

Technical Evaluation
and
Preliminary Determination

New Wales Chemicals, Inc.
Polk County, Florida

Federal Permit Number
PSD-FL-072

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting
April 22, 1981

Public Notice

PSD-FL-072

The New Wales Chemicals Company proposes to modify two double absorption type sulfuric acid plants, currently under construction at their chemical complex in western Polk County, to increase the production rate of each plant from 2,000 tons per day (TPD) to 2,750 TPD of 100% sulfuric acid.

Total emissions of air pollutants, in tons per year, resulting from the modification alone will be:

SO ₂	Acid Mist	CO	NO _x
1050	39.4	3.0	36.8

By authority of the U.S. Environmental Protection Agency, the Florida Department of Environmental Regulation (FDER) has reviewed the proposed modification under federal prevention of significant deterioration (PSD) regulations (40 CFR 52.21). The FDER has made a preliminary determination that the modification can be approved provided certain conditions are met. A summary of the basis for this determination and the application for a permit submitted by New Wales Chemicals, Inc. are available for public review in the Bartow Public Library, Bartow, Florida, and the following FDER offices:

Southwest District
7601 Highway 301 North
Tampa, Florida 33601

Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

The maximum percentage of allowable PSD increment consumed by the proposed modification is as follows:

Class II Increment

	<u>Annual</u>	<u>24-Hour</u>	<u>3-Hour</u>
SO ₂	4	14	18

Any person may submit written comments to FDER regarding the proposed modification. All comments postmarked not later than 30 days from the date of this notice will be considered by FDER in making a final determination regarding approval of this modification. These comments will be made available for public review at the above locations. Furthermore, a public hearing can be requested by any person. Such requests should be submitted within 15 days of the date of this notice. Letters should be addressed to:

Mr. Bill Thomas, P.E.
New Source Review Section
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

I. PROJECT DESCRIPTION

A. Applicant

New Wales Chemicals, Inc.

P. O. Box 1035

Mulberry, Florida 33860

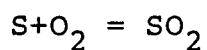
B. Project and Location

The applicant proposes to modify two double absorption type sulfuric acid plants, currently under construction, by increasing the production rate of each plant from 2,000 tons per day (TPD) to 2,750 TPD of 100% sulfuric acid. No physical change to the new plants is required to achieve the higher production rates. The affected plants are designated No. 4 and No. 5 by the applicant.

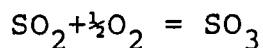
The plant site is in western Polk County, Florida, at Highway 640 and County Line Road. UTM coordinates are 396.6 km East and 3078.9 km North.

C. Process and Controls

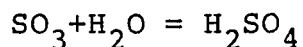
The principal steps in the process consist of burning sulfur (S) in air to form sulfur dioxide (SO₂), combining the sulfur dioxide with oxygen (O₂) to form sulfur trioxide (SO₃), and combining the sulfur trioxide with water (H₂O) to form a solution containing sulfuric acid (H₂SO₄). The chemical reactions are:



In furnace of boiler



In converter



In two absorption towers

The dual absorption process selected by the applicant is the best demonstrated control technology for SO₂ emissions from sulfuric acid plants. The high efficiency acid mist eliminator is the best demonstrated control technology for acid mist emissions. These controls will reduce the total emissions from the proposed sources to a level that is in compliance with the federal New Source Performance Standards (NSPS) requirements of 40 CFR 60, Subpart H.

II. RULE APPLICABILITY

The proposed project (production rate increase) is subject to preconstruction review under federal prevention of significant deterioration (PSD) regulations, Section 52.21 of Title 40 of the Code of Federal Regulations (40 CFR 52.21) as amended in the Federal Register of August 7, 1980 (45 FR 52676). Specifically, the New Wales Chemicals plant is a major stationary source (40 CFR 52.21)(b)(1)) located in an area designated in 40 CFR 81.310 as unclassifiable for the criteria pollutant particulate matter and attainment for the remaining criteria pollutants including SO₂. New Wales was granted authority to construct two 2000 TPD sulfuric acid plants on May 23, 1980 (federal PSD permit number PSD-FL-034). The proposed production rate increase (from 2000 TPD to 2750 TPD per plant) would result in a significant net emissions increase of SO₂ and sulfuric acid mist, thereby rendering it a major modification (40 CFR 52.21(b)(2)) subject to PSD review (40 CFR 52.21(i)).

Full PSD review is required for each pollutant for which a significant net emissions increase would occur, in this case SO₂ and sulfuric acid mist. The review consists of a determination of best available control technology (BACT) and an analysis of the air quality impact of the increased emissions. The review also includes an analysis of the impact on soils, vegetation, visibility and air quality impacts resulting from associated commercial, residential, and industrial growth.

The proposed project is also subject to the provisions of the federal New Source Performance Standard (NSPS) for sulfuric acid plants, 40 CFR 60, Subpart H.

III. SUMMARY OF EMISSIONS AND AIR QUALITY ANALYSIS

A. Emission Limitations

Table I summarizes the emissions of all pollutants regulated under the Act which are affected by the proposed modification. As the table shows, the proposed emissions increases of SO₂ and sulfuric acid mist exceed the significance levels set in the PSD regulations. The net emissions increases of carbon monoxide (CO) and nitrogen oxides (NO_x) are not significant; therefore, these pollutants are not subject to PSD review.

Best available control technology (BACT) has been determined for SO₂ and sulfuric acid mist emissions from the proposed sources. The emission limiting standards selected as BACT and made a condition of this permit are listed in Table II. Justification for the standards selected is included in Technical Appendix A.

The permitted emissions, including those subject to BACT, are in compliance with the federal New Source Performance Standards (NSPS) requirements of 40 CFR 60, Subpart H.

Table I
Emissions Summary

<u>Source</u>	Pollutant Emissions in Tons per Year			
	<u>SO₂</u>	<u>Acid Mist</u>	<u>NO_x</u>	<u>CO</u>
A. New Construction (1)				
No. 4 H ₂ SO ₄ Plant	1400	52.5	49.6	< 1
No. 5 H ₂ SO ₄ Plant	1400	52.5	49.6	< 1
B. After Modification (2)				
No. 4 H ₂ SO ₄ Plant	1925	72.2	68.0	< 1
No. 5 H ₂ SO ₄ Plant	1925	72.2	68.0	< 1
C. Increase from Modification (3)				
No. 4 H ₂ SO ₄ Plant	525	19.7	18.4	0.1
No. 5 H ₂ SO ₄ Plant	525	19.7	18.4	0.1
Fugitive Emissions (4)	0	0	0.2	2.8
D. Total Net Increase	1050	39.4	37.0	3.0
E. Significant Net Increase (5)	40	7.0	40.0	100

(1) Permitted allowable emissions (PSD-FL-034) at design rate of 2000 tons per day of 100% H₂SO₄ for 8400 hours per year

(2) Permitted allowable emissions (PSD-FL-072) at design rate of 2750 tons per day of 100% H₂SO₄ for 8400 hours per year

(3) Additional emissions which will result from increasing the production capacity of the No. 4 and No. 5 sulfuric acid plants from 2000 TPD to 2750 TPD each.

(4) Vehicle Traffic

(5) 40 CFR 52.21 (b) (23)

Table II

Allowable Emission Limits

Each Modified Sulfuric Acid Plant

<u>Pollutant</u>	<u>Maximum Emission- Pounds Per Hour</u>	<u>Emission Limiting Standard</u>	<u>Basis</u>
SO ₂	458.3	4 ^(a)	NSPS, BACT
Acid Mist	17.2	0.15 ^(a)	NSPS, BACT
Visible Emission		10% opacity	NSPS, BACT
NO _x	16.2	2.1 x 10 ⁻⁶ lb/dscf	PSD-FL-034

(a) Pounds per ton of 100% H₂SO₄ produced

B. Air Quality Impacts

An air quality impacts analysis has been performed to evaluate the impact of the proposed project on ambient concentrations of SO₂ and sulfuric acid mist. Through the use of dispersion modeling, the analysis considered the impacts of all SO₂ emitting sources within the New Wales complex along with those sources at other facilities surrounding the site which may add to the impact from New Wales.

Results of the analysis provide reasonable assurance that the project, as described in this permit and subject to the conditions herein, will not lead to any violation of National Ambient Air Quality Standards or PSD increments. Details of the analysis are discussed in the Technical Appendix B.

C. Additional Impact Analysis

An additional impacts analysis has been performed to assess (1) the impact of the proposed project on soils, vegetation, and visibility and (2) any air quality impacts resulting from associated commercial, residential, or industrial growth. No adverse impacts are expected; details of the analysis are discussed in Technical Appendix C.

IV. CONCLUSIONS

FDER proposes a preliminary determination of approval with conditions for the modification project (production rate increase) requested by the New Wales Chemicals Company in the PSD permit application submitted in December, 1980 and made complete on January 26, 1981. The determination is based on the information contained in the application and the supplementary information provided by the applicant on January 26, 1981.

The specific conditions of approval are as follows:

1. The new facility shall be constructed in accordance with the capacities and specifications stated in Table I.
2. Emission of sulfur dioxide from each modified sulfuric acid plant shall not exceed 458.3 pounds per hour at the maximum allowable operating rate of 114.5 tons per hour of 100% H₂SO₄. At lesser operating rates, the emissions shall not exceed 4 pounds per ton of 100% H₂SO₄ produced.
3. Emission of acid mist from each modified sulfuric acid plant shall not exceed 17.2 pounds per hour at the maximum allowable operating rate of 114.5 tons per hour of 100% H₂SO₄. At lesser operating rates, the emissions shall not exceed 0.15 pounds per ton 100% H₂SO₄.
4. Visible emissions from each modified sulfuric acid plant shall not exceed 10% opacity.
5. Sulfur dioxide emissions from the modified sulfuric acid plants shall be continuously monitored in accordance with the provisions of Paragraph 60.84 of 40 CFR 60, Subpart H -

Standards of Performance for Sulfuric Acid Plants. The applicant shall also comply with all other applicable requirements of 40 CFR 60, Subpart H.

6. Compliance with all emission limits shall be determined by performance tests scheduled in accordance with the attached General Conditions. Except as provided under 40 CFR 60.8(b), the performance tests shall be conducted in accordance with the provisions of the following reference methods in Appendix A of 40 CFR 60:

- a. Method 1 for sample and velocity traverses;
- b. Method 2 for volumetric flow rate;
- c. Method 3 for gas analysis;
- d. Method 8 for concentration of SO₂ and acid mist; and
- e. Method 9 for visible emissions.

A compliance test shall consist of the average of three consecutive runs. The maximum sample time and volume per run will be as specified in the NSPS (40 CFR 60.85). Each facility shall operate within 10 percent of maximum capacity during sampling. The parameters for the operating rate, control equipment variables and all continuous monitoring results shall be recorded during compliance testing and made a part of the test report.

7. This permit is not valid until the applicant has received permits covering the proposed modification issued under the State of Florida SIP. Any emission limits in these permits which are more stringent than those specified in the conditions above shall become a condition of this permit.

8. Maximum operating time for each plant will be limited to 8400 hours per year.

9. The source shall comply with the requirements of the attached General Conditions.

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 compliance 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 permitted 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) anticipate 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.

TECHNICAL APPENDIX A

BACT ANALYSIS

The applicant is required, under the provisions of 40 CFR 52.21 as revised August 7, 1980 (45 CFR 52676), to apply BACT to all criteria and noncriteria pollutants for which a significant net emissions increase would occur.

A determination of BACT for the two sulfuric acid plants was made by the Environmental Protection Agency (EPA) in the original PSD permit, PSD-FL-034. This BACT determination is revised as part of this permit, PSD-FL-072, to reflect the greater production rate projected by the applicant.

The NSPS for sulfuric acid plants (40 CFR 60, Subpart H) specifies SO₂, acid mist and visible emission limitations. These serve as a starting point for defining BACT. A recent review of the NSPS for sulfuric acid plants sponsored by EPA concluded that the current emission limitations should not be made more stringent. Therefore, the applicant proposed the NSPS levels as BACT. FDER agrees with the proposed limits as BACT for these sulfuric acid plants. The limits are summarized in Table II; a discussion of the BACT for each pollutant follows

1. Sulfur Dioxide

The applicant proposed double absorption technology and an emission limit of 4.0 pounds per ton of 100% H₂SO₄ produced as BACT for SO₂ from the sulfuric acid plants, based on the NSPS requirement (40 CFR 60.82). EPA recently reviewed available sulfuric acid plant technology and concluded that double

absorption remains the best technology for SO₂ emissions control. No basis for reducing the NSPS limit was found to exist. Similarly, no justification could be found by FDER to require a lower emission limit for the proposed plants.

2. Acid Mist

The applicant proposed high efficiency mist eliminators and an emission limit of 0.15 pounds of sulfuric acid mist per ton of acid produced as BACT, based on the NSPS requirements (40 CFR 60.83). FDER concurs that the NSPS for acid mist of 0.15 pounds per ton of 100% H₂SO₄ produced and the proposed control equipment constitutes BACT for this case. No justification for more stringent control could be found.

TECHNICAL APPENDIX B

AIR QUALITY ANALYSIS

PSD Increment Analysis

PSD increment analysis pertains only to SO₂ and particulate matter (PM) for which maximum allowable increases (increments) are defined in 40 CFR 52.21(c). These increments provide for future industrial growth while also ensuring that "cleaner" areas of the nation remain relatively clean. In the vicinity of the New Wales plant, the Class II PSD increments apply.

For the proposed modification (production increase) at New Wales, only two pollutants, SO₂ and sulfuric acid mist, are subject to PSD review. Both have emission rate increases above the significance levels defined in 40 CFR 52.21 (b) (23). Only SO₂ is subject to PSD increment analysis.

The Single-Source (CRSTER) model was used initially to determine the maximum area of impact of the proposed modification. This was determined by finding the greatest distance to which the predicted ground-level concentration (g.l.c.) equaled or exceeded the significance level for each averaging time (annual, 24-hour, and 3-hour) for which SO₂ increments are established. The model was run with receptor distance ranges of 3,6,9,12, and 15 kilometers. The distances to the significance levels were interpolated from these runs.

The surface meteorological data used in this analysis and all subsequent analyses were that of the National Weather Service in

Orlando, Florida for the period 1974 to 1978. Upper air data for the same period were derived from soundings taken at Tampa, Florida. The table below shows the maximum areas of impact for the proposed emission increase given as radii of circles equal to the greatest distances as determined above.

<u>Pollutant (Avg. Time)</u>	<u>Significance Level</u>	<u>Impact Area Radius</u>
SO ₂ (Annual)	1 ug/m ³	3.0 km
SO ₂ (24-hour)	5 ug/m ³	10.3 km
SO ₂ (3-hour)	25 ug/m ³	5.6 km

The maximum impact due to increment consuming sources at New Wales and surrounding plants was considered next. To determine the annual impact, the Air Quality Display Model (AQDM) was run using the five years of meteorological data in the STAR format with five stability classes. For the short-term increment analysis the PTMTPW model (a multiple point-source model) was used. This model was run for days of critical meteorology identified in the CRSTER runs, that is, days for which conditions were such that high concentrations were predicted to occur due to the New Wales sources only. Sources upwind of New Wales that consume increment were included for each critical day along with the New Wales increment consuming sources. The receptors for each model run for both the 24-hour and 3-hour averaging times were spaced at 0.1 kilometers. The maximum increment consumption concluded from the PTMTPW and AQDM modeling is summarized below.

<u>Pollutant (Avg. Time)</u>	<u>Maximum Impact of Modification Alone</u>	<u>Maximum Increment Consumed</u>	<u>Class II Allowable Increment</u>
SO ₂ (annual)	0.7 ug/m ³	6.6 ug/m ³	20 ug/m ³
SO ₂ (24-hour)	12.9 ug/m ³ (1)	59.3 ug/m ³ (1)	91 ug/m ³
SO ₂ (3-hour)	90.4 ug/m ³ (1)	347.3 ug/m ³ (1)	512 ug/m ³

(1) Highest second-high ground level concentration over the five year period.

The nearest Class I area to New Wales is the Chassohowitzka National Wilderness Area more than 100 kilometers to the north-west. The impact analysis of the proposed increase showed significant impact out to only 10.3 kilometers. Therefore, no increment consumption or adverse impact is predicted to occur in this Class I area.

National Ambient Air Quality Standards Analysis

The National Ambient Air Quality Standards (NAAQS) are established to protect public health and welfare. PSD regulations require the permit applicant to demonstrate that a proposed emissions increase subject to PSD review will not cause or contribute to any NAAQS violations. For the proposed modification at New Wales, PSD review is required for SO₂ and sulfuric acid mist; other emitted pollutants from the proposed modification, CO and NO_x, fall below the significant emission rates and are exempt from PSD review. NAAQS are established for SO₂; however, for this modification the permit applicant is exempt from the preconstruction monitoring requirements (40 CFR 52.21(m)) due to the maximum impact from the increase in SO₂ emissions being less than 13 ug/m³ on a

24-hour average, (40 CFR 52.21(i)(8)).

The maximum annual average g.l.c. of SO₂, taking into account all sources of SO₂ in the surrounding area of New Wales, was determined using the ADQM model. A background value of zero was assumed since all sources of SO₂ in the area were included in the modeling. A receptor grid spacing of 1.0 kilometer was used. The maximum predicted impact is 34.6 ug/m³.

The 24-hour and 3-hour maximum impacts were determined for selected days of critical meteorology as determined by the CRSTER model run for New Wales alone. PTMTPW was run for these days using all New Wales sources of SO₂ along with all significant sources upwind of the New Wales site. Again, a zero background concentration was assumed. The highest second-high days of critical meteorology were used and the grid spacing of the receptors was set at 0.1 kilometer. The results show maximum g.l.c.'s for 24-hour and 3-hour averages to be 223.4 ug/m³ and 924.0 ug/m³ respectively. The following table summarizes the results.

<u>Pollutant (Avg. Time)</u>	<u>Projected Air Quality</u>	<u>NAAQS</u>
SO ₂ (annual)	34.6 ug/m ³	80 ug/m ³
SO ₂ (24-hour)	223.4 ug/m ³ (1)	365 ug/m ³
SO ₂ (3-hour)	924.0 ug/m ³ (1)	1300 ug/m ³

(1) Highest second-high ground level concentration over the five year period.

The proposed emissions increase in sulfuric acid mist is 39.4 tons per year. This is above the significance level given in 40 CFR 52.21(b)(23) and as such is subject to PSD review. Sulfuric acid mist is a non-criteria pollutant so there are no NAAQS with which to compare. However, dispersion modeling was conducted to determine the maximum g.l.c.'s of sulfuric acid mist for the same averaging times used in the SO₂ analysis. The results are shown in the table below.

<u>Pollutant (Avg. Time)</u>	<u>Maximum Impact of Modification Alone</u>	<u>Maximum Impact of All Sources</u>
Sulfuric Acid Mist (Annual)	0.03 ug/m ³	1.0 ug/m ³
Sulfuric Acid Mist (24-hour)	0.61 ug/m ³	5.3 ug/m ³ (1)
Sulfuric Acid Mist (3-hour)	3.6 ug/m ³	32.2 ug/m ³ (1)

(1) Maximum impact of all sources at New Wales only.

Downwash was considered and found to be not important due to the stack heights being nearly equal to the good engineering practice criterion, or 2.5 times higher than any local structure.

TECHNICAL APPENDIX C
ADDITIONAL IMPACT ANALYSIS

Impact on Soils, Vegetation, and Visibility

The maximum impact of the proposed increase in SO₂ emissions, as demonstrated through the air quality analysis, will be below the national secondary air quality standards established to protect public welfare related values. As such, no adverse effect on soils, vegetation, and visibility is expected. The small increase in sulfuric acid mist concentrations is also not expected to have any significant impact.

Growth Impacts

The proposed production rate increase will result in no new jobs and hence no impact on air quality in the area as a result of population growth. The air quality impact analysis shows the maximum impacts of the modification alone will use less than 18% of the allowable PSD increments for all averaging times. Therefore future industrial growth in the area is not seen to be significantly impeded.