

BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATION
 AMAX PHOSPHATE, INC.
 Hillsborough County

The applicant plans to use an alternate fuel to fire an existing 300 ton per hour (118 million Btu per hour heat input) fluidized bed phosphate rock dryer in operation at their Big Four phosphate mine located near Fort Lonesome, Florida. The source is presently permitted to fire residual oil containing a maximum of 0.7 percent sulfur. The applicant plans to fire residual oil or a coal-oil-water mixture (COWM) both fuels having a 2.5 percent sulfur content. In addition to the fuel change, the applicant has requested the permitted annual operating hours to be increased from 7488 to 8760. Resultant air pollutant emissions are summarized in Table 1.

Table 1

DRYER EMISSIONS (tons/year)			
Pollutant	Particulates	SO ₂	NO _x
Present	39	354	99
Planned-OIL	79	569	115
-COWM	79	569	156
Increase	40	215	57
Significant Rate	25	40	40

The increase in the rock dryer operating hours will result in a production increase of 382,000 tons per year. The movement of this additional tonnage to dry rock storage and shipping will increase particulate emissions an additional 3 tons per year.

The rock dryer exhaust gases discharge through a cyclone separator into a Peabody Engineering Company, Type M160 impingement scrubber. Present permit conditions limit particulate emission to 0.034 pounds per hour and 0.73 pounds SO₂ per million Btu based upon firing oil containing 0.7 percent sulfur. The phosphate rock dryer is currently operating per conditions of FDER permit number AO29-22821, which limits dryer operation to 7488 hours per year.

The change in operation of the phosphate rock dryer will result in an increase in emissions and is therefore a modification per Rule 17-2.100(102), FAC. The source is subject to Rule 17-2.500 FAC, Prevention of Significant Deterioration (PSD). A BACT determination is required for all pollutants for which emissions will increase above the significant levels listed in Table 500-2. A BACT determination will be required for the pollutants sulfur dioxide, particulate matter and nitrogen oxides.

BACT Determination Requested by the Applicant:

Air pollutant emission limits from the phosphate rock dryer to be; 0.06 pounds particulate matter per ton of wet rock feed; 1.1 pounds sulfur dioxide per million Btu heat input; 0.30 pounds of nitrogen oxides per million Btu heat input.

Date of Receipt of a BACT Application:

February 10, 1983

Date of Publication in the Florida Administrative Weekly:

February 25, 1983

Review Group Members:

Willard Hanks - New Source Review, BAQM
Tom Rogers - Air Modeling Section, BAQM
Dan Williams - DER Southwest District Office.

BACT Determined by DER:

Big Four Mine 300 ton per hour rock dryer:

<u>Pollutant</u>	<u>Emission Limit</u>
Particulates	0.06 pounds per ton of wet rock feed.
Sulfur Dioxide	1.1 pounds per million Btu heat input.
NO _x	0.30 pounds per million Btu heat input
Visible Emission	Not to exceed 10% opacity

Compliance with the particulate emission limit will be in accordance with 40 CFR 60, Appendix A; Methods 1, 2, 3, and 5. Compliance with the sulfur dioxide emission limit will be in accordance with DER Method 6. Compliance with the opacity of emissions limitation will be in accordance with DER Method 9.

BACT Determination Rationale:

The source was originally permitted in 1976. The particulate emission limit was 0.03 grains per SCF at an exhaust gas flow rate of 40,000 SCFM. A New Source Performance Standard (NSPS), Subpart NN, was promulgated April 16, 1982 which limits particulate emission from this source to 0.06 pounds per ton of phosphate rock feed. Any source which is modified after September 21, 1979 is subject to the requirements of this NSPS.

The applicant has requested that the particulate emission limit be changed to the NSPS particulate emission limit of 0.06 pounds per ton of dryer feed. Three test runs were made with the dryer operating at 84% of capacity and firing a coal-oil-water mixture. The average stack gas flow rate was 54,837 DSCFM. The emission rate, using the 0.03 gr/SCF standard, is 14.1 lb/hr or 0.055 lbs/ton feed. Based upon the new information presented, the Department agrees with the applicant's request that BACT be equal to the NSPS particulate standard of 0.06 pounds per ton of dryer feed.

The intent of the original permit condition was to control sulfur dioxide emissions by limiting the fuel sulfur content. Data has been presented to the Department showing that SO₂ removal efficiency inherent in the process is a function of dryer feed stock and fuel sulfur content. The Department agrees with the applicant that, in this case, controlling SO₂ emissions by limiting fuel sulfur content does not allow the applicant fuel flexibility and therefore to take advantage of the SO₂ removed in the process.

The Department has determined BACT to be 1.1 pounds SO₂ per million Btu heat input. This process-rate standard determined as BACT is a reasonable compromise to protect our environment and still allow the applicant cost flexibility by using various grades and types of fuel.

A practical method to remove NO_x from a phosphate rock dryer is yet to be demonstrated. In the typical combustion process of fuels with excess air, the high temperature of combustion causes the nitrogen and oxygen in the air to combine to form nitric oxide. Then, as the hot gases move away from the source of high temperature, further oxidation takes place, and nitrogen dioxide is formed. The amount of excess air used and the method of firing a rock dryer tempers the combustion temperature and consequently the NO_x produced. The NO_x emission rate of 0.30 pounds per million Btu heat input proposed by the applicant is determined as BACT.

The applicant presently uses residual oil as fuel to fire the dryer. The applicant also plans to fire a coal-oil-water mixture (COWM) as an alternate fuel. COWM is a viscous liquid which is handled the same as residual oil. No major modifications, except burner nozzles, were made to the fuel handling system. The source was considered capable of accommodating the new fuel.

Details of the Analysis May be Obtained by Contacting:

Edward Palagyi, BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

Recommended By:

C. H. Fancy
C. H. Fancy, Deputy Bureau Chief

Date: *Oct. 7, 1983*

Approved:

Victoria J. Tschinkel
Victoria J. Tschinkel, Secretary

Date: *Oct 7, 1983*