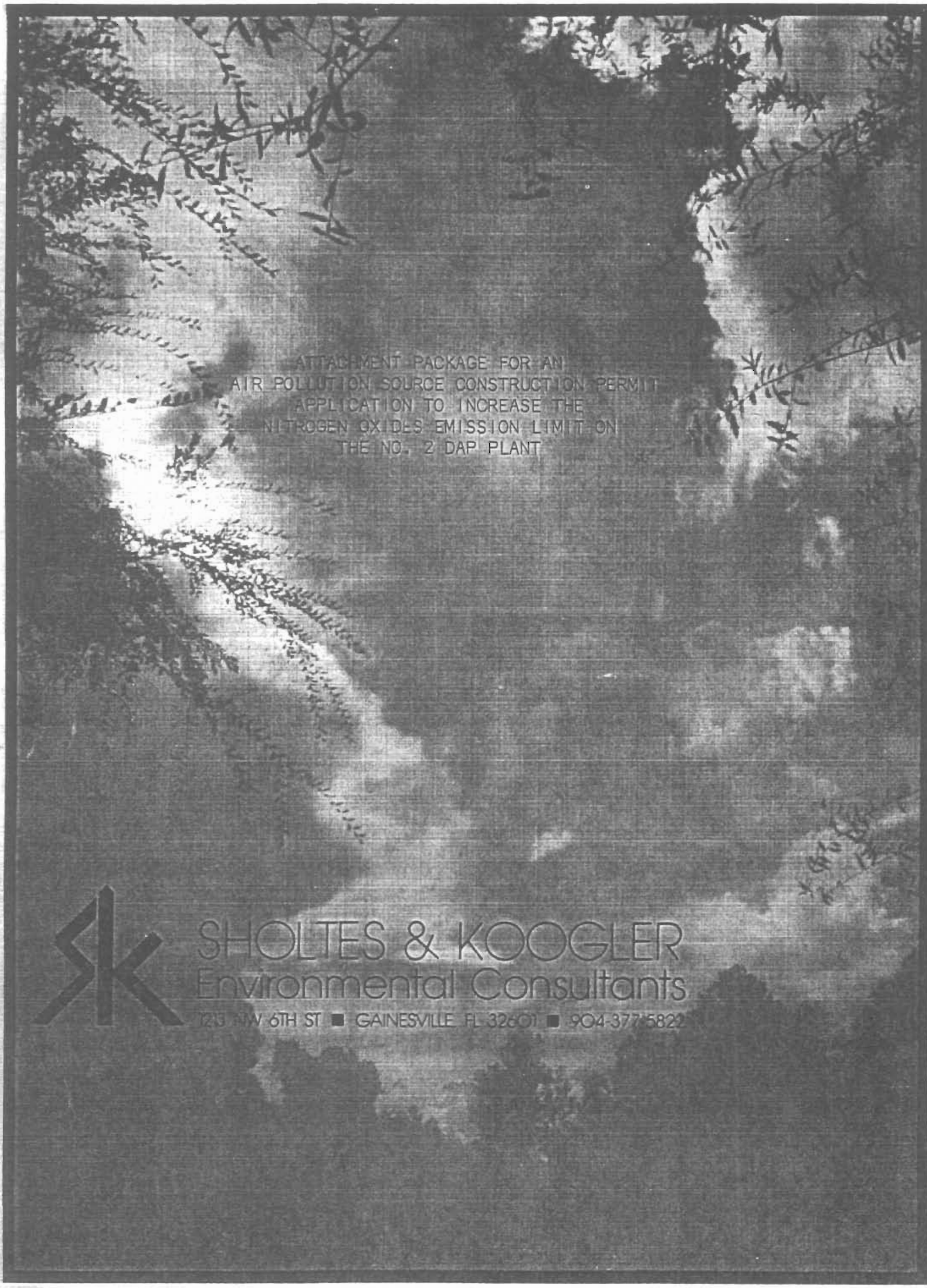

ATTACHMENT PACKAGE FOR AN AIR POLLUTION SOURCE CONSTRUCTION PERMIT APPLICATION TO INCREASE THE NITROGEN OXIDES EMISSION LIMIT ON THE NO. 2 DAP PLANT

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APRIL 2, 1986

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1.0 INTRODUCTION

The International Minerals and Chemical Corporation (IMC) owns and operates the New Wales chemical complex in Polk County, Florida. The IMC-New Wales chemical complex is a phosphate fertilizer facility where phosphate rock is processed into several different fertilizer products and animal feed supplements.

One of the granular fertilizer products produced by IMC-New Wales is diammonium phosphate (DAP). This product is produced in two plants; the No. 1 and No. 2 DAP plants. The No. 1 DAP plant has a design production capacity of 101 tons per hour and the No. 2 plant has a design capacity of 140 tons per hour. The purpose of this PSD construction permit application is to request a modification to the permitted nitrogen dioxide emission limiting standard for the No. 2 DAP plant.

The No. 2 DAP plant was constructed under PSD permit PSD-FL-034. This plant is a dual train production facility with each train designed for a 70-ton per hour production rate. The DAP produced in the two parallel trains is cooled in a common product cooler. The air pollution emission limits for the DAP plant, as established by PSD construction permit PSD-FL-034, were modified by EPA by letter dated February 27, 1985 to apply to the entire plant rather than to the individual trains within the plant.

Emission measurements conducted by IMC to demonstrate compliance with the air pollutant emission limits established by permit showed that nitrogen oxides emissions from the plant exceeded the permitted emission limits. Additional nitrogen oxides emission measurement and plant operating procedures were reviewed to determine if nitrogen oxides emissions could be reduced. It was determined that the nitrogen oxides emissions from the DAP plant were primarily a function of burner design and that there is no practical, cost effective means of reducing the nitrogen oxides emissions from the plant.

The permitted nitrogen oxides emission rate for the No. 2 DAP plant is 8.6 pounds per hour and 0.21 pounds per million BTU heat input. At the 95 percent annual operating factor reported in the construction permit application for the plant, the annual nitrogen oxides emission rate would be 35.8 tons per year. The annual nitrogen oxides emission rate referenced in PSD-FL-034 is 23 tons per year.

The proposed nitrogen oxides emission limits for the No. 2 DAP plant (expressed as nitrogen dioxide) are:

42.0 pounds per hour,
1.00 pounds per million BTU, and
174.8 tons per year.

The proposed limits will result in a nitrogen oxides emission increase of 33.4 pounds per hour and 151.8 tons per year. The annual increase exceeds the 40 tons per hour de minimis emission increase defined in 17-2.500(2)(e)2, FAC; thus requiring a PSD review for the requested action.

The purpose of this construction permit application is to request a review and modification (increase) to the nitrogen oxides emission limit for the No. 2 DAP plant operated by IMC at the New Wales chemical complex. It should be noted that the proposed increase in nitrogen oxides emissions will have no effect on the emission rates of other air pollutants from the plant and will have no effect on the operating rate of the plant.

2.0 FACILITY DESCRIPTION

IMC-New Wales is a phosphate fertilizer manufacturing facility located in Polk County, Florida. The plant is located approximately 10.5 kilometers southwest of the town of Mulberry at SR 640 and County Line (Polk-Hillsborough) Road. The UTM coordinates of the plant are Zone 17, 396.6 kilometers East and 3078.9 kilometers North. The plant was originally permitted in 1973 and has undergone several modifications since that time.

2.1 History of the New Wales Chemical Complex

The chemical complex was originally permitted in 1973 and constructed immediately thereafter. As originally constructed, the facility included three double absorption sulfuric acid plants; two phosphoric acid plants; granular fertilizer production facilities capable of producing ammoniated fertilizer products and granular triple superphosphate; storage and shipping facilities for the granular fertilizer products; phosphate rock receiving, storage, drying and grinding capabilities; a gypsum disposal area and a cooling water recirculation system.

In 1976, an animal feed ingredients (AFI) plant was constructed and in 1977 a multiphos plant was constructed. In 1978 a second granular products load-out system was permitted and constructed and in the same year a uranium recovery plant was permitted. At this point in time, the fertilizer complex had a production capacity of one million tons per year of P205.

On May 23, 1980 a PSD construction permit (PSD-FL-034) was approved by EPA to increase the P205 production capacity of the chemical complex by 50 percent; from one million tons of P205 per year to 1.5 million tons of P205 per year. This expansion was referred to as the Third Train Expansion and included two double absorption sulfuric acid plants, each rated at 2000 tons of 100 percent acid per day; a 1500 tons per day (P205) phosphoric acid plant; an ammoniated fertilizer production facility with a production capacity of 140 tons per hour; a granular product load-out system; and the necessary support facilities. A plant-wide modification that occurred concurrent with the Third Train Expansion was the replacement of dry phosphate rock with wet rock for most uses within the chemical complex. This resulted in the elimination of nine particulate matter sources with a particulate matter emission rate of 141 tons per year and the elimination of one sulfur dioxide source with a sulfur dioxide emission rate of 1577 tons per year.

In late 1980, IMC-New Wales applied for a construction permit (PSD-FL-072) to increase the production capacity of the two Third Train Sulfuric Acid Plants from 2000 tons per day to 2750 tons per day each of 100 percent sulfuric acid. This production rate increase was accomplished by taking advantage of excess capacity designed into the sulfuric acid plants and involved no physical changes or modifications to the plants. This production rate increase was approved in 1981.

2.2 Description of Existing Facilities

The present IMC-New Wales chemical complex consists of manufacturing facilities for sulfuric acid, phosphoric acid, granular ammoniated and granular triple superphosphate fertilizer products and animal feed supplements. A separate facility located on-site is designed to recover uranium that occurs naturally in the phosphate rock.

Raw materials for the chemical complex include phosphate rock, sulfur, water, ammonia and limestone. The phosphate rock is shipped into the New Wales chemical complex from IMC mining facilities located in Polk County. Sulfur is transported to the chemical complex by truck and rail. Ammonia is brought in by pipeline and limestone is shipped to the chemical complex by truck.

Wet, unground phosphate rock received by rail from IMC mines in Polk County, is unloaded into underground loading pits. From there it is transferred by belt conveyor to a 400,000 ton storage pile that provides approximately a four week rock storage capacity for the plant. Wet, unground rock from the storge pile is ground and stored in agitated tanks prior to being pumped to the phosphoric acid plants.

Dry, ground phosphate rock used for producing granular triple superphosphate (GTSP) is received by rail from the IMC Noralyn mine. This rock is transferred to dry rock silos and from there, directly to the GTSP plant.

Sulfuric acid is manufactured by the convential contact sulfuric acid process. In this operation, elemental sulfur is burned in a furnace to form sulfur dioxide. The sulfur dioxide is then passed through a series of converters where it reacts with oxygen to form sulfur trioxide. This gas passes on to an absorption tower where it reacts with water and sulfuric acid to form a product sulfuric acid. There are five sulfuric acid plants at the New Wales Chemical Complex with a total production capacity of 13,140 tons of 100 percent sulfuric acid per day. This sulfuric acid production capacity requires approximately 4400 tons per day of sulfur. The sulfur is received by truck and rail and is stored in heated, insulated storage tanks prior to use.

Phosphoric acid is produced by reacting wet, ground phosphate rock with sulfuric acid attack tanks. Three separate phosphoric acid trains, two proposed at 1700 tons per day each and one at 2000 tons per day of P205, are located at the chemical complex. The weak phosphoric acid produced in the attack tanks is separated from the gypsum by filtration and the gypsum is pumped to a gypsum disposal area immediately to the east of the chemical complex. The 30 percent phosphoric acid separated from the gypsum is pumped to storage tanks and from the storage tanks to evaporators where the acid is concentrated step-wise up to 54 percent P205. Excess steam from the sulfuric acid plants is used in the phosphoric acid evaporators.

Approximately 25 percent of the phosphoric acid produced at the IMC-New Wales chemical complex is further clarified for direct sales. The remainder of the acid is pumped to other facilities in the chemical complex, such as granular ammoniated fertilizer production facilities, the GTSP production facility, or the animal feed supplement plants.

Ammoniated fertilizer products (diammonium phosphate and monoammonium phosphate) are produced at two facilities in the IMC-New Wales chemical complex. At each of the facilities, the two products are produced by reacting 54 percent P205 phosphoric acid and ammonia to produce a granular fertilizer product. The ratio of phosphoric acid to ammonia determines the product. The original facility, constructed in 1974 and referred to as the No. 1 DAP plant, has a production capacity of 101 tons per hour of DAP. The No. 2 DAP plant was constructed as part of the Third Train Expansion in 1980. This plant is a dual train facility, with a total design production capacity of 140 tons per hour of DAP.

Granular triple superphosphate is produced by reacting 40 percent phosphoric acid with dry, ground phosphate rock received from the IMC Noralyn mine in a reaction/granulation circuit. The wet granular product is then dried, screened and transferred to storage. The production capacity for GTSP at the IMC-New Wales chemical complex is 65 tons per hour.

The MAP, DAP and GTSP products produced at the chemical complex are conveyed from the bulk storage buildings to shipping facilities and from there they are loaded either into rail cars or trucks at rates approaching 7000 tons per day.

Up to 2000 tons per day of calcium and ammonium phosphate Animal Feed Ingredients can be produced at the IMC-New Wales chemical complex. These products are produced by reacting defluorinated phosphoric acid with ammonia or limestone to produce the desired product. A second animal feed product, referred to as Multifos, is produced at a rate of

480 tons per day by reacting phosphate rock, soda ash and phosphoric acid in a high temperature kiln. The calcining of the material results in the defluorination of the phosphate rock which is necessary in the production of animal feed supplements.

The Animal Feed Ingredients and Multifos are stored and shipped from areas within the chemical complex isolated from normal fertilizer products. This is done to minimize the chance of contaminating the feed products with normal fertilizer products containing nominal levels of fluoride.

A uranium recovery facility is also located at the IMC-New Wales chemical complex. At this facility uranium is recovered from phosphoric acid and is processed to a product referred to as yellow cake. This is a U308 product which is shipped off-site for further refining.

2.3 Description of Proposed Project

The action for which a permit is requested by this application is a modification to the permitted nitrogen oxides emission limiting standard for the No. 2 DAP plant. The plant was permitted in 1980 under PSD construction permit PSD-FL-034 for a nitrogen oxides emission rate of 4.3 pounds per hour (0.21 pounds per million BTU heat input) for each of the two 70 ton per hour DAP trains. By letter dated February 27, 1985, EPA modified the nitrogen oxide emission limiting standard to allow a total plant nitrogen oxides emission rate of 8.6 pounds per hour or 0.21 pounds per million BTU heat input.

On May 29, 1985, nitrogen oxides emission measurements were made on the No. 2 DAP plant dryer to demonstrate compliance with the permitted emission limiting standard. 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 a rate of 195 gallons per hour. The measured nitrogen oxides emission rate averaged 20.2 pounds per hour or 0.71 pounds per million BTU heat input. Subsequent nitrogen oxides emission measurements on the No. 2 DAP plant showed nitrogen oxides emissions ranging from 0.80 to 0.88 pounds per million BTU heat input. Following a review of the plant operating practices and the dryer burner design, it was concluded there were no pratical modifications that could be made to reduce nitrogen oxides emissios to the permitted emission rate of 0.21 pounds per million BTU or 8.6 pounds per hour. As a result of this, this construction permit application is presented as a request to increase the nitrogen oxides emission limiting standards for the No. 2 DAP plant.

2.3.1 Description of No. 2 DAP Plant

Diammonium phosphate is produced by reacting ammonia with phosphoric acid. Anhydrous ammonia and phosphoric acid (about 40 percent P205) are reacted in a preneutralizer. The primary reaction is:

$$2NH_3 + H_3PO_4 \text{ -- } (NH_4)_2\ HPO_4$$

The slurry thus produced flows into an ammoniator-granulator and is distributed over a bed of recycled fines. Ammoniation to the required mole ratio of 2.0 takes place in the granulator by injecting ammonia under the rolling bed of solids. It is necessary to feed excess ammonia to the granulator to achieve a 2.0 mole raio. Excess ammonia and water vapor driven off by the heat of reaction are directed to a scrubber which uses phosphoric acid as the scrubbing liquid. The ammonia is almost completely recovered by the phosphoric acid scrubbing liquor and recycled to the preneutralizer. Granulated DAP from the granulator is then dried in a rotary dryer fired with fuel oil or natural gas. The dried product is screened with undersized material and crushed oversized material being recycled to the granulator. Product size material is cooled and transferred to storage.

The No. 2 DAP plant is a dual train plant with each train designed to produce 70 tons per hour of DAP. Each train has an independent reactor/granulator and dryer. A common cooler serves both trains.

2.3.1.1 Air Pollutant Emissions, General

DAP plants have a potential to emit particulate matter, fluorides, sulfur dioxide and nitrogen oxides. The emissions originate from three sources:

1. the reactor/granulator,
2. the product dryer, and
3. the screens and product cooler.

The primary emissions from the first two sources are ammonia and fluorides. The ammonia losses are controlled by scrubbing in a venturi scrubber with phosphoric acid. Fluorides are controlled by a packed bed scrubber that follows the venturi scrubber. Particulate matter from the first two sources are also controlled with the venturi and packed bed scrubbers. The sulfur dioxide and nitrogen oxides generated in the dryer are controlled to varying degrees by sorption in the dryer, by fuel selection and/or by plant design consideration. Emissions from the screens and product cooler consist of particulate emissions only and are controlled in the No. 2 DAP plant with a baghouse.

The sulfur dioxide and nitrogen oxides emissions from the two dryers result from the fuel oil or natural gas that is used to fire the dryers. For design purposes, it was estimated that 0.3 million BTU would be required to dry one ton of DAP (two gallons of fuel oil or 290 cubic feet of natural gas per ton of DAP). At the rated production rate of 140 tons of DAP per hour, the maximum expected fuel use rate would be 280 gallons of fuel oil or approximately 41,000 cubic feet of natural gas per hour.

Since there is free ammonia in the product entering the dryer, it is expected that sulfur dioxide generated during fuel oil combustion will be partially absorbed by a reaction with the ammonia. The nitrogen oxides generated during fuel combustion will not be significantly affected by reactions within the dryer or by the dryer air pollution control system. The control of nitrogen oxides will depend almost entirely on the design of the dryer burner.

2.3.1.2 Nitrogen Oxides Emissions

The combustion of fuel in the DAP dryer will generate nitrogen oxides as a result of the fixation of atmospheric nitrogen at the peak temperatures achieved in the flame. The quantity of nitrogen oxides generated was expected, during the original permitting of the No. 2 DAP plant, to be low because of the nature of the dryer. The purpose of the burner in the DAP dryer is to heat air which in turn is used to drive excess moisture from the granular DAP product. If the dryer temperature is too high the DAP will decompose, hence excess air is added to moderate the dryer temperatures. This performance differs from that of a boiler where the intent is to transfer the heat of combustion to boiler feed water circulating through tubes surrounding the combustion chamber. In the boiler, therefore, it is advantageous to introduce as little excess combustion air as possible since the heat required to raise the temperature of the air will be lost.

In boilers fired with oil, it is common practice to introduce 15 to 20 percent excess air. In contrast, a DAP dryer has approximately 50 percent excess air fired with the fuel and then secondary combustion air is added resulting in 600 to 800 percent excess air in the heated gases entering the dryer. The high excess air in the DAP dryer was expected to quench the flame temperature and reduce the formation of nitrogen oxides in the manner of a low-NOx burner; a burner designed specifically to minimize nitrogen oxides emissions.

Because of the inherent design of the burner in the DAP dryer, a nitrogen oxides emission factor from the lower range of published emission factors for fossil-fuel fired boilers was selected when estimating nitrogen oxides emissions during the preparation of the initial application for PSD construction permit. The emission factor selected resulted in a permitted nitrogen oxides emission rate

(PSD-FL-034) of 8.6 pounds per hour (0.21 pounds per million BTU heat input) for the entire plant. Measured nitrogen oxides emission rates from the No. 2 DAP plant showed emissions in the range of 0.7 to 0.9 pounds per million BTU.

3.0 FACTORS EFFECTING NITROGEN OXIDES EMISSIONS FROM NO. 2 DAP PLANT

Following the initial nitrogen oxides emission measurements on the No. 2 DAP plant in May 1985, an effort was undertaken to evaluate the factors effecting nitrogen oxides emissions from the plant. This effort included additional nitrogen oxides emission measurements on the No. 2 DAP plant, nitrogen oxides emission measurements on other granular products dryers at IMC-New Wales and the compilation of existing nitrogen oxides emission data for fossil fuel fired combustion sources (other than boilers) in the phosphate fertilizer industry. The effort also included an evaluation of the burners in the two No. 2 DAP plant dryers and a comparison of these burners with burners in other granular product dryers at IMC-New Wales.

3.1 Nitrogen Oxides Emission Data Evaluation

The emission measurements conducted on the No. 2 DAP plant in May 1985, showed a nitrogen oxides emission rate of 0.71 pounds per million BTU. This compares with a permitted emission rate of 0.21 pounds per million BTU. Subsequent nitrogen oxides emission measurements made on both the east and west trains of the No. 2 DAP plant in August 1985 showed nitrogen oxides emission rates of 0.80 and 0.88 pounds per million BTU.

During the August 1985 test period at IMC-New Wales, nitrogen oxides emission measurements were also conducted on the No. 1 DAP plant dryer and on the dryer on the GTSP plant. The nitrogen oxides emissions from the No. 1 DAP plant were 0.34 pounds per million BTU and those from the GTSP plant dryer were 0.53 pounds per million BTU. Nitrogen oxides emissions from phosphate rock dryers that had previously been reported to the Department were in the range of 0.35-0.39 pounds per million BTU.

All of the nitrogen oxides emission data were summarized and reported to the Department by Sholtes & Koogler, Environmental Consultant (SKEC) under cover letter dated October 18, 1985. A copy of this letter is included as Appendix A of this application. The nitrogen oxides emission data for DAP plants, GTSP plants, and phosphate rock dryers reported to the Department by SKEC under cover letter dated October 18, 1985 showed nitrogen oxides emission rates ranging from 0.34 to 0.88 pounds per million BTU heat input. As a point of reference, nitrogen oxides emissions from fossil fuel fired boilers are expected to range from 0.20 to 0.70 pounds per million BTU heat input based on emission factors published in the document, Compilation of Air Pollutant Emission Factors, Publication AP-42, U. S. Environmental Protection Agency.

All of the nitrogen oxides emission data reported to the Department under the SKEC letter of October 18, 1985 were from sources burning No. 6 fuel oil with a nitrogen content of approximately 0.28 percent.

The data showed that the actual nitrogen oxides emissions from the No. 2 DAP plant at IMC-New Wales exceeded the potential fuel generated nitrogen oxides emissions by 40-80 percent. The data further showed that the actual nitrogen oxides emissions from the No. 1 DAP plant at IMC-New Wales and the two phosphate rock dryers were only 70-80 percent potential of the fuel generated nitrogen nitrogen oxides and that the actual nitrogen oxides emissions from the GTSP plant at IMC-New Wales were approximately equal to the potential fuel generated nitrogen oxides emissions. These data (see Appendix A) demonstrate that the nitrogen oxides emissions from the No. 2 DAP plant are consistently higher than nitrogen oxides emissions from the other DAP plant tested and from other fuel oil fired dryers in the phosphate fertilizer industry.

By comparing nitrogen oxides emissions from the No. 2 DAP plant with emissions from the No. 1 DAP plant at IMC-New Wales and the other sources for which data were available it will be noted that emissions from the No. 1 DAP plant are consistent with nitrogen oxides emissions from the other sources (rockdryers) while the emissions from the No. 2 DAP plant are significantly higher. From this, it can be concluded that the nitrogen oxides emissions from DAP plants are not a primary function of free ammonia in the system.

Further investigation of the potential effect of free ammonia in the DAP plant dryer on nitrogen oxides emissions included a review of data that showed nitrogen oxides formation resulting from the oxidation of ammonia does not become significant until temperatures reach approximately 1740°F(1) Data provided by IMC-New Wales showed that the gas temperatures leaving the burners and entering the dryers of the No. 1 and No. 2 DAP plants range from 700-1000°F. These temperatures are well below the temperature necessary to produce nitrogen oxides by the oxidation of free ammonia.

3.2 No. 2 DAP Plant Burner Design

The burners for the two dryers in the No. 2 DAP plant were provided by the John Zink Company of Tulsa, Oklahoma. The burners were designed during a period of high fuel oil cost in the early 1980's and were designed to be as fuel efficient as possible. In addition to the fuel efficiency designed into the burners, discussions with the John Zink Company during the preparation of the

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(1) Air Pollution Control at Resource Recovery Facilities, State of California Air Resources Board, May 24, 1984.

construction permit application for the No. 2 DAP plant in 1980 indicated the burners in the No. 2 DAP plant would function similar to low-NOx burners (see Appendix B). The low-NOx burner is designed for primary combustion to occur in an oxygen poor zone, with secondary combustion air being supplied either downstream or at the periphery of the primary combustion zone. Since nitrogen oxides formation is linearly dependent upon the availability of oxygen, primary combustion (where peak combustion temperatures are realized) in an oxygen poor zone will reduce the formation of nitrogen oxides.

The burners in the No. 2 DAP plant have the steam atomized fuel fired with low primary combustion air. Secondary combustion air is supplied through an orifice plate around the burner, resulting in an air supply of approximately 100 percent in excess of stoichmetric combustion air (see Figure 3-1). Tertiary air is added further downstream resulting in approximately 800 percent excess air in the airstream entering the DAP dryer. Because of this design, it was originally felt that the No. 2 DAP plant dryer burners would function as low-NOx burners and result in nitrogen oxides emission that were in the low range of emissions reported in the document AP-42.

Since the nitrogen oxides emissions from the No. 2 DAP plant turned out to be much higher than expected, and approximately 50 percent higher than nitrogen oxides emissions from the No. 1 DAP plant, a comparison of the burners in the dryers of the two plants was made. Figure 3-1 is a schematic diagram of the burners in both the No. 1 and No. 2 DAP plants at IMC-New Wales.

It will be noted that both burners have the same general configuration; that is, the fuel is fired into a combustion chamber that is perpendicular to the axis of the dryer. Also, primary and secondary combustion air in both burners is controlled by an orifice plate through which the fuel nozzle protrudes. The main difference in the two burners is the fact that tertiary combustion air is supplied to the burner in the No. 2 DAP plant while all of the combustion air supplied to the burner on the No. 1 DAP plant is supplied as primary or secondary air.

The burner for the No. 1 DAP plant is similar to the burners on the GTSP plant and the animal feed ingredients plants at IMC-New Wales. In these burners, steam atomized fuel oil is supplied through an orifice plate with approximately 50 percent excess combustion air. Secondary combustion air is supplied through four large openings in the orifice plate surrounding the nozzle, resulting in approximately

600 percent excess air in the combustion chamber downstream of the orifice plate. Combustion gas temperatures measured at the entrance to the dryer on the No. 1 DAP plant range from 1000-1200°F. The gas temperatures in the GTSP plant dryer combustion chamber range from 1200-1400°F. The higher temperatures in the GTSP plant burner probably account for the higher nitrogen oxides emissions from the GTSP plant (0.53 pounds per million BTU compared to 0.34 pounds per million BTU from the No. 1 DAP plant).

In the No. 2 DAP plant, steam atomized fuel oil is supplied with 50 percent or less excess air through the center of the orifice plate and secondary combustion air is supplied through several small openings in the orifice plate surrounding the fuel nozzle. In the chamber immediately downstream of the orifice plate, temperatures range from 1800-2400°F and there is approximately 100 percent excess combustion air. Tertiary combustion air is then added resulting in an airstream with approximately 800 percent excess air and temperatures ranging from 700-900°F at the entrance to the dryer. The high temperatures in the combustion zone immediately downstream of the orifice plate in the No. 2 DAP plant burner apparently result in the higher nitrogen oxides emission rate from this plant; 0.7-0.9 pounds per million BTU compared with 0.5 pounds per million BTU for the No. 1 DAP plant.

In the discussion of temperature effects on nitrogen oxides formation, it is recognized that nitrogen oxides from the fixation of atmospheric nitrogen are not produced at temperatures below 3000°F and reach a peak formation rate at temperatures of approximately 3500°F. The temperatures reference in the No. 1 and No. 2 DAP plant burners are referenced temperatures and are cited only as an indication of relative temperature differences in the two types of dryer burners.

3.3 Nitrogen Oxides Emission Control Alternatives for No. 2 DAP Plant

There are three basic alternatives for controlling nitrogen oxides emissions from the No. 2 DAP plant. These are:

1. flue-gas denitrification,
2. burner modifications, and
3. no control.

The control of nitrogen oxides by flue-gas treatment does not appear reasonable on cursory review because (1) flue-gas denitrification has never been applied to a source similar to a DAP plant and (2) because of the cost/effectiveness of controlling a nitrogen oxides emission rate of only 40-50 pounds per hour.

Combustion modifications that could be considered include modifications in the primary/secondary/tertiary air ratios, flue gas recirculation, physical modifications to the burner/combustion chamber (to approach the burner design in the No. 1 DAP plant), and ammonia injection. The combustion air ratios were investigated and modified during the shakedown period for the No. 2 DAP plant in 1981-1982. During this time, IMC-New Wales operating personnel found it necessary to increase the primary combustion air over original design rate since at lower primary combustion air flow rates combustion problems occurred resulting in the incomplete combustion of fuel and an increase in visible emissions from the dryer stack. To control nitrogen oxides emissions, the primary combustion air would again have to be reduced, resulting in the combustion inefficiencies originally faced by IMC-New Wales.

Flue gas recirculation on the No. 2 DAP plant is not a viable means of reducing available oxygen in the combustion zone since the flue gas from the dryer has approximately 800 percent excess air; or approximately 18 percent oxygen. A gas stream this rich in oxygen will not be effective in reducing available oxygen in the combustion zone.

Nitrogen injection as a means of nitrogen oxides control has been investigated and found to be effective if the ammonia can be injected into the combustion gas stream where the temperatures are in the range of 1600-1800°F. Technical difficulties reported with this technology include (1) difficulty in maintaining combustion gas temperatures in the required temperature range (1600-1800°F) for an adequate period of time, (2) the potential for the formation of ammonium sulfate resulting from the reaction of ammonia and sulfur dioxide, with resultant visible emission problems, and (3) a potential for cyanide formation from chemical reactions between ammonia and unburned hydrocarbons from the fuel. Furthermore, ammonia injection has not been demonstrated as a feasible alternative for reducing nitrogen oxides emissions in facilities similar to a DAP plant.

Physical modifications to the burner/combustion chambers of the No. 2 DAP plant dryers have been evaluated by IMC-New Wales personnel for purposes of this permit application. Changes possibly could be made that would result in burner/combustion chambers on the two No. 2 DAP plant dryers that approximated the burner/combustion chamber design of the No. 1 DAP plant. To determine for certain if the modification could be made, a detailed investigation would have to be undertaken to determine if the combustion chamber cross-sectioned area (immediately downstream of the burner) is large enough to accept all of the combustion air. (Presently two-thirds of the total air is added at the 90 degree bend in the chamber as shown in Figure 3-1). If it would be possible to make the modification, the result would be a reduction in nitrogen oxides emissions from approximately 0.80 to 0.34 pounds per million BTU heat input, or a reduction of about 20 pounds per hour or 80 tons per year. The impact of this emissions reduction onambient air quality (see Section 5.0) will be a reduction in the maximum annual nitrogen oxides level of approximately 0.4 micrograms per cubic meter; compared to the annual ambient air quality standard for nitrogen oxides of 100 micrograms per cubic meter.

The costs associated with modifying each of the combustion chambers in the No. 2 DAP plant, if it is possible, are:

1.	Replacement of refractory in chamber -	$80,000
2.	Enlargement of the plenum (the area through which the primary and secondary combustion air enters the combustion chamber behind the orifice plate) to accept the primary and all secondary combustion air -	$40,000
3.	Replacement of fan -	$30,000
4.	Change the duct work from the fan to the plenum to accept all primary and secondary combustion air	$30,000
5.	Change or modify controls -	$20,000.
	Total	$200,000 each burner

In addition to these direct costs of $400,000 for the two dryers, there will be a production loss resulting from approximately 20 days down-time on each dryer. This cost, compared with the associated reduction in ambient nitrogen oxides levels (0.4 micrograms per cubic meter), does not appear to be justified.

The alternative of no control appears reasonable considering the fact that the uncontrolled nitrogen oxides emissions from the No. 2 DAP plant will be in the range of 40 to 50 pounds per hour, maximum, and the impact of these emissions plus the impact of nitrogen oxides emissions from all other sources in the IMC-New Wales chemical complex will be in the range of three micrograms per cubic meter, annual average impact. This impact compares with the ambient air quality standard for nitrogen oxides of 100 micrograms per cubic meter, annual average. The uncontrolled emissions from the No. 2 DAP plant are discussed in Section 4.0 and the impact of these emissions are reviewed in Section 5.0.

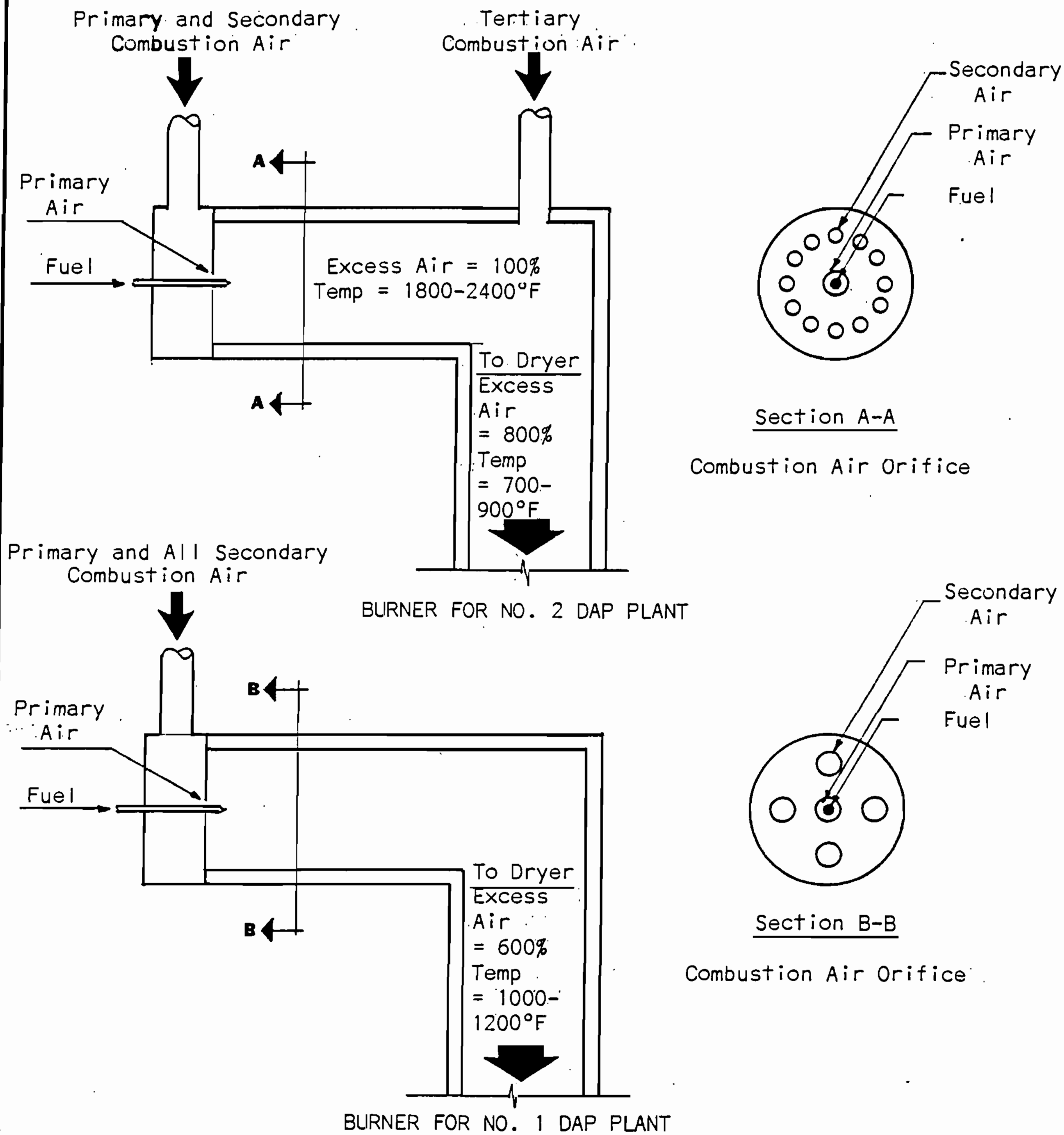

FIGURE 3-1

BURNER DIAGRAMS FOR DAP PLANTS

IMC-NEW WALES
POLK COUNTY, FLORIDA

4.0 PROPOSED EMISSIONS FOR THE NO. 2 DAP PLANT

Nitrogen oxides emission measurements were made at the No. 2 DAP plant in May and August of 1985. During both series of measurements, the plant was operating normally and the dryers were being fired with No. 6 fuel oil with a nitrogen content of approximately 0.28 percent. The measured nitrogen oxides emissions during the test periods ranged from 0.71 to 0.88 pounds per million BTU heat input (expressed as nitrogen dioxide). The dryers in the No. 2 DAP plant can also be fired with natural gas. With gas firing, however, nitrogen oxides emissions are expected to be reduce since natural gas burns with a cooler flame than No. 6 fuel oil.

For permitting purposes, it is proposed that the nitrogen oxides limit for the No. 2 DAP plant be set at 1.0 pound of nitrogen oxides (expressed as nitrogen dioxide) per million BTU heat input. At a maximum plant operating rate of 140 tons of DAP per hour and a design heat input rate of 0.3 million BTU per ton of DAP, the total heat input rate to the plant will be 42.0 million BTU per hour; resulting in a maximum permitted nitrogen oxide emission rate of 42.0 pounds per hour (expressed as nitrogen dioxide) for the entire plant. Table 4-1 summarizes the operating parameters of the No. 2 DAP plant and the proposed nitrogen oxides emission rate for the plant.

TABLE 4-1

PROPOSED NITROGEN OXIDES EMISSIONS
FROM NO. 2 DAP PLANT

IMC - NEW WALES OPERATIONS
POLK COUNTY, FLORIDA

Plant Production Rate	= 140 tons DAP/hour
Fuel Requirements @ 0.3×10^6 BTU/ton DAP	
No. 6 fuel oil	= 140 tons/hr x 0.3×10^6 BTU/ton x 1/149,500 BTU/gal = 280 gal/hour.
Natural Gas	= 140 x 0.3×10^6 x 1/1025 BTU/ft^3 = 41,000 ft^3/hour.
Heat Input @ 0.3×10^6 BTU/ton DAP	= 140 tons/hour x 0.3×10^6 BTU/ton = 42×10^6 BTU/hour.
Proposed Nitrogen Oxide Emission Rate	= 1.0 lb NOx/10^6 BTU (based on 5/85 and 8/85 measurements ranging from 0.71-0.88 lb/10^6 BTU) = 42.0 lb NOx/hour (based on a maximum heat input of 42.0×10^6 BTU/hour) x 8,760 hr/yr x 1/2000 lb/ton x 0.95 = 174.8 tons/year.

5.0 AIR QUALITY REVIEW

Air quality modeling was conducted to evaluate the impact of the increased emissions from the No. 2 DAP plant on ambient air quality and to evaluate the impact of all nitrogen oxides emissions from the IMC-New Wales chemical complex. The modeling was conducted with the ISC-LT model using a five year summary (1974-78) of meteorological data for Orlando, Florida. The ISC-LT model was used since the only applicable ambient air quality standard for nitrogen oxides is an annual average standard.

Air quality monitoring was conducted to evaluate the impact of the proposed nitrogen oxide emission increase from the No. 2 DAP plant, to evaluate the impact of total proposed emissions from the No. 2 DAP plant and to evaluate the impact of nitrogen oxides emissions from all sources at the IMC-New Wales chemical complex. The source data used for the air quality monitoring are summarized in Table 5-1. The nitrogen oxides emission data for the various sources are based on actual measurements, published emission factors or estimates based on emissions from similar sources.

The receptors used for the air quality monitoring were established by an 8.0 kilometer by 8.0 kilometer grid centered at the IMC-New Wales chemical complex. The receptor spacing within this grid was 0.5 kilometers, center-to-center.

The results of the air quality monitoring indicate that the maximum impact of the proposed nitrogen oxide emission increase from the No. 2 DAP plant will be 0.62 micrograms per cubic meter, annual average. This compares with a de minimis nitrogen oxides impact of 14.0 micrograms per cubic meter, annual average defined in 17-2.500(3)(e)1, FAC. If the de minimis impact level had been exceeded, the requirement for preconstruction ambient air quality monitoring would have been triggered. Based upon the results of this phase of the air quality monitoring, it can be concluded that preconstruction ambient air quality monitoring will not be a requirement of this construction application.

Additional modeling demonstrated that the maximum impact of total emissions from the No. 2 DAP plant (42.0 pounds per hour) will be 0.78 micrograms per cubic meter, annual average and the maximum nitrogen oxides impact of all sources operated at the IMC-New Wales chemical complex will be 3.3 micrograms per cubic meter, annual average. The maximum impacts will occur approximately 1.0 kilometers west of the chemical complex on land owned by IMC. The ambient air quality standard for nitrogen oxides is 100 micrograms per cubic meter, annual average.

The results of modeling clearly demonstrate that the proposed increase in nitrogen oxides emissions from the No. 2 DAP plant will result in no significant impact on ambient air quality. The results of all modeling are included as Appendix C of this application.

The impacts of nitrogen oxides emissions from sources outside of IMC-New Wales chemical complex were not included in the air quality review based upon engineering judgement. It was estimated that because of the expected magnitude of nitrogen oxides emissions from sources in the vicinity of IMC-New Wales and the distances from these sources to the IMC-New Wales chemical complex, it would be very unlikely that any of the sources, individually or collectively, would result in a significant nitrogen oxide impact in the project area.

TABLE 5-1

SOURCE DATA USED TO EVALUATE THE IMPACT OF
NOx EMISSIONS FROM SOURCES AT
IMC-NEW WALES
POLK COUNTY, FLORIDA

Source	NOx Emissions (lb/hr)	NOx Emissions (g/sec)	Stack Height (feet)	Stack Diameter (feet)	Stack Gas Vel (fps)	Stack Gas Temp (°F)
1-3 Sulfuric Acid	55.2	6.96	200	8.2	54.8	170
4 Sulfuric Acid	18.4	2.32	200	8.5	51.0	170
5 Sulfuric Acid	18.4	2.32	200	8.5	51.0	170
AFI	47.8	6.02	172	7.9	42.6	120
Multiphos	87.5	11.02	172	7.9	23.3	120
Uranium Rec.	1.2	0.15	100	2.0	26.4	100
No. 1 DAP	10.0	1.26	120	6.9	51.2	115
GTSP	18.0	2.27	120	6.0	66.9	125
Auxiliary Boiler(1)	0.1	0.01	56	5.6	56.4	555
No. 2 DAP(2)	8.6	1.08	120	5.9	68.2	120
No. 2 DAP(3)	42.0	5.29	120	5.9	68.2	120

(1) Auxiliary boiler does not operate when sulfuric acid plants operate.
(2) No. 2 DAP at permitted NOx emission rate.
(3) No. 2 DAP at proposed NOx emission rate.

6.0 IMPACT ON SOILS, VEGETATION AND VISIBILITY

The impact of the proposed nitrogen oxides emission increase for the No. 2 DAP plant will be 0.62 micrograms per cubic meter, annual average. This compares with the ambient air quality standard for nitrogen oxides of 100 micrograms per cubic meter, annual average. Since the impact of the proposed emission increase is less than one percent of the ambient air quality standard for nitrogen oxides, it is extremely unlikely that the impact will result in any adverse effect on soils, vegetation or visibility in the Polk-Hillsborough County area.

The proposed increase in nitrogen oxides emissions from the No. 2 DAP plant will not affect the emission rate of any other air pollutant from the No. 2 DAP plant or other facilities at the IMC-New Wales chemical complex. Furthermore, the proposed emission rate increase will not affect the production rate of the No. 2 DAP plant and hence, will have no effect on traffic or the number of employees at the IMC-New Wales chemical complex.

APPENDIX A

Summary of NOx Emission Data
Reported to the Florida
Department of Environmental Regulation

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

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 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

8/28/85 GTSP

Production - 60 tph
Fuel - 3.4 gal/ton
- 204.0 gal/hr @ 145,900 BTU/gal
- 29.76×10^6 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
- 122.8×10^6 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
- 72.9×10^6 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.

APPENDIX B

Supplemental Information on NOx Emissions
Provided to EPA During Review of PSD
Construction Permit Application
PSD-FL-034

SUPPLEMENTAL DATA FOR PSD REVIEW

NEW WALES CHEMICALS, INC.
POLK COUNTY, FLORIDA

DECEMBER 14, 1979

SHOLTES & KOOGLER
ENVIRONMENTAL CONSULTANTS
1213 NW 6TH STREET
GAINESVILLE, FLORIDA 32601
(904) 377-5822

SHOLTES KOOGLER

7.0 FUEL RELATED AIR POLLUTANT EMISSIONS IN THE DAP PLANT

7.1 Introduction

Heat is required in the DAP product dryer to remove excess water from the product. New Wales is designing the dryers to use fuel oil combustion for the heat source.

For design purposes it is assumed that two gallons of fuel oil will be required to dry one ton of product. The rated production capacity of the proposed DAP plant is 140 tons per hour total (70 tons per hour in each of two identical trains). This production rate will require a maximum of 280 gallons per hour of fuel oil. New Wales is proposing to use a residual No. 6 fuel oil with a maximum 2.5 percent sulfur content.

7.2 SO_2 Emissions

Since there is free ammonia in the product entering the dryer, it is expected that sulfur dioxide will be partially absorbed by a reaction with the ammonia. New Wales has conducted emission measurements and can commit to a maximum sulfur dioxide emission rate from the total DAP plant of 44 pounds per hour. This will be a maximum SO_2 emission rate of 22 pounds per hour from each of the two dryers.

This commitment is equivalent to a 60 percent reduction in the SO_2 emission rate with the dryers burning a 2.5 percent sulfur fuel at a combined rate of 280 gallons per hour. This is also equivalent to burning a fuel oil with 1.0 percent sulfur.

This commitment will reduce the actual sulfur dioxide emissions from the DAP plant from 457 tons per year to 183 tons per year which is only four percent of the total sulfur dioxide emissions from the "new sources" at the New Wales Chemical Complex. Because of the SO_2 sorption capacity inherent with the DAP process the combustion of fuel with a 2.5 percent sulfur is equivalent to using a 1.0 percent sulfur fuel. No expenditure of energy is required to achieve the sorption and the SO_2 remaining in the tail gas has been shown not to cause or contribute to a violation of secondary air quality standards or PSD increments. Because of these factors the use of a 2.5 percent sulfur fuel is considered BACT.

7.3 NO_x Emissions

The combination of fuel oil in the DAP dryer will generate some NO_x as a result of the oxidation of atmospheric nitrogen at the peak temperatures achieved in the flame. The quantity of NO_x generated is expected to be low; however, because of the nature of the dryer performance.

The purpose of the burner in the DAP dryer is to heat and which in turn is used to drive excess moisture from the granular DAP product. If the temperature is too high the DAP will decompose. This performance differs from that of a boiler where the intent is to transfer the heat of combustion to water. The latter requires as little excess combustion air as possible since the heat transferred to the excess air is lost.

In a DAP dryer burner the heavy fuel oil is steam atomized. Additionally about 150 percent stoichiometric combustion air (50 percent excess air) is fed through the burner. Downstream of the burner nozzle quench air is added resulting in a total air flow equivalent to 300-500 percent excess air.

The use of steam atomization of the fuel and the addition of quench air results in a burner that functions much like a low NO_x burner(1). The addition of less than 50 percent excess air at the burner would probably result in lower NO_x emissions but it would also result in higher temperatures in the front of the kiln which in turn would cause DAP decomposition.

Because of the nature of the drying operation the DAP burner functions much like a low NO_x burner. Further modification of the burner to reduce NO_x emissions, such as by reducing primary combustion air is not possible. Temperatures resulting from the reduction in primary air would cause an increase in temperature at the end of the dryer that would cause product decomposition. Flue gas recirculation, likewise is not feasible because of the high excess air flow used in the dryer. The flue gas has an oxygen content not significantly lower than that of air.

It is the opinion of New Wales and the burner supplier (John Zink, Inc.) that the burners used in DAP plants represent BACT for NO_x control in this type source.

In response to a specific EPA request for information, the air flow to the burner and the quench air orifices is controlled by fixed orifices in the air line. The fuel flow rate is controlled by an orifice and the pressure of the oil pump.

REFERENCES
SECTION 7

1. Personal communication with Lee Massey, John Zink, Inc., Tulsa, Oklahoma, December 7, 1979.

APPENDIX C

Air Quality Modeling

- ISCLT INPUT DATA -

NUMBER OF SOURCES = 11
NUMBER OF X AXIS GRID SYSTEM POINTS = 21
NUMBER OF Y AXIS GRID SYSTEM POINTS = 21
NUMBER OF SPECIAL POINTS = 0
NUMBER OF SEASONS = 1
NUMBER OF WIND SPEED CLASSES = 6
NUMBER OF STABILITY CLASSES = 6
NUMBER OF WIND DIRECTION CLASSES = 16
FILE NUMBER OF DATA FILE USED FOR REPORTS = 1
THE PROGRAM IS RUN IN RURAL MODE
CONCENTRATION (DEPOSITION) UNITS CONVERSION FACTOR = .10000000E+07
ACCELERATION OF GRAVITY (METERS/SEC**2) = 9.800
HEIGHT OF MEASUREMENT OF WIND SPEED (METERS) = 10.000
ENTRAINMENT PARAMETER FOR UNSTABLE CONDITIONS = .600
ENTRAINMENT PARAMETER FOR STABLE CONDITIONS = .600
CORRECTION ANGLE FOR GRID SYSTEM VERSUS DIRECTION DATA NORTH (DEGREES) = .000
DECAY COEFFICIENT = .00000000E+00
PROGRAM OPTION SWITCHES = 1, 1, 1, 0, 0, 3, 2, 2, 3, 2, 2, 0, 0, 0, 0, 0, 0, 1, 0, 0,
SOURCES USED TO FORM SOURCE COMBINATION 1 ARE - 2304,
SOURCES USED TO FORM SOURCE COMBINATION 2 ARE - 2304, 2344,
SOURCES USED TO FORM SOURCE COMBINATION 3 ARE - 2301,-12311,
DISTANCE X AXIS GRID SYSTEM POINTS (METERS)= 391500.00, 392000.00, 392500.00, 393000.00, 393500.00, 394000.00, 394500.00, 395000.00, 395500.00, 396000.00, 396500.00, 397000.00, 397500.00, 398000.00, 398500.00, 399000.00, 399500.00, 400000.00, 400500.00, 401000.00, 401500.00,
DISTANCE Y AXIS GRID SYSTEM POINTS (METERS)= 3074000.00, 3074500.00, 3075000.00, 3075500.00, 3076000.00, 3076500.00, 3077000.00, 3077500.00, 3078000.00, 3078500.00, 3079000.00, 3079500.00, 3080000.00, 3080500.00, 3081000.00, 3081500.00, 3082000.00, 3082500.00, 3083000.00, 3083500.00, 3084000.00,

- AMBIENT AIR TEMPERATURE (DEGREES KELVIN) -

	STABILITY CATEGORY 1	STABILITY CATEGORY 2	STABILITY CATEGORY 3	STABILITY CATEGORY 4	STABILITY CATEGORY 5	STABILITY CATEGORY 6
SEASON 1	298.0000	298.0000	298.0000	298.0000	298.0000	298.0000

- MIXING LAYER HEIGHT (METERS) -

SEASON 1

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 2	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 3	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 4	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04	.100000E+04
STABILITY CATEGORY 5	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05
STABILITY CATEGORY 6	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05	.100000E+05

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 1

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00018000	.00005000	.00000000	.00000000	.00000000	.00000000
22.500	.00009000	.00002000	.00000000	.00000000	.00000000	.00000000
45.000	.00019000	.00023000	.00000000	.00000000	.00000000	.00000000
67.500	.00024000	.00025000	.00000000	.00000000	.00000000	.00000000
90.000	.00042000	.00057000	.00000000	.00000000	.00000000	.00000000
112.500	.00033000	.00027000	.00000000	.00000000	.00000000	.00000000
135.000	.00024000	.00025000	.00000000	.00000000	.00000000	.00000000
157.500	.00030000	.00039000	.00000000	.00000000	.00000000	.00000000
180.000	.00023000	.00023000	.00000000	.00000000	.00000000	.00000000
202.500	.00014000	.00016000	.00000000	.00000000	.00000000	.00000000
225.000	.00008000	.00011000	.00000000	.00000000	.00000000	.00000000
247.500	.00020000	.00018000	.00000000	.00000000	.00000000	.00000000
270.000	.00016000	.00018000	.00000000	.00000000	.00000000	.00000000
292.500	.00015000	.00011000	.00000000	.00000000	.00000000	.00000000
315.000	.00014000	.00009000	.00000000	.00000000	.00000000	.00000000
337.500	.00010000	.00009000	.00000000	.00000000	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 2

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00073000	.00153000	.00094000	.00000000	.00000000	.00000000
22.500	.00078000	.00164000	.00084000	.00000000	.00000000	.00000000
45.000	.00101000	.00402000	.00205000	.00000000	.00000000	.00000000
67.500	.00145000	.00507000	.00363000	.00000000	.00000000	.00000000
90.000	.00224000	.00774000	.00612000	.00000000	.00000000	.00000000
112.500	.00111000	.00308000	.00235000	.00000000	.00000000	.00000000
135.000	.00075000	.00283000	.00169000	.00000000	.00000000	.00000000
157.500	.00063000	.00256000	.00153000	.00000000	.00000000	.00000000
180.000	.00088000	.00260000	.00219000	.00000000	.00000000	.00000000
202.500	.00034000	.00132000	.00110000	.00000000	.00000000	.00000000
225.000	.00053000	.00121000	.00094000	.00000000	.00000000	.00000000
247.500	.00056000	.00155000	.00107000	.00000000	.00000000	.00000000
270.000	.00083000	.00190000	.00219000	.00000000	.00000000	.00000000
292.500	.00069000	.00174000	.00100000	.00000000	.00000000	.00000000
315.000	.00037000	.00142000	.00112000	.00000000	.00000000	.00000000
337.500	.00038000	.00119000	.00050000	.00000000	.00000000	.00000000

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 3

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00035000	.00201000	.00448000	.00037000	.00002000	.00000000
22.500	.00045000	.00324000	.00352000	.00057000	.00007000	.00000000
45.000	.00060000	.00600000	.00669000	.00139000	.00000000	.00000000
67.500	.00080000	.00527000	.00671000	.00203000	.00002000	.00000000
90.000	.00091000	.00769000	.01205999	.00390000	.00005000	.00000000
112.500	.00040000	.00331000	.00699000	.00228000	.00009000	.00000000
135.000	.00042000	.00272000	.00475000	.00075000	.00000000	.00000000
157.500	.00056000	.00224000	.00324000	.00048000	.00000000	.00000000
180.000	.00056000	.00315000	.00635000	.00068000	.00002000	.00000000
202.500	.00021000	.00121000	.00192000	.00048000	.00002000	.00000000
225.000	.00011000	.00162000	.00340000	.00066000	.00005000	.00000000
247.500	.00025000	.00228000	.00304000	.00078000	.00005000	.00000000
270.000	.00022000	.00215000	.00646000	.00114000	.00007000	.00005000
292.500	.00015000	.00183000	.00404000	.00066000	.00009000	.00000000
315.000	.00025000	.00110000	.00342000	.00066000	.00000000	.00000000
337.500	.00020000	.00103000	.00203000	.00011000	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 4

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00088000	.00411000	.01892999	.01730999	.00155000	.00005000
22.500	.00066000	.00448000	.00978999	.00969999	.00128000	.00018000
45.000	.00098000	.00612000	.00985999	.00926999	.00062000	.00005000
67.500	.00097000	.00527000	.00856000	.00690000	.00030000	.00005000
90.000	.00108000	.00694000	.01223999	.01106999	.00037000	.00000000
112.500	.00070000	.00363000	.00769000	.00733000	.00014000	.00000000
135.000	.00050000	.00356000	.00901999	.00582000	.00032000	.00005000
157.500	.00049000	.00345000	.00942999	.00876999	.00105000	.00005000
180.000	.00095000	.00541000	.01600999	.01483999	.00251000	.00014000
202.500	.00031000	.00233000	.00678000	.00507000	.00094000	.00009000
225.000	.00071000	.00267000	.00735000	.00669000	.00100000	.00023000
247.500	.00042000	.00313000	.00612000	.00432000	.00103000	.00018000
270.000	.00055000	.00324000	.00692000	.00894999	.00183000	.00021000
292.500	.00046000	.00265000	.00580000	.00747000	.00146000	.00023000
315.000	.00045000	.00219000	.00557000	.00862999	.00112000	.00002000
337.500	.00048000	.00228000	.00623000	.00626000	.00034000	.00009000

- ISCLT INPUT DATA (CONT.) -

- FREQUENCY OF OCCURRENCE OF WIND SPEED, DIRECTION AND STABILITY -

SEASON 1

STABILITY CATEGORY 5

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.00000000	.00849000	.01392999	.00000000	.00000000	.00000000
22.500	.00000000	.00628000	.00459000	.00000000	.00000000	.00000000
45.000	.00000000	.00843000	.00352000	.00000000	.00000000	.00000000
67.500	.00000000	.00612000	.00221000	.00000000	.00000000	.00000000
90.000	.00000000	.00740000	.00272000	.00000000	.00000000	.00000000
112.500	.00000000	.00457000	.00208000	.00000000	.00000000	.00000000
135.000	.00000000	.00505000	.00281000	.00000000	.00000000	.00000000
157.500	.00000000	.00571000	.00285000	.00000000	.00000000	.00000000
180.000	.00000000	.00967999	.00457000	.00000000	.00000000	.00000000
202.500	.00000000	.00358000	.00190000	.00000000	.00000000	.00000000
225.000	.00000000	.00422000	.00190000	.00000000	.00000000	.00000000
247.500	.00000000	.00322000	.00203000	.00000000	.00000000	.00000000
270.000	.00000000	.00299000	.00276000	.00000000	.00000000	.00000000
292.500	.00000000	.00242000	.00372000	.00000000	.00000000	.00000000
315.000	.00000000	.00148000	.00370000	.00000000	.00000000	.00000000
337.500	.00000000	.00269000	.00630000	.00000000	.00000000	.00000000

SEASON 1

STABILITY CATEGORY 6

DIRECTION (DEGREES)	WIND SPEED CATEGORY 1 (.7500MPS)	WIND SPEED CATEGORY 2 (2.5000MPS)	WIND SPEED CATEGORY 3 (4.3000MPS)	WIND SPEED CATEGORY 4 (6.8000MPS)	WIND SPEED CATEGORY 5 (9.5000MPS)	WIND SPEED CATEGORY 6 (12.5000MPS)
.000	.01492999	.01867999	.00000000	.00000000	.00000000	.00000000
22.500	.01269999	.01323999	.00000000	.00000000	.00000000	.00000000
45.000	.01155999	.01216999	.00000000	.00000000	.00000000	.00000000
67.500	.00959999	.00871999	.00000000	.00000000	.00000000	.00000000
90.000	.00991999	.00840000	.00000000	.00000000	.00000000	.00000000
112.500	.00780000	.00610000	.00000000	.00000000	.00000000	.00000000
135.000	.00757000	.00566000	.00000000	.00000000	.00000000	.00000000
157.500	.00691000	.00646000	.00000000	.00000000	.00000000	.00000000
180.000	.00982999	.01072999	.00000000	.00000000	.00000000	.00000000
202.500	.00352000	.00324000	.00000000	.00000000	.00000000	.00000000
225.000	.00397000	.00454000	.00000000	.00000000	.00000000	.00000000
247.500	.00435000	.00397000	.00000000	.00000000	.00000000	.00000000
270.000	.00572000	.00676000	.00000000	.00000000	.00000000	.00000000
292.500	.00483000	.00527000	.00000000	.00000000	.00000000	.00000000
315.000	.00274000	.00281000	.00000000	.00000000	.00000000	.00000000
337.500	.00391000	.00500000	.00000000	.00000000	.00000000	.00000000

- ISCLT INPUT DATA (CONT.) -

- VERTICAL POTENTIAL TEMPERATURE GRADIENT (DEGREES KELVIN/METER) -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 2	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 3	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 4	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00	.000000E+00
STABILITY CATEGORY 5	.200000E-01	.200000E-01	.200000E-01	.200000E-01	.200000E-01	.200000E-01
STABILITY CATEGORY 6	.350000E-01	.350000E-01	.350000E-01	.350000E-01	.350000E-01	.350000E-01

- WIND PROFILE POWER LAW EXPONENTS -

	WIND SPEED CATEGORY 1	WIND SPEED CATEGORY 2	WIND SPEED CATEGORY 3	WIND SPEED CATEGORY 4	WIND SPEED CATEGORY 5	WIND SPEED CATEGORY 6
STABILITY CATEGORY 1	.100000E+00	.100000E+00	.100000E+00	.100000E+00	.100000E+00	.100000E+00
STABILITY CATEGORY 2	.150000E+00	.150000E+00	.150000E+00	.150000E+00	.150000E+00	.150000E+00
STABILITY CATEGORY 3	.200000E+00	.200000E+00	.200000E+00	.200000E+00	.200000E+00	.200000E+00
STABILITY CATEGORY 4	.250000E+00	.250000E+00	.250000E+00	.250000E+00	.250000E+00	.250000E+00
STABILITY CATEGORY 5	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00
STABILITY CATEGORY 6	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00	.300000E+00

- SOURCE INPUT DATA -

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C T SOURCE SOURCE      X            Y       EMISSION  BASE /
A A NUMBER  TYPE   COORDINATE  COORDINATE   HEIGHT   ELEV- /              - SOURCE DETAILS DEPENDING ON TYPE -
R P                   (M)          (M)        (M)    ATION /
D E                                                   (M)  /
---------------------------------------------------------------------------------------------------------------------
X     2301  STACK   396560.00  3078640.00  60.70     .00 GAS EXIT TEMP (DEG K)= 349.70, GAS EXIT VEL. (M/SEC)= 15.55,
   #4 H2SO4                                              STACK DIAMETER (M)= 2.600, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                     SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                    2.32000E+00
X     2302  STACK   396750.00  3079350.00  52.40     .00 GAS EXIT TEMP (DEG K)= 321.90, GAS EXIT VEL. (M/SEC)= 13.00,
    AFI                                                  STACK DIAMETER (M)= 2.400, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                     SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                    6.02000E+00
X     2303  STACK   396830.00  3079430.00  52.40     .00 GAS EXIT TEMP (DEG K)= 319.10, GAS EXIT VEL. (M/SEC)=  7.10,
    Multiphos                                            STACK DIAMETER (M)= 2.400, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                     SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                    1.10200E+01
X     2304  STACK   396450.00  3079150.00  36.60     .00 GAS EXIT TEMP (DEG K)= 319.10, GAS EXIT VEL. (M/SEC)= 20.80,
   #2 DAP @ 33.4 lb/hr                                   STACK DIAMETER (M)= 1.800, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
  (33.4 lb/hr = 42.0 lb/hr proposed                            - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
              - 8.6 lb/hr permitted)                                 SEASON 1     SEASON 2     SEASON 3     SEASON 4
              = Requested increase                          ~~3.33000E+00~~ 4.21 E+00
X     2305  STACK   396490.00  3078640.00  60.70     .00 GAS EXIT TEMP (DEG K)= 349.70, GAS EXIT VEL. (M/SEC)= 15.55,
   #5 H2SO4                                              STACK DIAMETER (M)= 2.600, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                     SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                    2.32000E+00
X     2307  STACK   396670.00  3079210.00  30.18     .00 GAS EXIT TEMP (DEG K)= 310.00, GAS EXIT VEL. (M/SEC)=  8.09,
    Uranium Rec.                                         STACK DIAMETER (M)=  .610, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                     SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                    1.50000E-01
X     2318  STACK   396530.00  3078750.00  61.00     .00 GAS EXIT TEMP (DEG K)= 350.20, GAS EXIT VEL. (M/SEC)= 16.71,
                                                         STACK DIAMETER (M)= 2.500, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
   #1-3 H2SO4                                            ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                               - SOURCE STRENGTHS ( GRAMS PER SEC                        ) -
                                                                     SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                    6.96000E+00
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- SOURCE INPUT DATA -

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C T SOURCE SOURCE     X           Y       EMISSION  BASE /
A A NUMBER  TYPE  COORDINATE  COORDINATE  HEIGHT   ELEV- /            - SOURCE DETAILS DEPENDING ON TYPE -
R P                  (M)         (M)        (M)    ATION /
D E                                                 (M)  /
------------------------------------------------------------------------------------------------------------------------
X     2344  STACK   396450.00  3079150.00  36.60     .00 GAS EXIT TEMP (DEG K)= 319.10, GAS EXIT VEL. (M/SEC)= 20.80,
                                                         STACK DIAMETER (M)= 1.800, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                              - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  1.08000E+00
X    12307  STACK   396540.00  3079030.00  36.60     .00 GAS EXIT TEMP (DEG K)= 319.10, GAS EXIT VEL. (M/SEC)= 15.60,
                                                         STACK DIAMETER (M)= 2.100, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                              - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  1.26000E+00
WARNING - DISTANCE BETWEEN SOURCE  12307 AND POINT X,Y=  396500.00, 3079000.00 IS LESS THAN PERMITTED
X    12310  STACK   396560.00  3078810.00  29.00     .00 GAS EXIT TEMP (DEG K)= 564.10, GAS EXIT VEL. (M/SEC)= 17.20,
                                                         STACK DIAMETER (M)= 1.700, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                              - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  1.00000E-02
X    12311  STACK   396550.00  3079150.00  36.60     .00 GAS EXIT TEMP (DEG K)= 325.20, GAS EXIT VEL. (M/SEC)= 20.40,
                                                         STACK DIAMETER (M)= 1.800, HEIGHT OF ASSO. BLDG. (M)=   .00, WIDTH OF
                                                         ASSO. BLDG. (M)=    .00, WAKE EFFECTS FLAG = 0
                                                              - SOURCE STRENGTHS ( GRAMS PER SEC                         ) -
                                                                   SEASON 1     SEASON 2     SEASON 3     SEASON 4
                                                                  2.27000E+00
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- Source 2344: #2DAP @ 8.6 lb/hr
- Source 12307: #1 DAP
- Source 12310: Aux Boiler (does not operate when H_2SO_4 plants operate)
- Source 12311: GTSP

Impact of Proposed Emission Increase
(NOTE: Increase all impacts by the factor $\frac{4.21}{3.33}$)

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 2304 **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	391500.000	392000.000	392500.000	393000.000	393500.000	394000.000	394500.000	395000.000	395500.000
	- CONCENTRATION -								
3084000.000	.067925	.070459	.073274	.076341	.079661	.083205	.088046	.102268	.117570
3083500.000	.070280	.072881	.076001	.079540	.083438	.087666	.092133	.105394	.123669
3083000.000	.072814	.075796	.079008	.083008	.087636	.092756	.098258	.108249	.130374
3082500.000	.075540	.078996	.082810	.086947	.092303	.098589	.105400	.112505	.137325
3082000.000	.078458	.082493	.087071	.092205	.097785	.105114	.113689	.122891	.144118
3081500.000	.081545	.086267	.091785	.098206	.105379	.113039	.123435	.135211	.148910
3081000.000	.089108	.090250	.096882	.104842	.114174	.124837	.135569	.150224	.166487
3080500.000	.104177	.108433	.112548	.115664	.124105	.138641	.155175	.170825	.189109
3080000.000	.120221	.128326	.137816	.148517	.160154	.170366	.179899	.207075	.223000
3079500.000	.136568	.148766	.164105	.183488	.208543	.240596	.281083	.322213	.320303
3079000.000	.144692	.158829	.176946	.200460	.232021	.274973	.335395	.416212	.490106 .619
3078500.000	.134048	.145177	.158893	.175715	.196604	.221334	.248994	.279325	.335001
3078000.000	.123196	.131267	.140582	.150893	.161777	.182485	.215601	.256676	.276543
3077500.000	.112645	.117890	.123710	.137574	.155069	.177052	.203792	.222924	.213656
3077000.000	.104869	.113403	.123829	.136655	.152151	.170863	.184831	.184263	.176314
3076500.000	.105653	.113813	.123540	.135144	.148831	.159193	.160825	.159217	.165437
3076000.000	.106175	.113907	.122897	.133301	.141301	.143218	.143494	.141603	.160473
3075500.000	.106421	.113699	.121964	.128266	.130011	.131005	.130885	.132131	.154979
3075000.000	.106387	.113208	.118394	.119981	.121128	.121667	.121391	.130355	.149641
3074500.000	.106083	.110507	.112007	.113217	.114054	.114416	.114182	.128188	.144529
3074000.000	.103801	.105368	.106620	.107619	.108311	.108637	.112977	.125824	.139842

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	396000.000	396500.000	397000.000	397500.000	398000.000	398500.000	399000.000	399500.000	400000.000
	- CONCENTRATION -								
3084000.000	.133344	.144890	.120258	.095733	.072464	.052986	.053308	.053330	.053090
3083500.000	.142738	.156738	.127043	.097682	.070300	.057872	.058022	.057791	.057254
3083000.000	.153881	.171269	.134608	.098787	.066179	.063842	.063670	.063024	.062037
3082500.000	.167013	.189191	.142651	.097972	.071034	.071188	.070497	.069185	.066197
3082000.000	.182444	.211777	.150543	.093575	.080748	.080270	.078711	.074709	.068578
3081500.000	.199859	.240316	.156164	.092570	.093268	.091739	.086256	.077914	.070855
3081000.000	.217090	.275633	.154005	.110098	.109900	.102572	.090736	.080865	.072867
3080500.000	.224932	.311876	.129421	.134317	.126450	.108773	.094640	.083374	.076527
3080000.000	.224434	.298679	.150650	.157270	.134374	.114183	.104669	.095372	.087049
3079500.000	.197500	.056210	.133626	.178142	.167559	.145530	.125466	.109951	.097760
3079000.000	.263602	.000026	.150478	.226490	.194611	.161134	.135306	.116698	.102693
3078500.000	.266230	.171975	.152585	.170775	.153762	.136117	.119335	.105773	.094783
3078000.000	.230467	.288233	.130508	.140889	.130507	.116634	.104090	.094345	.086425
3077500.000	.229857	.280798	.145942	.116197	.110636	.101491	.092881	.085183	.078751
3077000.000	.218379	.257578	.160053	.100860	.095932	.088621	.082253	.076795	.072007
3076500.000	.204254	.234193	.161406	.095593	.085971	.079949	.073355	.069011	.065499
3076000.000	.191699	.215095	.158383	.104940	.078487	.073502	.068044	.062543	.059496

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 2304 (CONT.) **

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	396000.000	396500.000	397000.000	397500.000	398000.000	398500.000	399000.000	399500.000	400000.000
	- CONCENTRATION -								
3075500.000	.180225	.198932	.153365	.109425	.072732	.068464	.063800	.059111	.054621
3075000.000	.170442	.185689	.148055	.111200	.077321	.064334	.060345	.056290	.052352
3074500.000	.161892	.174540	.142780	.111396	.081947	.060931	.057461	.053907	.050415
3074000.000	.154567	.165231	.137928	.110788	.084940	.061244	.054990	.051840	.048716

- GRID SYSTEM RECEPTORS -

- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	400500.000	401000.000	401500.000
	- CONCENTRATION -		
3084000.000	.052632	.051998	.050508
3083500.000	.056482	.054672	.051735
3083000.000	.059757	.056134	.052912
3082500.000	.061575	.057536	.054012
3082000.000	.063323	.058839	.055004
3081500.000	.064925	.059991	.055854
3081000.000	.066288	.061297	.058679
3080500.000	.071852	.067650	.063988
3080000.000	.080105	.074280	.069460
3079500.000	.088345	.080858	.074867
3079000.000	.092142	.083900	.077383
3078500.000	.086134	.079148	.073505
3078000.000	.079740	.074111	.069415
3077500.000	.073404	.069075	.065302
3077000.000	.067842	.064316	.061311
3076500.000	.062393	.059681	.057307
3076000.000	.057229	.055195	.053369
3075500.000	.052467	.050970	.049596
3075000.000	.048636	.047064	.046050
3074500.000	.047076	.043944	.042759
3074000.000	.045697	.042830	.040104

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 2304,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
395500.00	3079000.00	.490106 $\times \frac{4.21}{3.33} = 0.62\ \mu g/m^3$
395000.00	3079000.00	.416212
394500.00	3079000.00	.335395
395500.00	3078500.00	.335001
395000.00	3079500.00	.322213

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) DUE TO SOURCE 2304 (CONT.) **

- 10 CONTRIBUTING VALUES TO PROGRAM DETERMINED MAXIMUM 10 OF COMBINED SOURCES 2304,

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
395500.00	3079500.00	.320303
396500.00	3080500.00	.311876
396500.00	3080000.00	.298679
396500.00	3078000.00	.288233
394500.00	3079500.00	.281083

Impact of Emissions from No 2 DAP
at Proposed Emission Rate of 42.0 lb/hr
(NOTE: Increase all impacts by the factor $\frac{42.0}{35.0}$)

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM COMBINED SOURCES 2304, 2344,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	391500.000	392000.000	392500.000	393000.000	393500.000	394000.000	394500.000	395000.000	395500.000
	- CONCENTRATION -								
3084000.000	.089954	.093310	.097039	.101100	.105496	.110190	.116602	.135436	.155701
3083500.000	.093073	.096517	.100650	.105337	.110499	.116098	.122014	.139576	.163778
3083000.000	.096429	.100379	.104632	.109930	.116059	.122839	.130125	.143356	.172658
3082500.000	.100040	.104617	.109668	.115147	.122239	.130563	.139584	.148993	.181862
3082000.000	.103904	.109247	.115310	.122109	.129499	.139205	.150561	.162748	.190859
3081500.000	.107993	.114245	.121554	.130057	.139556	.149700	.163468	.179063	.197205
3081000.000	.118008	.119520	.128303	.138844	.151203	.165325	.179537	.198945	.220482
3080500.000	.137964	.143601	.149051	.153176	.164356	.183606	.205502	.226227	.250442
3080000.000	.159211	.169945	.182514	.196685	.212096	.225620	.238245	.274234	.295325
3079500.000	.180860	.197015	.217329	.242998	.276178	.318627	.372245	.426715	.424184
3079000.000	.191619	.210341	.234333	.265474	.307271	.364154	.444172	.551200	.649059
3078500.000	.177523	.192262	.210426	.232703	.260367	.293118	.329749	.369917	.443651
3078000.000	.163151	.173840	.186176	.199832	.214245	.241670	.285525	.339922	.366232
3077500.000	.149179	.156124	.163833	.182193	.205362	.234474	.269887	.295223	.282950
3077000.000	.138881	.150182	.163990	.180975	.201498	.226278	.244776	.244023	.233497
3076500.000	.139918	.150726	.163607	.178975	.197100	.210823	.212984	.210855	.219092
3076000.000	.140610	.150850	.162756	.176534	.187129	.189666	.190032	.187528	.212518
3075500.000	.140936	.150574	.161520	.169866	.172177	.173493	.173335	.174984	.205243
3075000.000	.140891	.149925	.156793	.158894	.160413	.161127	.160761	.172633	.198174
3074500.000	.140489	.146347	.148333	.149936	.151045	.151523	.151215	.169763	.191404
3074000.000	.137466	.139542	.141200	.142522	.143439	.143871	.149618	.166632	.185197

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	396000.000	396500.000	397000.000	397500.000	398000.000	398500.000	399000.000	399500.000	400000.000
	- CONCENTRATION -								
3084000.000	.176590	.191881	.159261	.126782	.095966	.070171	.070598	.070626	.070309
3083500.000	.189032	.207572	.168247	.129363	.093100	.076642	.076840	.076533	.075822
3083000.000	.203788	.226816	.178265	.130826	.087642	.084547	.084320	.083465	.082157
3082500.000	.221179	.250551	.188917	.129747	.094072	.094277	.093361	.091624	.087666
3082000.000	.241615	.280461	.199368	.123923	.106936	.106304	.104239	.098939	.090819
3081500.000	.264678	.318257	.206812	.122592	.123517	.121492	.114231	.103184	.093835
3081000.000	.287497	.365028	.203953	.145805	.145544	.135838	.120164	.107092	.096500
3080500.000	.297883	.413025	.171395	.177879	.167460	.144050	.125335	.110414	.101346
3080000.000	.297223	.395547	.199510	.208276	.177955	.151216	.138616	.126304	.115281
3079500.000	.261554	.074441	.176964	.235918	.221902	.192729	.166158	.145611	.129466
3079000.000	.349095	.000035	.199282	.299946	.257727	.213394	.179189	.154546	.135999
3078500.000	.352575	.227751	.202072	.226161	.203631	.180263	.158038	.140078	.125523
3078000.000	.305212	.381715	.172835	.186582	.172833	.154461	.137849	.124943	.114455
3077500.000	.304405	.371868	.193274	.153882	.146518	.134407	.123004	.112810	.104292
3077000.000	.289205	.341117	.211963	.133572	.127045	.117363	.108930	.101701	.095360
3076500.000	.270498	.310147	.213754	.126596	.113853	.105878	.097146	.091392	.086742
3076000.000	.253872	.284855	.209751	.138974	.103942	.097341	.090113	.082827	.078792

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 2304, 2344,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	396000.000	396500.000	397000.000	397500.000	398000.000	398500.000	399000.000	399500.000	400000.000
	- CONCENTRATION -								
3075500.000	.238677	.263451	.203105	.144915	.096321	.090668	.084492	.078282	.072336
3075000.000	.225721	.245911	.196072	.147265	.102398	.085199	.079916	.074546	.069330
3074500.000	.214397	.231148	.189087	.147525	.108524	.080692	.076096	.071390	.066765
3074000.000	.204697	.218820	.182662	.146720	.112488	.081107	.072824	.068653	.064516

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	400500.000	401000.000	401500.000
	- CONCENTRATION -		
3084000.000	.069702	.068862	.066889
3083500.000	.074801	.072404	.068514
3083000.000	.079137	.074339	.070073
3082500.000	.081546	.076197	.071529
3082000.000	.083860	.077922	.072844
3081500.000	.085982	.079447	.073969
3081000.000	.087787	.081177	.077711
3080500.000	.095155	.089590	.084741
3080000.000	.106084	.098371	.091988
3079500.000	.116998	.107082	.099148
3079000.000	.122027	.111111	.102480
3078500.000	.114070	.104817	.097345
3078000.000	.105602	.098147	.091929
3077500.000	.097211	.091477	.086481
3077000.000	.089845	.085175	.081196
3076500.000	.082629	.079036	.075893
3076000.000	.075790	.073096	.070677
3075500.000	.069483	.067501	.065681
3075000.000	.064410	.062328	.060985
3074500.000	.062344	.058196	.056627
3074000.000	.060518	.056721	.053110

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
395500.00	3079000.00	.649059
395000.00	3079000.00	.551200
394500.00	3079000.00	.444172
395500.00	3078500.00	.443651
395000.00	3079500.00	.426715

$\times \frac{42.0}{35.0} = 0.78\ \mu g/m^3$

Max increase
$= 0.78 - 0.65$
$= 0.13\ \mu g/m^3$

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 2304, 2344,

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
395500.00	3079500.00	.424184
396500.00	3080500.00	.413025
396500.00	3080000.00	.395547
396500.00	3078000.00	.381715
394500.00	3079500.00	.372245

Impact of NOx Emissions from all IMC-New Wales Sources
(Note: Increase all impacts by 0.13 μg/m³ [see previous run])

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) FROM COMBINED SOURCES 2301,-12311,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	391500.000	392000.000	392500.000	393000.000	393500.000	394000.000	394500.000	395000.000	395500.000
	- CONCENTRATION -								
3084000.000	.516671	.536184	.558526	.583806	.611146	.640237	.675906	.752190	.872468
3083500.000	.535920	.557079	.581064	.609164	.641415	.676291	.713112	.782028	.913487
3083000.000	.557271	.581236	.607860	.638442	.674921	.717192	.762495	.825083	.955262
3082500.000	.580266	.608499	.639553	.674332	.714704	.763434	.819414	.879435	1.000939
3082000.000	.604769	.638088	.675742	.717734	.764958	.819300	.884315	.959240	1.075572
3081500.000	.638648	.669638	.715183	.767716	.826480	.891477	.966501	1.054863	1.163979
3081000.000	.719294	.744908	.781605	.823973	.897473	.983244	1.077114	1.181602	1.299693
3080500.000	.832494	.872965	.921474	.975018	1.040361	1.113808	1.222994	1.365500	1.502937
3080000.000	.959026	1.028697	1.110740	1.205116	1.314662	1.447320	1.586797	1.745576	1.831863
3079500.000	1.086507	1.186622	1.311410	1.467475	1.666001	1.918866	2.243497	2.666158	3.090863
3079000.000	1.115871	1.222314	1.355792	1.524002	1.740306	2.018979	2.379877	2.813900	3.167997
3078500.000	1.056821	1.146896	1.256691	1.389594	1.550646	1.738838	1.942233	2.211613	2.514353
3078000.000	.967578	1.033987	1.110299	1.195064	1.291695	1.453393	1.665712	1.917656	2.103935
3077500.000	.879674	.923810	.984596	1.080923	1.199021	1.355139	1.544545	1.716245	1.676818
3077000.000	.815695	.875503	.949050	1.045525	1.161290	1.297068	1.426072	1.445275	1.374730
3076500.000	.801477	.864011	.937842	1.024764	1.125521	1.222502	1.250766	1.235422	1.198803
3076000.000	.799630	.857916	.925199	1.002328	1.076607	1.102855	1.105279	1.087290	1.124917
3075500.000	.796164	.850178	.911191	.969419	.991449	.999143	.996203	.983050	1.090776
3075000.000	.791241	.841125	.888293	.906612	.915195	.918055	.913104	.921933	1.055884
3074500.000	.784472	.824407	.840092	.848577	.853615	.854063	.848653	.905514	1.021910
3074000.000	.770355	.785527	.794296	.800260	.803319	.802747	.805377	.888665	.989763

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE, METERS)	396000.000	396500.000	397000.000	397500.000	398000.000	398500.000	399000.000	399500.000	400000.000
	- CONCENTRATION -								
3084000.000	.998535	1.119100	1.038007	.841201	.650341	.475894	.425639	.426438	.424673
3083500.000	1.066138	1.213226	1.116160	.877425	.648913	.466890	.466178	.464928	.460558
3083000.000	1.142738	1.326217	1.207506	.911456	.633825	.514828	.515331	.510659	.502297
3082500.000	1.228337	1.463448	1.314627	.937549	.614600	.578099	.574941	.565136	.545505
3082000.000	1.319212	1.629362	1.436910	.941967	.655355	.657676	.647744	.622652	.572400
3081500.000	1.404663	1.826496	1.567787	.910181	.762861	.758717	.727439	.658886	.595416
3081000.000	1.530700	2.033551	1.668131	.884502	.906572	.874012	.777848	.689719	.616218
3080500.000	1.670166	2.158974	1.604488	1.065721	1.076905	.944831	.819876	.719816	.657970
3080000.000	1.901888	1.918579	1.086197	1.234725	1.165718	1.034296	.929903	.830321	.747801
3079500.000	3.042365	.845990	.445594	1.460833	1.535317	1.316956	1.120869	.966844	.847402
3079000.000	2.594438	.896345	.640013	1.440768	1.487057	1.311601	1.127849	.976549	.856840
3078500.000	2.239524	1.428972	1.183863	1.215993	1.236361	1.127680	.997952	.889414	.795993
3078000.000	1.771226	1.853938	1.383292	1.005417	1.017351	.953944	.868335	.787735	.715677
3077500.000	1.525254	1.875561	1.439701	.934802	.864860	.821397	.762925	.703345	.649633
3077000.000	1.463109	1.777436	1.439810	.924645	.753117	.721363	.675954	.631217	.590534
3076500.000	1.399527	1.655769	1.394439	.920248	.681441	.646334	.608540	.569989	.536956
3076000.000	1.331442	1.540275	1.333320	.942176	.673200	.587283	.557965	.522922	.491425

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 2301,-12311,

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	396000.000	396500.000	397000.000	397500.000	398000.000	398500.000	399000.000	399500.000	400000.000
	- CONCENTRATION -								
3075500.000	1.264725	1.436254	1.268984	.947637	.669642	.541477	.516297	.487579	.457333
3075000.000	1.202485	1.345048	1.206784	.938577	.686357	.529057	.482714	.458134	.432394
3074500.000	1.146383	1.266379	1.149923	.922427	.704758	.529757	.455127	.433724	.411232
3074000.000	1.096462	1.198804	1.099030	.903235	.713656	.538421	.439211	.413074	.393164

- GRID SYSTEM RECEPTORS -
- X AXIS (DISTANCE, METERS) -

Y AXIS (DISTANCE , METERS)	400500.000	401000.000	401500.000
	- CONCENTRATION -		
3084000.000	.420843	.415430	.405984
3083500.000	.453880	.442192	.418660
3083000.000	.487321	.457860	.429549
3082500.000	.507484	.471450	.439934
3082000.000	.525046	.484321	.449462
3081500.000	.541430	.495875	.457715
3081000.000	.555608	.513393	.483862
3080500.000	.607178	.563567	.527847
3080000.000	.679899	.623170	.575943
3079500.000	.754639	.681344	.622667
3079000.000	.763030	.688630	.628908
3078500.000	.718670	.654798	.602230
3078000.000	.656943	.607099	.564503
3077500.000	.602324	.561341	.526464
3077000.000	.552941	.520416	.492293
3076500.000	.508435	.482506	.459381
3076000.000	.466967	.447031	.428786
3075500.000	.432181	.413905	.399665
3075000.000	.406722	.386372	.372406
3074500.000	.388599	.366700	.349934
3074000.000	.372998	.353130	.334106

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION	
395500.00	3079000.00	3.167997	+ 0.13 = 3.30 ug/m³
395500.00	3079500.00	3.090863	
396000.00	3079500.00	3.042365	
395000.00	3079000.00	2.813900	
395000.00	3079500.00	2.666158	

** ANNUAL GROUND LEVEL CONCENTRATION (MICROGRAMS PER CUBIC METER) (CONT.) FROM COMBINED SOURCES 2301,-12311,

- PROGRAM DETERMINED MAXIMUM 10 VALUES -

X COORDINATE (METERS)	Y COORDINATE (METERS)	CONCENTRATION
396000.00	3079000.00	2.594438
395500.00	3078500.00	2.514353
394500.00	3079000.00	2.379877
394500.00	3079500.00	2.243497
396000.00	3078500.00	2.239524

** END OF ISCLT PROGRAM, 11 SOURCES PROCESSED **