is still necessary to periodically shutdown a DAP plant for scrubber cleaning. Therefore, the secondary scrubber is designed to meet 0.01 gr/dscf and is shutdown for cleaning when PM emissions approach 0.02 gr/dscf. Finally, the tail gas stream will pass through a mist eliminator before being emitted to the atmosphere. Note that the emission controls for the DAP plant coexist in duplicate since the process flow is a dual train system.

A bag collector with 99% control of potential emissions is proposed for use on the DAP cooler. High ammonia vapor levels keep fluoride emissions suppressed so that PM is the only significant pollutant at this facility. The PM recovered in the filters is actually DAP product, and when retrieved, increases the total product yield. Wet scrubbers could be just as effective as bag filters. However, the use of pond water as the scrubbing medium might introduce fluoride emissions into a source that otherwise was uncontaminated.

The DAP dryer will be a source of those emissions commonly associated with combustion. No. 6 residual oil at 2.5% S will be fired at a rate of 140 gal/hr in each of the two dual trains.* AP42 emission factors for fuel oil combustion are used to estimate potential emissions. On the basis of the fuel analyses, one would project an SO₂ emission rate of 56 lb/hr from each train. New Wales believes they can meet a 22 lb/hr SO₂ emission rate, however, because ammonia vapors offer a strong natural suppression effect on the acidic SO₂ emissions. PM emissions are controlled by the same wet scrubbing systems used for controlling reactor and granulator emissions from each train. NO_x emissions are controlled by steam

*The 140 gal/hr rate is based on the assumption that two gallons of fuel oil are required to dry one ton of DAP product.

atomizing the fuel oil and injecting 300 to 500 percent excess quench air. Because of the nature of the drying operation, the burners function similar to a "low NO_x burner" design. Air/fuel ratios are controlled by use of orifices in air and fuel lines and by varying the load on the oil pump.* In actual practice fuel oil is used as an alternate heat source. Primary heat for the dryers will be excess steam from the H_2SO_4 plants. For permitting purposes, however, it is assumed dryers operate continuously.

PM emissions from the liming station occur only when lime and limestone are discharged to two storage silos. Emission rates are based on 0.010 gr/dscf at 1600 acfm each. Bag filters are the obvious choice for control technology.

The third product loadout system for GTSP will be identical to a second now in operation. There will be two negative air system bag filters to recover product during loading of trucks and rail cars. A maximum 0.010 gr/dscf is achievable. Product recovered by bag filters increases the total product yield.

The control technologies proposed by New Wales comply with NSPS and BACT requirements. The use of double absorption for H_2SO_4 plants has been the chosen technology in 28 of 32 new or modified H_2SO_4 plants built since 1971, with all 32 plants having the acid mist eliminators being proposed by New Wales. The control technologies for the phosphate rock processes were chosen for being the best systems currently available within the industry.

*The concept of air/fuel ratio control by flue gas oxygen monitoring is often applied to combustion sources to minimize NO_x emissions. In such cases the flue gas oxygen monitor assists in maintaining excess air within a narrow optimum range of 10 to 20 percent over stoichiometry. Such instrumentation is not applicable to DAP dryers, however, because these are designed to operate over a wide range of 300 to 500 percent excess air.

B. Source Impact on Class II Increments

PM and SO₂ are major pollutants with defined allowable Class II increments, 40CFR52.21 (c). Increments provide for future industrial growth in areas shown not to violate National Ambient Air Quality Standards (NAAQS).

New Wales' increment impacts were evaluated using air dispersion models approved by the EPA Guideline for Air Quality Models, March 1978. Meteorological model input data was obtained for the period 1970 through 1974 from the National Weather Service in Tampa, Florida, 25 miles west of the source.

The CRSTER model (single source model) was used initially. Proposed PM emissions and SO₂ emissions of this permit were examined for ground level concentration (g.l.c.) impacts. The first CRSTER run revealed the annual mean g.l.c.'s, maximum 24-hr average g.l.c.'s, and the 2nd highest 24-hr averaged g.l.c.'s for each receptor at a range of 0.5 to 2.5 km from the source. A second CRSTER run with PM proposed emissions and receptors spaced 2.0 to 5.0 km from the source resolved the PM "impact areas". Impact areas are areas outside of which g.l.c.'s from a source's emissions are less than significance levels defined in PSD regulations. They may be isopleths, but for simplicity are often drawn as unresolved circles. Impact areas expressed as circles are shown below for PM and SO₂ proposed emissions.

<u>Parameter</u>	<u>Significance Level</u>	<u>Impact Area Radii</u>
PM, annual geo. mean	1 µg/m ³	2.0 km
PM, 24-hr mean	5 µg/m ³	3.4 km
SO ₂ , annual mean	1 µg/m ³	30. km
SO ₂ , 24-hr mean	5 µg/m ³	55 km
SO ₂ , 3-hr mean	25 µg/m ³	72 km

The SO₂ long term and short term averaged g.l.c.'s and impact areas were defined in a series of five CRSTER runs.

At this point, model results were reviewed to determine which year's meteorological data from 1970 through 1974 had given the worst case annual mean g.l.c.'s for both PM and SO₂. Similarly, 24-hr and 3-hr intervals of meteorological data were analyzed to determine what periods resulted in worst case second highest g.l.c.'s. (The highest short term average g.l.c.'s were properly ignored because a broad meteorological data base of five years had been used.) These selections provided the meteorological data base for all subsequent short term impact modeling which consisted of five predominant wind directions for PM 24-hr average impacts, five similar wind directions for SO₂ 24-hr average impacts, and four wind directions for SO₂ 3-hr average impacts.

The PTMTPW model (multiple point source model) was used to refine second worst case short term PM and SO₂ impacts disclosed by CRSTER. PM and SO₂ emissions of this permit with other increases in allowable emissions at New Wales since 1-6-75 were modeled along with all other increment consuming emissions within a 50 mile radius. This emission inventory was prepared by examining permit files at the Florida Department of Environmental Regulation office in Tampa. The list included twenty-five PM and SO₂ sources. New Wales' increment emissions were modeled with upwind increment emissions to project downwind g.l.c.'s for any given wind direction selected.

The Air Quality Display Model (AQDM) was run to determine annual mean SO₂ and PM increment consumption using the 1970 through 1974 meteorological data in the STAR format with five stability classes.

The worst case increment consumption concluded from PTMTPW and AQDM modeling is summarized below:

<u>Parameter</u>	<u>Allowable Increment</u>	<u>Increment Consumed</u>
PM, annual geo. mean	19	11
PM, 24-hr mean	37	24
SO ₂ , annual mean	20	5
SO ₂ , 24-hr mean	91	47
SO ₂ , 3-hr mean	512	124

C. Source Impacts on National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS) protect public health and welfare, Table 5. PSD regulations required the affected permit applicant to demonstrate their proposed allowable emissions will not cause or contribute to any NAAQS violations, 40 CFR 52.21 (k)(1).

PM, SO₂, and NO_x are New Wales' major pollutants for which NAAQS exist. For permit applications submitted after August 7, 1978, the application must use continuous air quality monitoring data from the previous year to support conclusions that NAAQS would not be violated, 40 CFR 52.21 (n)(2). This monitoring requirement for PM, SO₂, and NO_x was waived by the Administrator, however, due to a consideration of several factors. This exempting authority is also defined at 40 CFR 52.21 (n)(2).

NO_x monitoring was not required because New Wales adequately demonstrated that increased NO_x emissions associated with this permit would impact the annual average g.l.c. at less than 1 ug/m³, or less than the significance level defined in PSD regulations. Additionally, this value is less than 1 percent of the annual mean 100 ug/m³ NAAQS, and does not justify the source to be required to monitor NO_x. NO_x allowable emissions in this permit were modeled with AQDM with 1970 through 1974 meteorological data supporting this determination.

Site-specific SO₂ monitoring was not required because the permit applicant's consultant had available existing SO₂ monitoring data for the period January 1977 through January 1978. This data from four monitoring sites situated within ten miles northeast of New Wales reflected existing air quality in the predominant downwind region of the source. The EPA Reference Method (40 CFR 50, Appendix A) 24-hour SO₂ bubbler was the instrumentation. The highest annual mean value was 9.2 ug/m³; the highest 24-hour values, 215 ug/m³, with the second highest 24-hour value being only 92 ug/m³ at that same site. Since existing SO₂ air quality for the year 1977 indicated no threat to NAAQS, the Administrator decided additional SO₂ monitoring should not be required.

Monitoring of total suspended particulate (TSP) is done with "high volume samplers" to assess the impact of existing PM emissions and background on existing TSP air quality. New Wales has operated a high volume sampler since January 1975 six miles west of their plant.

This is in an upwind direction from the source 90 percent of the time, and therefore provides a good indication of existing background TSP. From 1975 to 1979 annual geometric mean values ranged 28.7 to 38.8 $\mu\text{g}/\text{m}^3$. The highest 24-hour value was 132 $\mu\text{g}/\text{m}^3$. Since these values indicate no threat to the NAAQS, and PM allowable emissions increases for the source in this permit are only 14.1 tons per year, EPA decided additional site-specific TSP monitoring should not be required.

Modeling the additive impacts of proposed allowable PM and SO_2 emissions along with permitted existing and new source emissions within 50 km was the technique used by the applicant to demonstrate no threat of NAAQS violations for these pollutants. This emission inventory was obtained from the FDER permit files in Tampa.

CRSTER was used to select five predominant wind directions for PM emission 24-hour average increment impact, five directions for the SO_2 emission 24-hour average, and four directions for the SO_2 3-hour increment impact study. These same selected meteorological data were used to assess impacts of all existing and proposed allowable emissions on the 24-hour and 3-hour period NAAQS. The Air Quality Display Model (AQDM) was used to assess impacts of all proposed and permitted emissions on the annual NAAQS, and PTMTPW was used to project short-term impacts.

Background concentrations for SO_2 in NAAQS modeling are assumed 20 $\mu\text{g}/\text{m}^3$ in accordance with EPA's Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), May 1978. Background concentrations for TSP are assumed 40 $\mu\text{g}/\text{m}^3$ in accordance with the same document. However, the applicant chose to use a higher value of 65 $\mu\text{g}/\text{m}^3$ for the 24-hour concentration. Both of these assume backgrounds more conservative than those actually measured in the site's vicinity from the above discussion. These background concentrations are added to worst case g.l.c.'s from the PTMTPW and AQDM models to project worst-case future air quality. The results summarized below demonstrate worst case future air quality within each applicable NAAQS from Table 5, and on this basis, New Wales demonstrates proposed allowable emission increases from this permit will cause no NAAQS violations.

<u>Parameter</u>	<u>Background (ug/m³)</u>	<u>Worst Case G.L.C. (ug/m³)</u>	<u>Projected Future Air Quality (ug/m³)</u>	<u>NAAQS (ug/m³)</u>
TSP, Annual Geo. Mean	40	20	60	75
TSP, 24-Hr Mean	65*	42	107	150
SO ₂ , Annual Mean	20	50	70	80
SO ₂ , 24-Hr Mean	20	174	194	365
SO ₂ , 3-Hr. Mean	20	393	413	1300

*This background concentration was selected by the applicant as a conservative estimate.

TABLE V

National Ambient Air Quality Standards

<u>Pollutant</u>	<u>Averaging Time</u>	<u>Primary Standard</u> <u>($\mu\text{g}/\text{m}^3$)</u>	<u>Secondary Standard</u> <u>($\mu\text{g}/\text{m}^3$)</u>
Sulfur Dioxide	Annual Arithmetic Mean	80	--
	24-Hour*	365	
	3-Hour*	--	1,300
Particulate Matter	Annual Geometric Mean	75	60
	24-Hour*	260	150
Carbon Monoxide	8-Hour*	10,000	10,000
	1-Hour*	40,000	40,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100
Ozone	1-Hour*	240	240
Lead	Calendar Quarter	1.5	1.5
	Arithmetic Mean	--	--

* Not to be exceeded more than once per year

It should be noted that, consistent with EPA Region IV policy, the small amount of fugitive TSP emissions from the wet rock storage pile are not considered in the increment and NAAQS impacts. This exemption is made on the basis of the current controversy over the accuracy of available analytical techniques for predicting impacts of fugitive TSP. Further, the high moisture content of the New Wales phosphate rock (12%) precludes the potential for fugitive TSP emissions from this source.

Downwash from proposed stacks at the plant was considered for adverse air quality impacts, 40 CFR 52.21(h). The H_2SO_4 plants will have 200 foot stacks, 2.33 times the height of the nearest important structures which are 86 feet high. The tail gas velocity exiting these will be 10.8 m/s, or nearly three times the average wind speed. Due to this fact and the closeness of these stack heights to GEP (200 vs. 215 ft.), these stacks should not contribute any downwash problem.

The three stacks exhausting the DAP plant and the stack from the third product load-out system are each less than two times the height of nearby structures. Impact of downwash for SO_2 and PM emissions is analyzed with the PAL model. The initial (0_z) is set equal to the structure width divided by 4.3 in accordance with recommendations in D.B. Turner's Workbook of Atmospheric Dispersion Estimates, 1969. Meteorological data resulting in worst case dispersion as determined from CRSTER is used. Results indicate PM downwash could amount to a 13 ug/m^3 concentration as a 24-hr average. For SO_2 worst case downwash is 31 ug/m^3 as a 3-hr average. Furthermore, these values occur within the property boundaries. At distances further than property boundaries impacts from normal dispersion become more significant than downwash impacts.

Modeling analyses with PAL demonstrated no adverse air quality impacts from downwash, and the stack heights proposed are concluded to meet good engineering practice design.

D. Source Impact on Soils, Vegetation, and Visibility

This impact analyses is required at 40 CFR 52.21(p) for PM, SO₂, NO_x, and acid mist major pollutants.

Impacts of increased PM, NO_x, and SO₂ emissions are minimized by offsets within the source. The maximum ground level NO_x concentration was estimated at less than 1 µg/m³. This is less than the significance level for that pollutant as defined in PSD regulations.

SO₂ behaves as an acid causing lesions on plant leaves and lowers the pH of the soil. Concentration levels for these phenomena, however, are beyond the limits permitted by NAAQS.* No impact on soils and vegetation from SO₂ is anticipated.

Visibility impacts are controlled by visible emission standards of (20% opacity for all facilities except for the H₂SO₄ plants which are subject to visible emissions standard of 10% opacity defined in the NSPS.

No significant impacts on soils, vegetation, or visibility are projected.

E. Growth Impacts

PSD regulations require the impact of community growth associated with a proposed project be evaluated for its additional impact on future air quality, 40 CFR 52.21(p)(2).

The entire southwest section of Polk County is the richest phosphate rock deposition in the world. Therefore, this entire region is devoted to the phosphate rock processing industry. Property for several miles around the site is either privately owned by New Wales or by other phosphate rock companies with a mutual interest in the industry. The proposed project with associated growths is typical for the area. About 300 people will be hired to operate the expansion facilities.*

On the basis of air quality impact analyses in this permit, there would also be ample increment available for another major source in this area.

*Also there are no agricultural crops, or other vegetation of commercial significance in the area.

* Expansion of mining operations should not be a significant secondary source impact. Over 98% of the phosphate rock produced in the United States is mined from ground where the moisture content is high enough to preclude particulate emissions. Mobile source emissions will include an additional 150 trucks and 75 railcars per day.

F. Source Impact on Class I Areas

PSD regulations require source impact on Class I areas be assessed, 40 CFR 52.21(q)(1).

The nearest Class I area to the New Wales site is the Chassahowitzka National Wildlife Refuge 62 miles northwest. The largest area of significant impact of proposed emissions is 72 km or 45 miles, and this is for the SO₂ 3-hr average. This means there is no significant impact of emissions on the Class I area. New Wales' proposed emissions will not impact the Chassahowitzka National Wildlife Refuge.

V. Conclusions

EPA Region IV proposes a final determination of approval with conditions for New Wales to construct the proposed expansion projects described in the PSD permit application, PSD-FL-034. This approval recommendation is based on information submitted to EPA by the applicant in the following correspondence:

- | | |
|----------------------|---|
| 1. June 5, 1979 | PSD permit application submittal |
| 2. September 5, 1979 | DAP plant proposal |
| 3. October 19, 1979 | additional information submittal |
| 4. December 20, 1979 | more additional information |
| 5. February 14, 1980 | applicant's response to FDER's comments on air quality modeling |

This approval recommendation requires the following conditions be a part of the PSD permit to be issued:

1. In the P₂O₅ plant all potential sources of total fluoride emissions including (but not limited to) the hotwell, Prayon filter, seal tank, vents from sumps, clarifiers and acid tanks, will either be unexposed to ambient air or will be ducted to this facility's wet scrubber system.
2. There will be no visible emissions from the phosphate rock receiving, unloading, and conveying operations at the source. There will also be no visible emissions from the rock storage pile.
3. Fugitive PM emissions during construction phases of the proposed project are limited to 20% opacity. Control will be achieved through use of water suppression, wind breaks, and road paving as needed to meet the opacity limitation.

4. The following existing source facilities scheduled to be phased out will have zero emissions after any facility of this permit begins operating:

<u>Facility</u>	<u>Designation Code</u>
Dry Rock Silo	A053-5963
Rock Grinding-west	A053-5969
Dry Rock load-out	A053-5979
Rock Grinding-east	A053-5967
Dry Rock Silo Bottom	A053-5980
Dry Prod. Belt. Trans..	A053-5981
Wet Rock Dryer	A053-5982
Phos. Acid Rock Bin-west	A053-4970
Phos. Acid Rock Bin-east	A053-5968

5. Unless otherwise specified, each emission point associated with this permit is subject to a 20 percent visible emission standard using Method 9.
6. H_2SO_4 plant SO_2 continuous emissions monitoring is required in accordance with 40 CFR 60.84.
7. The mass flow of phosphorus-bearing feed will be monitored at the DAP plant and the P_2O_5 plant in accordance with 40 CFR 60.223 and 40 CFR 60.203, respectively.
8. The total pressure drop across process scrubbing systems in the DAP plant and the P_2O_5 plant will be monitored in accordance with 40 CFR 60.223 and 40 CFR 60.204, respectively.
9. The emissions from the constructed facilities will not exceed the allowable emission limits outlined in the attached allowable emissions tables for fluorides, particulate matter, sulfur dioxide, and acid mist (H_2SO_4).
10. In accordance with 40 CFR 60.8 performance tests using EPA approved methods will be conducted to ensure that each allowable emissions of this permit is complied with. The gypsum ponds are exempted from this requirement on the basis that no accepted method exists for testing fugitive emissions of fluoride from gypsum ponds.
11. Post construction continuous monitoring for particulate matter and sulfur dioxide will be performed for a period of at least one year. Such monitoring will be in accordance with the EPA

quality assurance procedures and the requirements outlined in Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EPA-450/2-78-019).

12. The applicant will comply with the requirements and procedures of the attached general conditions.

Total Fluoride allowable emissions:

<u>Facility</u>	<u>Allowable Emissions</u>
No. 3 P ₂ O ₅ plant 1500 ton P ₂ O ₅ /day	0.020 lb/ton of equivalent P ₂ O ₅ feed and 1.25 lb/hr
DAP reactor, granulator, and dryer 35 ton/hr P ₂ O ₅ each train	0.060 lb/ton of equivalent P ₂ O ₅ feed and 2.10 lb/hr from each of two trains
DAP cooler	zero - 0.060 lb/ton P ₂ O ₅ total complex
Gypsum Ponds ^a	4 lb/hr ^a

Note: control technology is not specified for total fluoride emissions because of exemption authorized at 40 CFR 52.21(j)(2).

^a No established test method exists for fluorides from gypsum ponds; therefore, performance testing for the gypsum ponds is not required.

PM allowable emissions

<u>Facility</u>	<u>Allowable Emissions</u>	<u>Control Technology</u>
DAP reactor, granulator, and dryer. 35 ton/hr P ₂ O ₅ each train (nominal capacity)	14.8 lb/hr* each train, and 0.020 gr/dscf based on 100,000 dscfm on each train, and 0.50 lb/ton P ₂ O ₅ equivalent feed.	primary scrubber: coaxial venturi; secondary scrubber: spray chamber, and countercurrent packed bed; mist eliminators
DAP cooler bag collector 1 unit common to both trains	4.30 lb/hr, and 0.010 gr/dscf based on 50,000 scfm	99% control of potential emissions 10,000 ft ² cloth, 50,000 SCFM
3rd GTSP Product Loadout:		
a) truck loading system	0.90 lb/hr, and 0.010 gr/dscf	A negative air bag collector system is provided for each; 99% removal of potential emissions is design.
b) railcar loading system	0.80 lb/hr, and 0.010 gr/dscf	
Liming Station	0.140 lb/hr each, and 0.010 gr/dscf at 1600 scfm each	A bag collector for each of 2 silos; 99% removal of potential emissions is design; emissions occur only during material transfer into the silos.

*14.8 lb/hr is consistent with State permitted allowable emissions rate.

Sulfur dioxide allowable emissions:

<u>Facility</u>	<u>Allowable Emissions</u>	<u>Control Technology</u>
No. 4 H ₂ SO ₄ plant; No. 5 H ₂ SO ₄ plant (2000 TPD capacity each)	4 lb/ton H ₂ SO ₄ produced, expressed as 100% H ₂ SO ₄ , and 333 lb/hr each	double adsorption process; catalyst changeover as required to keep SO ₂ emissions within compliance
DAP reactor, granulator, and dryer (dual train)	22 lb/hr from each of two dryers, and 1.1 lb/10 ⁶ Btu input	2.5% S maximum No. 6 fuel oil; free ammonia present in the dryer vapors naturally suppresses SO ₂ emissions, 60% control is estimated based on firing 140 gal/hr total.

NO_x allowable emissions:

No. 4 H ₂ SO ₄ plant; No. 5 H ₂ SO ₄ plant	12.6 lb/hr each, and 2.1 x 10 ⁻⁶ lb/dscf	good engineering practices; no scrubber technology known. Allowable emissions are based on actual measurements of existing identical units
DAP reactor, granulator, and dryer	4.3 lb/hr each train, and 0.21 lb/10 ⁶ Btu input	low NO _x type burners for the dryer; free ammonia present in the dryer vapors naturally suppresses some NO _x species. Air/fuel control for oil firing in dryers is achieved by fixed orifices in both oil and air lines and using variable pressure on the oil pump; high excess air is required for proper process flow; steam atomization of fuel oil.

Acid mist (H_2SO_4) allowable emissions:

<u>Facility</u>	<u>Allowable Emissions</u>	<u>Control Technology</u>
No. 4 H_2SO_4 plant; No. 5 H_2SO_4 plant	12.5 lb/hr each, and 0.15 lb/ton H_2SO_4 produced, expressed as 100% H_2SO_4	HE or HV mist eliminators, 90% control of potential emissions; opacity must not exceed 10% by Method 9

GENERAL CONDITIONS

1. The permittee shall notify the permitting authority in writing of the beginning of construction of the permitted source within 30 days of such action and the estimated date of start-up of operation.
2. The permittee shall notify the permitting authority in writing of the actual start-up of the permitted source within 30 days of such action and the estimated date of demonstration of compliance as required in the specific conditions.
3. Each emission point for which an emission test method is established in this permit shall be tested in order to determine compliance with the emission limitations contained herein within sixty (60) days of achieving the maximum production rate, but in no event later than 180 days after initial start-up of the permitted source. The permittee shall notify the permitting authority of the scheduled date of compliance testing at least thirty (30) days in advance of such test. Compliance test results shall be submitted to the permitting authority within forty-five (45) days after the complete testing. The permittee shall provide (1) sampling ports adequate for test methods applicable to such facility, (2) safe sampling platforms, (3) safe access to sampling platforms, and (4) utilities for sampling and testing equipment.
4. The permittee shall retain records of all information resulting from monitoring activities and information indicating operating parameters as specified in the specific conditions of this permit for a minimum of two (2) years from the date of recording.
5. If, for any reason, the permittee does not comply with or will not be able to comply with the emission limitations specified in this permit, the permittee shall provide the permitting authority with the following information in writing within five (5) days of such conditions:
 - (a) description of noncomplying emission(s),
 - (b) cause of noncompliance,
 - (c) anticipated time the noncompliance is expected to continue or, if corrected, the duration of the period of noncompliance,
 - (d) steps taken by the permittee to reduce and eliminate the noncomplying emission,and
 - (e) steps taken by the permittee to prevent recurrence of the noncomplying emission.

Failure to provide the above information when appropriate shall constitute a violation of the terms and conditions of this permit. Submittal of this report does not constitute a waiver of the emission limitations contained within this permit.

6. Any change in the information submitted in the application regarding facility emissions or changes in the quantity or quality of materials processed that will result in new or increased emissions must be reported to the permitting authority. If appropriate, modifications to the permit may then be made by the permitting authority to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause violation of the emission limitations specified herein.
7. In the event of any change in control or ownership of the source described in the permit, the permittee shall notify the succeeding owner of the existence of this permit by letter and forward a copy of such letter to the permitting authority.
8. The permittee shall allow representatives of the State environmental control agency or representatives of the Environmental Protection Agency, upon the presentation of credentials:
 - (a) to enter upon the permittee's premises, or other premises under the control of the permittee, where an air pollutant source is located or in which any records are required to be kept under the terms and conditions of the permit;
 - (b) to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit, or the Act;
 - (c) to inspect at reasonable times any monitoring equipment or monitoring method required in this permit;
 - (d) to sample at reasonable times any emission of pollutants;and
 - (e) to perform at reasonable times an operation and maintenance inspection of the permitted source.
9. All correspondence required to be submitted by this permit to the permitting agency shall be mailed to the:

Chief, Air Facilities Branch
Air and Hazardous Materials Division
U.S. Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30308
10. The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

The emission of any pollutant more frequently or at a level in excess of that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

REFERENCES

1. Sulfuric Acid Plants, New Source Performance Standards Inspection Manual for Enforcement of, EPA-340/1-77-008, May 1977.
2. Sulfuric Acid Plants, A Review of Standards of Performance for New Stationary Sources, EPA-450/3-79-003, January 1979.
3. Source Assessment: Chemical and Fertilizer Mineral Industry, State of the Art, EPA-600/2-78-004p, June 1978.
4. Inspection Manual for Enforcement of New Source Performance Standards: Phosphate Fertilizer Plants, EPA-340/1-77-009, May 1977.
5. Fluoride Emissions from Phosphoric Acid Plant Gypsum Ponds, EPA-650/2-74-095, October 1974.
6. Atmospheric Emissions from Wet-Process Phosphoric Acid Manufacture, U.S. Department of H.E.W., April 1970.
7. Phosphate Rock Plants - Background Information for Proposed Standards, Draft EIS, EPA-450/3-79-017, September 1979.