ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1782-1]

Standards of Performance for New Stationary Sources; Phosphate Rock Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Standards of performance for phosphate rock plants were proposed in the **Federal Register** on September 21, 1979 (44 FR 54970). This action finalizes standards of performance for phosphate rock plants. These standards implement the Clean Air Act and are based on the Administrator's determination that emissions from phosphate rock plants contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. The intended effect of the standards is to require the application of the best demonstrated systems of continuous emission reduction to new, modified, or reconstructed phosphate rock dryers, calciners, grinders, and ground rock storage and handling systems at phosphate rock plants. The designated best demonstrated systems of continuous emission reduction were determined considering costs and nonair quality health and environmental and energy impacts.

EFFECTIVE DATE: April 16, 1982.

Judicial Review: Under Section 307(b)(1) of the Clean Air Act, judicial review of this new source performance standard is available only by the filing of a petition for review in the United States Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under Section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

ADDRESSES: Background Information Document. The background information documents for the proposed and final standards are available on request from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777 or (FTS) 629-2777 or (FTS) 629-2777. Please refer to "Phosphate Rock Plants, Background Information for Proposed Standards, Volume I," (EPA-450/3-79-017) and/or "Phosphate Rock Plants, Background Information for Promulgated Standards, Volume II" (EPA-450/3-79-017b).

Docket. Docket No. OAQPS-79-6, containing all supporting information used by EPA in developing the standards, is available for inspection and copying during normal business hours Monday through Friday at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: John D. Crenshaw, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number: (919) 541-5624 or (FTS) 629-5624.

SUPPLEMENTARY INFORMATION:

Background

Standards of performance for new, reconstructed or modified phosphate rock plants were proposed on September 21, 1979. The proposed standards would have limited particulate emissions to 0.02 kilogram (kg) per megagram (Mg) of feed rock (0.04 lb/ton) from dryers, 0.055 kg/Mg (0.11 lb/ton) from calciners and 0.006 kg/Mg (0.012 lb/ton) from grinders. Visible emission limits for these affected facilities were proposed at zero percent opacity. A zero percent opacity limit was also proposed for ground rock handling and storage systems.

During the public comment period, a total of 16 comment letters were received. Several commenters questioned the proposed emission limits. They argued that the particulate and opacity limits for both dryers and calciners were too stringent. After reviewing these comments, EPA concluded that the data base supporting the proposed standards was incomplete because it was not representative of all combinations of control conditions that are likely to recur. EPA requested and received emission source test data from both the industrial commenters and several State air pollution control agencies. Based on this additional data, several changes were made to the proposed standards. The most significant changes were a relaxation of the particulate emission limits for calciners processing unbeneficiated rock and for dryers. The opacity limits for both dryers and calciners were also revised.

Other changes were to exclude from the standards facilities with a production capacity less than 3.6 Mg/hr (4.0 ton/hr) and to exempt ground rock storage and handling systems from the continuous monitoring requirements. Several wording and definition changes were made to clarify the applicability of the promulgated standards.

Standards of Performance

The promulgated standards apply to new, modified, or reconstructed phosphate rock dryers, calciners, grinders, and ground rock handling and storage facilities at phosphate rock plants with a maximum production rate greater than 3.6 megagrams of rock per hour (4 tons/hr). The promulgated standards will limit emissions of particulate matter to 0.03 kilogram (kg) per megagram (Mg) of rock feed (0.06 lb/ton) from phosphate rock dryers, 0.12 kg/Mg (0.23 lb/ton) from phosphate rock calciners processing unbeneficiated rock or blends of beneficiated and unbeneficiated rock, 0.055 kg/Mg (0.11 lb/ton) from phosphate rock calciners processing beneficiated rock, and 0.006 kg/Mg (0.012 lb/ton) from phosphate rock grinders. Opacity levels from grinders and ground rock storage and handling systems are limited to zero percent. Opacity levels from dryers and calciners are limited to no more than 10 percent.

The emission limits are based on the performance of baghouses or high energy venturi scrubbers. Electrostatic precipitators (ESP) are also capable of meeting the standards. However, because of the higher cost of ESP control on phosphate rock applications, ESP's were not designated as a basis for the standard.

Compliance with the mass emission limits is to be determined by source test (EPA Method 5). Continuous monitoring equipment will be required for dryers, calciners, and grinders. However, when scrubbers are used for emission control, continuous opacity monitors would not be required. Instead, the pressure drop of the scrubber and the liquid supply pressure will be monitored as indicators of the scrubber performance.

Environmental, Energy, and Economic Impacts

The promulgated standards would reduce particulate emissions from phosphate rock plants by about 99 percent from the levels that would occur with no emission control, and by about 91 percent from the levels allowed by typical State standards. These reductions would reduce nationwide particulate emissions allowed by State Implementation Plan (SIP) regulations by about 14,100 Mg (15,600 tons) per year in 1985. However, the level of control existing on many affected sources is already more stringent than that required by SIP regulations. For example, many existing grinder facilities

are controlled by baghouses to prevent the loss of valuable product rock. As a result, the actual emission reduction resulting from implementation of the standard will be less than 14,100 Mg (15,600 tons). The standards will cause a reduction in particulate matter emissions from the level which would occur with typical existing industry control practices of about 3,300 megagrams (3,600 tons) in 1985 and 5,100 megagrams (5,600 tons) in 1990.

None of the alternative control technologies required by these standards (baghouse, scrubber) would result in significant adverse environmental impacts. If scrubbers are used to meet the requirements of the standard, there would be a small increase in solid waste disposal and water pollution. However, the incremental increase (over the prevailing controls) of solid materials and wastewaters produced during control of emissions is insignificant in comparison with the large volume of such wastes generated by production processes. Baghouse technology is marginally more environmentally acceptable than other control alternatives because it generates no liquid effluents.

Compliance with the promulgated standards will require additional electrical energy above that required at the SIP level of control. The incremental increase in energy will depend on the type of control system that is selected. If high-energy venturi scrubbers are used, the total process energy requirements will increase by 8 percent above the energy required at the existing SIP level of control. The incremental energy increase above the SIP level would be 5 percent with baghouses.

The costs of operating control equipment that would be needed to attain the promulgated standards were estimated using model plants. Phosphate rock plants are concentrated primarily in Florida, North Carolina, Idaho, Wyoming, Utah and Montana. Phosphate rock deposits in North Carolina and Florida consist of a consolidated mass of phosphate pebbles and clays normally occurring below the water table. Western deposits consist of hard rock. Because of these processing differences, costs were presented separately for eastern and western plants. A typical Florida plant was selected as representative of eastern facilities. The control costs per ton of production are typically lower for eastern plants because they have a larger capacity than western plants.

The annualized cost of installing and operating prevailing controls used to meet existing State standards at typical eastern phosphate rock plants is estimated at $0.35 per megagram. The additional cost of employing control technology to meet the promulgated standards at a new eastern plant is estimated at $0.02/megagram when using baghouses and $0.07/megagram for scrubbers.

The annualized control cost of existing SIP standards at a typical new western plant is $0.87/megagram. The additional cost of using control technology to meet the promulgated standards at new western plants is estimated at $0.08/megagram for baghouse control and $0.28/megagram for scrubbers.

The incremental cost of the promulgated standards above SIP control costs will have negligible impacts on the profitability of the plant and the future growth of the phosphate rock industry. By the year 1985, compliance with the standards would increase the industry cost of production of phosphate rock by 0.1 percent (baghouse controls) to 0.2 percent (scrubber controls) above the cost to meet existing SIP regulations. A more detailed discussion of the economic analysis is discussed in the Background Information Document for Proposed Standards, Volume I.

Public Participation

In accordance with Section 117 of the Clean Air Act, proposal of the standards was preceded by consultation with appropriate advisory committees, independent experts, industry representatives, and Federal departments and agencies. The proposed standards were published in the **Federal Register** on September 21, 1979, with a request for public comment. The public comment period was extended to February 15, 1980, to allow interested persons to obtain and review the proposed standards and the background information document for proposal. To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed standards, a public hearing was held on October 25, 1979, at Research Triangle Park, North Carolina. The hearing was open to the public and each attendee was given the opportunity to comment on the proposed standards.

Significant Comments and Changes to the Proposed Regulations

Many comment letters received by EPA contained multiple comments. A detailed discussion of these comments and EPA's responses to them are presented in the Background Information for Promulgated Standards, Volume II. The most significant comments and changes made to the proposed standards have been grouped according to topic and are discussed below.

General

Several commenters were concerned with the applicability of the proposed standards. They questioned whether the standard was intended to apply to mining operations, elemental phosphorus plants, and ground rock transfer facilities at fertilizer plants.

The promulgated standard is not intended to apply to crushing or mining, beneficiation, thermal defluorination, elemental phosphorus production or ground rock handling at fertilizer plants. The standards are intended to apply to new, reconstructed, or modified phosphate rock dryers, calciners, grinders, and ground rock storage and handling systems at phosphate rock plants. There have been several wording and definition changes in the standards to clarify the applicability of the promulgated standards.

Several commenters questioned the need for a standard since some existing facilities were not causing ambient air quality violations.

The purpose of new source performance standards is not limited to ensuring compliance with ambient air quality standards. The primary purpose of new source performance standards is to prevent future air pollution problems and to prevent costly retrofits of control equipment that might result from such problems. New source performance standards will require the uniform application of control requirements nationwide and will prevent unfair competition between States for industrial development based on varying environmental regulations.

As required by Section III of the Clean Air Act, the Administrator has published a list of categories of sources which contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare (Section III(b)(1)(A)), and for which new source performance standards will therefore be developed (40 CFR 60.16, 44 FR 49222, August 21, 1979). The proposed list was published in the **Federal Register** with a request for public comment. After review of the comments, the list was published on August 21, 1979. The sources on this list were selected and ranked according to an established screening procedure. Phosphate rock plants ranked according to an established screening procedure. Phosphate rock plants ranked 16th in priority of the 59 sources on the list. In the Administrator's judgment the

revised estimate of emissions for this category of sources still justifies the conclusion that it contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

Environmental Impact

Several commenters questioned the need for a standard because they felt the environmental benefits presented with the original proposal were exaggerated. The commenters felt that the emission reductions resulting from implementation of the standard were exaggerated because they were based on outdated and excessive production forecasts. These commenters argued that EPA should use the most recent production estimates from the Bureau of Mines. In addition, several commenters pointed out that existing sources were controlled at a more stringent level than actually required by existing State Implementation Plan regulations, which reduces the projected air quality improvement resulting from implementation of the standard.

EPA has reevaluated the environmental benefits presented with the original proposal. The reevaluation of environmental benefits as presented in Section 2.1.2 of the "Background Information for Promulgated Standards, Volume II" indicates a significant decrease in the environmental benefits of the standards. However, in the Administrator's judgement, the revised estimates of environmental benefits still justify the implementation of the standards.

The environmental impacts presented with the original proposal were based on an expected 5-percent annual increase in production. This expected increase was based on actual yearly production figures for 1950 compared to those projected for 1980. The projected production was based on data from the Bureau of Mines (1971). However, annual phosphate rock production has been fluctuating recently. Therefore, the most recent Bureau of Mines (1979) production forecast data were obtained to more accurately project the impact of the standards.

These Bureau of Mines production forecast data show that U.S. phosphate rock production will increase from 47.0 million megagrams in 1977 to 64.0 million megagrams in 1986, with a decrease to 56.0 million megagrams in 1995. With the routine replacement of existing equipment, approximately 23.3 million megagrams of phosphate rock production will be subject to the promulgated standards by 1985. This figure was used as the basis for the environmental benefits presented in this notice in "Environmental, Energy and Economic Impacts".

A lower size cutoff was requested to exclude from the standards small pilot scale and laboratory facilities used for testing and research. Economic analysis, presented in the "Background Information for Promulgated Standards," indicates that emissions from facilities with low production capacities are relatively small and the cost of controlling these emissions is excessive. The Administrator, therefore, has determined that an exemption for small facilities is appropriate. The promulgated standards apply only to plants with a production capacity greater than 3.6 megagrams per hour (4 tons/hr). This capacity is representative of the upper limit of the size range for testing and research facilities. There are no existing production facilities with capacities less than 3.6 mg/hr (4.0 tons/hr).

Particulate Emission Limits

Several commenters indicated that the proposed particulate matter emission limits for phosphate rock dryers and calciners were too stringent to be achieved on a continuous basis. The commenters contended that the proposed emission limits from dryers and calciners were not based on the performance of control systems operating on worst case particulate emission conditions. One of the problems cited was that the Agency's data base was outdated. In order to evaluate the comments, EPA requested source test data from the industrial commenters. In cases where the commenters could not supply data to support their position, EPA solicited data from State air pollution control agencies. The evaluation of the revised data base indicated that the proposed emission limits for dryers and calciners could not be achieved continuously under all operating conditions which are likely to recur. Therefore, the emission limits for both calciners and dryers have been revised.

The major variables that have the potential to affect emission levels from phosphate rock dryers and calciners are the type of feed rock and the type of fuel. Industrial experience indicated that the most important variable affecting particulate matter emission levels from dryers and calciners is the feed rock characteristics. With residual oil or coal firing, the process rock will account for greater than 80 and 90 percent of the uncontrolled emissions from dryers and calciners, respectively. Feed rock varies from mine site to mine site. Rock types vary from coarse pebbles to fine concentrates with many blends of rock between these extremes. Surface properties, organic content, level of beneficiation, and residence time in the processing unit vary with rock type. Beneficiation removes fines and increases the average particle size of emissions. Smaller average particle size causes the most difficult control situations. Therefore, beneficiation reduces emission levels. Increased residence time increases the volume of air per unit of rock and, therefore, increases the emission rate per unit of rock. These variations can effect both the particulate matter emission levels and the particle size distribution of the emissions. Florida coarse pebble rock and unbeneficiated Western rock are the least beneficiated and have longest unit residence times. As a result, they have the smallest average particle size and highest emission levels of all the phosphate rock types. Unbeneficiated Western rock, which has a slightly higher percentage of fines and smaller average particle size than coarse pebble, is the most difficult control case.

The four combustion fuels used in dryers and calciners are natural gas, distillate and residual oil, and coal. The particulate matter emissions resulting from the combustion of natural gas and distillate oil are insignificant, and will not affect particulate emission levels or the designated best control equipment performance. However, the combustion of both residual oil and coal produces significant amounts of particulate matter. Although coal usually produces a greater mass of particulate matter, residual oil combustion produces a smaller average particle size that is more difficult to control. An analysis of control device performance indicates that particulate levels after control would be higher with residual oil firing than with coal firing. Therefore, the Administrator has determined that residual oil-fired units represent the most adverse control situation with respect to fuel.

The data base of worst-case conditions for dryers consisted of five source tests from two dryer facilities processing coarse pebble rock and firing residual oil. Because dryers are not used in conjunction with unbeneficiated Western rock, these data represent the most adverse control conditions for dryers. An evaluation of the performance of a high energy venturi scrubber on these sources indicated an achievable emission limit of 0.03 kg/Mg (0.06 lb/ton). Therefore, the particulate matter emission limit for phosphate rock dryers had been revised from the proposed 0.02 kg/Mg (0.04 lb/ton) to 0.03 kg/Mg (0.06 lb/ton).

Additional source test data were acquired for calciners processing unbeneficiated Western rock. The data acquired were from the only existing facility calcining unbeneficiated Western rock. The data were from a natural gas-fired calciner controlled with a high energy wet scrubber. During the tests used as the basis for the emission limit, the calciner was processing a blend of unbeneficiated and beneficiated rock. The highest controlled emission level during the tests was 0.11 kg/Mg (0.21 lb/ton). The analysis of the tests indicated that this controlled emission level is representative of the highest level that would occur with any mix of beneficiated and unbeneficiated rock.[1] Although this unit is processing the worst-case rock type, there is a potential for residual oil or coal firing of new units. An analysis of the impacts of residual oil and firing indicate that residual oil would have the greater impact on controlled emission levels. The analysis indicated that residual oil firing could increase controlled emissions by about 0.01 kg/Mg (0.02 lb/ton). Therefore, a particulate matter emission limit of 0.12 kg/Mg (0.23 lb/ton) has been added to the standards for calciners processing unbeneficiated rock or blends of beneficiated and unbeneficiated rock. Calciners processing blends with a small percentage of unbeneficiated rock could probably comply with the proposed emission limit of 0.055 kg/Mg (0.11 lb/ton). However, existing data are insufficient to determine a precise relationship between emission level and blend ratios. The promulgated emission limit, therefore, applies to all mixtures of unbeneficiated and beneficiated rock.

Because the majority of new calciners will process beneficiated rock only, an emission limit for calciners based solely on unbeneficiated rock would allow new sources processing beneficiated rock to comply with the emission limits with less than the best demonstrated control systems. Therefore, the originally proposed particulate emission limit of 0.055 kg/Mg (0.11 lb/ton) is retained for facilities calcining beneficiated rock. The potential impacts of residual oil or coal firing are accounted for in this emission limit.

A comment was also made that the particulate matter emission limits could not be achieved continuously because it would require continuous operation of the control equipment at the maximum performance level. As required by the Clean Air Act, the promulgated particulate matter emission limits are based on the performance of the best available control equipment on the worst case uncontrolled emission levels. The best control systems have been demonstrated to be continuously effective. Therefore, there should be no problems achieving the standards if the control equipment is properly maintained and operated. The costs of operation and maintenance were included in the economic analysis of the standards and were concluded to be reasonable.

Opacity Standard

Several commenters questioned the need for opacity standards since particulate matter emissions were also subjected to mass emission limits.

Opacity limits are included in the standards to lower compliance costs and simplify enforcement procedures. Effective enforcement includes initial demonstration of compliance and routine evaluation of control equipment operation and maintenance. Compliance with particulate mass emission limits can only be demonstrated with EPA Method 5 performance tests. However, Method 5 tests are too expensive and maintenance of emission control equipment, which is the key factor in continuous compliance with the emission limit. In contrast, EPA Method 9 opacity tests are quicker, simpler, and less expensive than EPA Method 5. Therefore, opacity limits have been adopted in the standards as an effective tool to assure proper operation and maintenance of control equipment. See Clean Air Act, Section 302(k). The promulgated opacity limits have been set at levels no more restrictive than the particulate mass emission limits to ensure that any observed violations of the opacity standards accurately indicate a violation of the particulate mass emission limits. In addition the United States Court of Appeals for the District of Columbia Circuit has specifically upheld the use of opacity standards to aid in controlling mass emission under NSPS. "Portland Cement Association v. Train," 513F. 2d 506, 508 (1975).

In criticizing the opacity limits, several commenters recommended that the opacity limits for dryers and calciners should be set at 5- or 10-percent opacity. EPA has reevaluated the proposed opacity standards, considering the revisions in the particulate emission limits, and has revised the opacity limits for phosphate rock dryers and calciners to 10 percent.

Typically, visible emission standards are based on opacity observations collected simultaneously with the particulate emission tests on which the mass emission limits are based. In this case, the source test data that were used as the basis for the revised dryer and calciner particulate limits did not contain corresponding opactiy data. In the absence of corresponding opacity data, the visible emission limits for dryers and calciners were based on engineering evaluations.

The evaluations involved the use of opacity observations from an ESP-controlled phosphate rock dryer and an empirical correlation between particle concentration and opacity. Although ESP's are not designated as a basis for this standard, the visible emissions from this unit are characteristic of any dryer or calciner with a similar particle concentration. The correlation of concentration and opacity was taken from an EPA study of an asphalt aggregate dryer.[2] The use of the asphalt study was judged reasonable because asphalt aggregate dryers, phospate rock dryers, and phospate rock calciners have similar outlet particulate concentrations and particle size distributions.

The observed opacity from the ESP-controlled dryer was 7.7 percent. This level was corrected to 6 percent to adjust for an over-designed stack. Particulate mass emissions were 0.02 kg/Mg (0.039 lb/ton) at the time of the opacity observations, with a corresponding particulate concentration of 0.023 g/m^3 (0.010 gr/acf). The emission test used as the basis for the promulgated particulate emission limit of 0.03 kg/Mg (0.06 lb./ton) for phosphate rock dryers had a corresponding particulate concentration of 0.037 g/m^3 (0.016 gr/acf). The asphalt correlation was used to estimate the impact of a 0.006 gr/acf increase on a base of 6 percent opacity. Based on this approach the opacity level expected at 0.037 g/m^3 (0.016 gr/acf) would be approximately 7 percent. Allowing for a safety margin in the calculations, the opacity limit for dryers was set at 10 percent.

The particulate concentration used as the basis for the mass emission limit for calciners processing unbeneficiated rock was 0.06 g/m^3 (0.025 gr/acf). Based on the same approach used for dryers, the expected opacity at this concentration would be appoximately 8 percent. The particulate concentration used as the basis for the mass emission limit for

[1] Phosphate Rock Plants. Background Information for Promulgated Standards. Volume II. EPA-450/3-79-017b. p. 2-20.

[2] In-Stack Transmissometer Measurement of Particulate Opacity and Mass Concentration. U.S. Environmental Protection Agency. Publication No. EPA-650/2-74-120. November 1974. p. 34-35.

calciners processing beneficiated rock was 0.073 g/m³ (0.032 gr/acf). However, this unit was controlled by a 3.0 kPa (12 inches of water) pressure drop venturi scrubber. If the pressure drop is increased to the designated best level of control at 7.5 kPa (30 inches of water), the particulate concentration should be reduced to 0.23 g/m³ (0.010 gr/acf). At this concentration an opacity level of approximately 6 percent would be expected. Allowing for a safety margin in the calculations, a 10 percent opacity standard was set for calciners processing either beneficiated or unbeneficiated rock.

Although the opacity limits for calciners and dryers have been revised, the proposed zero percent opacity limit has been retained for grinders and ground rock storage and handling systems. Several commenters criticized the concept of zero percent opacity. They contended that any deviation of opacity above zero percent would cause the average for the observation period to exceed zero percent and would prevent compliance with the standards.

The zero percent opacity limit for grinders and ground rock storage and handling systems was retained because all data base opacity observations of well-controlled sources had zero percent opacity. Method 9 procedures can allow some visible emissions during a demonstration of compliance with the zero percent limit. Opacity readings are recorded every 15 seconds for 6 minutes (24 readings). These readings are recorded in 5 percent increments (i.e., 0, 5, 10, etc.). The arithmetic average of the 24 readings rounded off to the nearest whole number (i.e., 0.4 would be rounded off to 0) is the value of opacity used for determining compliance with the opacity standards. Consequently, a zero percent opacity standard does not necessarily mean there are never any visible emissions. It means either that visible emissions during a 6-minute period are insufficient to cause a certified observer to record them as 5 percent opacity, or that the average of the twenty-four 15-second readings is calculated to be less than 0.5 percent. Therefore, although emissions released to the atmosphere from a grinder or ground rock handling and storage system may be visible to a certified observer, at some time during the observation period, the source may still be found in compliance with the zero percent opacity standard.

The commenters also requested that the standards contain site-specific relief from the opacity limits in situations where particulate emission limits were being achieved while opacity limits were violated. Such a provision is not necessary. In specific cases where it can be demonstrated that the opacity standards are being violated while the particulate mass emission limits are being met, provisions for individual review and site-specific relief are included in the general provisions to these regulations (40 CFR 60.11(e)).

Continuous Monitoring

Several comments indicated a misunderstanding of the purpose and requirements for continuous monitoring equipment. The commenters felt that the purpose of the continuous monitors was to demonstrate compliance with the opacity limits. They indicated that continuous opacity monitors could not be used to accurately determine compliance with the opacity limits.

Continuous opacity monitors are not intended for demonstration of compliance with opacity or particulate matter standards. Only EPA Reference Methods can be used to demonstrate compliance. The purpose of continuous monitoring at phosphate rock plants is to ensure that emission control equipment is properly maintained and operated continuously. Continuous monitoring equipment has been demonstrated to be accurate, reliable, and suitable for purposes of monitoring excess emissions. Without continuous monitoring requirements there would be no incentive for the proper operation and maintenance of emission control equipment except during performance testing. Further, the United States Court of Appeals for the District of Columbia Circuit has specifically upheld the use of continuous opacity monitors in "National Lime Association v. EPA," 627 F. 2d 416, 450–451 (1980).

A comment was made that the proposed requirement for continuous monitoring equipment on ground rock storage and handling systems was unreasonable. The commenter pointed out that transfer points on ground rock handling systems were often controlled by small baghouses which were far less expensive than continuous monitoring equipment.

The requirement of continuous monitoring equipment on ground rock handling and storage systems has been reconsidered and has been determined to be unnecessary. The design of ground rock storage and handling systems vary greatly from plant to plant. Therefore, no typical handling and storage system can be defined. Most of the potential emissions from storage and handling systems are fugitive in nature and can be prevented by proper operation and maintenance. Because of the fugitive nature of emissions, it is difficult to define or predict specific emission points and emission control equipment requirements. Therefore, storage and handling systems are subject only to visible emission limits, compliance with which can be routinely demonstrated with Method 9. The annualized cost of a typical opacity monitoring system is about $12,500 per year (1978). The absolute costs of continuous monitoring systems is considered excessive relative to the control costs. Therefore, the requirement for continuous opacity monitors on ground rock storage and handling systems has been deleted.

Two commenters stated that an opacity averaging period of 6 minutes with overlapping time intervals would produce an excessively large and useless volume of paperwork.

The 6-minute opacity averaging periods required of continuous opacity monitors are discrete successive 6-minute periods and are not composed of overlapping time intervals. The general provisions (40 CFR 60.13(e)(i)) state that continuous opacity monitors shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle for data recording for each successive 6-minute period. Therefore, the volume of data produced will not be as large as stated by the commenters.

Emission Control Technology

Several commenters questioned the designation of baghouses as best available control technology. The commenters stated that no baghouses are in current use on existing dryers or calciners, and that technological problems associated with high temperatures and moisture blinding of bags would limit their use.

EPA agrees that there are no baghouses currently in use on phosphate rock dryers or calciners. However, baghouses have been installed and are operating effectively on similar applications, including kaolin rotary kiln dryers and asphalt aggregate dryers. The control conditions in these applications are more severe than those typically occurring with phosphate rock dryers or calciners. Baghouse manufacturers have stated that baghouses could be applied successfully to dryers and calciners. Design and operational procedures are available which prevent high temperature damage and moisture blinding. These include insulation of the baghouse and duct work, high temperature bags and preheating of the unit before cold start-

up.[3] Furthermore, baghouses are not the only technique that can be used to comply with the promulgated emission limits. If an operator believes that due to site-specific circumstances, there is economic risk in using a baghouse, then a high energy venturi scrubber can be used to comply with the standards.

The comment was made that Volume I of the BID should not have contained ESPs as a control technique because it was stated in Volume I that ESPs were not the best demonstrated system, although they are equally efficient as baghouses and high-energy venturi scrubbers. The commenters further questioned EPA's judgment that ESPs were equally as efficient as baghouses or high-energy venturi scrubbers on dryers and calciners. The commenters felt that the source test data base did not support this judgment, and ESPs should not be used as a basis for the standards.

Alternative particulate control equipment options with control efficiency levels in the range of, or above, existing controls for phosphate rock plants are baghouses, venturi scrubbers, and ESPs. Therefore, ESPs were analyzed in Volume I as a control alternative. The level of control required by the standards is estimated to be approximately 99.3 percent when processing the worst-case rock types. EPA agrees that the source tests of ESPs presented in the BID, Volume I, do not achieve this level of control. The ESPs tested achieved efficiencies in the range of 93 to 99 percent efficiency. However, ESP efficiency is a direct function of the collector plate area to gas volume ratio. By increasing the collector plate area of the tested ESPs, the efficiency can be increased to 99.3 percent. The economic evaluation of ESPs presented in Volume I of the BID presented the cost of ESPs at the increased plate area to gas volume ratio necessary to achieve 99.3 percent control. Because the cost of ESPs is primarily a function of collector plate area, the larger plate area results in significantly higher costs. The annualized costs of an ESP on a model dryer or calciner are 2 to 2.5 times higher than high-energy venturi scrubber or baghouse costs on the same source. Because of these higher costs, ESPs were not designated as a basis for the standards. The promulgated emission limits are based on the performance of high-energy venturi scrubbers and baghouses.

[3] Phosphate Rock Plants. Background Information for Promulgated Standards. Volume II. EPA-450/3-79-017b. p. 2-26, 27.

Economic Impact

Several commenters stated that the costs to control dryers and calciners to the required level were underestimated, because the costs were based on typical uncontrolled emission rates rather than worst case uncontrolled emission rates. The promulgated emission limits represent the level of control achievable with the best demonstrated control systems on worst case emission conditions. The available control options which are capable of achieving the promulgated emission limits are baghouses and high energy venturi scrubbers. The reevaluation of worst case emission levels caused a revision in the achievable emission limits for dryers and calciners processing unbeneficiated rock. These revisions were caused by changes in the inlet loadings and particle size distributions to the control device. However, there was no change in the design or operating parameters of the designated best emission control systems. Therefore, there is no change in the costs of the control alternatives from those presented in the analysis for the proposed standard.

Other commenters stated that the control cost estimates should be higher for Western plants since unbeneficiated Western rock contains a higher percentage of fines. Unbeneficiated Western rock does have a typically higher percentage of fines than Eastern rock. However, the analysis of control costs for the proposed standard included the economic analysis of a typical Western plant. The economic analysis of the standards presented in Chapter 7 of the "Background Information for Proposed Standards, Volume I," indicates that, while control costs may be higher for Western plants, the control costs are not excessive.

The commenters also felt that control costs for Western plants were underestimated because no phosphate rock dryer had been costed for the typical model Western plant. EPA also agrees that the addition of a dryer to a model Western rock processing facility will result in increased annual control costs for typical Western plants. However, existing SIP regulations already require dryer emissions control usually achieved with wet scrubbers. Based on industrial comments, industry would probably install high-energy venturi scrubbers as a means of complying with the promulgated standards. With implementation of the promulgated standards, there would be no significant increase in installation costs, because scrubber installation costs do not vary significantly at different efficiency levels. There would, however, be an increase in operating costs for the higher energy venturi scrubber. For a typical 160-ton/hr dryer, the increased annualized cost of the promulgated standard above the existing level of control would be approximately $0.06 (1978) per megagram ($0.07/ton) of product rock. The price of phosphate rock under the promulgated standard would increase from $24.53 per megagram ($22.25/ton) to $24.61 per megagram ($22.32/ton) in 1978 dollars. Therefore, there would be no significant change in the economic impact of the promulgated standard with the addition of a dryer facility at a Western plant.

The commenters also questioned the costs of applying a baghouse to phospate rock dryers or calciners. The commenters stated that an auxiliary heat source would be necessary to maintain the required temperature differential necessary to prevent condensation of moisture on the bags. An auxiliary heat source for baghouses on phosphate rock dryers and calciners was not costed or addressed because it should be unnecessary. The temperature differential necessary to prevent condensation can be maintained by properly insulating the baghouse and all ductwork to prevent heat loss. During start-up, the baghouse can be heated to operating temperature by operating the burners at low fire with no rock in the dryer or calciner. Baghouses are operating on similar applications such as asphalt dryers and kaolin dryers without auxiliary heat sources.

The commenters also argued that baghouse costs for calciners had been underestimated because the air flow that was costed for the model facility was too low. However, as pointed out in Volume I of the BID, calciner air flows for typical 45.4 Mg/hr (50 ton/hr) units range from 850 to 1,700 standard m^3/min (30,000–60,000 scfm). At a typical exhaust temperature of 120° C, these figures would present an air flow range of 1,160 to 2,310 actual m^3/min (40,800 to 81,600 acfm). The air volume costed for the model calciner facility was 2,930 actual m^3/min (103,460 acfm) for a 54 Mg/hr (60 ton/hr) unit. Therefore, the air flow costed is representative of the upper range of air flows and does not cause an underestimation of control costs.

Commenters also questioned the cost effectiveness of continuous monitoring equipment. They felt that the costs associated with continuous monitoring had not been adequately evaluated. The cost to purchase, install, operate, and maintain continuous opacity monitoring

equipment was addressed and evaluated during the development of the standards. The annualized cost of a typical continuous opacity monitoring system is about $12,500 (1978 dollars) per year. This cost is relatively minor compared to the annualized cost of the emission control equipment required by the promulgated standard (about 4.2 percent of a venturi scrubber on a 145-Mg/hr dryer) and was concluded to be reasonable.

The comment was also made that the control costs required by the standard were underestimated because the costs required to install, calibrate, maintain, and operate a device for measuring phosphate rock mass feed to the emission sources were not included in the control costs.

The cost of rock feed rate (by weight) measurement equipment was addressed and considered during the economic analysis of the standards. Rock feed measuring equipment is normally utilized at phosphate rock plants to measure production process feed rates and is not solely a part of control requirements. The installed cost of rock feed measurement equipment is about $14,000 (1978) for a facility processing 135 megagrams per hour (150 tons/hr) of rock, and has an annualized cost of about $3,500 (1978) per year. These costs are insignificant (about 1.1 percent of the annualized cost of a venturi scrubber on a 145/Mg/hr dryer) when compared to the control equipment costs of the same facility.

Docket

The docket is an organized and complete file of all the information considered by EPA in the development of the rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process. Along with the statement of basis and purpose of the promulgated standards and EPA responses to significant comments, the contents of the docket will serve as the record in case of judicial review (Section 307(d)(7)(A)).

Miscellaneous

Standards of performance for new sources established under Section 111 of the Clean Air Act reflect the degree of emission limitation achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and nonair-quality health, environmental impact, and energy requirements) the Administrator determines has been adequately demonstrated.

Althought there may be emission control technology available that can reduce emissions below those levels required to comply with the standards of performance, this technology might not be selected as the basis of standards of performance because of the costs associated with its use. Accordingly, standards of performance should not be viewed as the ultimate in achievable emission control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations. For example, applicable costs do not play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources located in nonattainment areas (i.e., those areas where statutorily mandated health and welfare standards are being violated). In this respect, Section 173 of the Act requires that new or modified sources constructed in an area which violates the National Ambient Air Quality Standards (NAAQS) must reduce emissions to a level that reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3), for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

(A) The most stringent emission limitation contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable; or,

(B) The most stringent emission limitation achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard (Section 171(3)).

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources (referred to in Section 169(1)) employ "best available control technology" (as defined in Section 169(3)) for all pollutants regulated under the Act. Best available control technology (BACT) must be determined on a case-by-case basis, taking energy, environmental, and economic impacts and other costs into account. In no event may the application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, State Implementation Plans (SIPS) approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of National Ambient Air Quality Standards (NAAQS) designed to protect public health and welfare. For this purpose, SIPs must in some cases require greater emission reductions than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent emission limits than those established under Section 111, or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than EPA's standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

EPA will review this regulation 4 years from the date of promulgation. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology and reporting requirements. The reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Under Executive Order 12291, EPA must judge whether a regulation is "Major" and therefore subject to the requirement of a Regulatory Impact Analysis. This regulation is not Major because: (1) The national annualized compliance costs, including capital charges resulting from the standards total less than $100 million; (2) the standards do not cause a major increase in prices or production costs; and (3) the standards do not cause significant adverse effects on domestic competition, employment, investment, productivity, innovation or competition in foreign markets. This regulation was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291. The docket is available for public inspection at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460.

Although no regulatory impact analysis is required, an economic impact assessment of alternative emission standards has been prepared, as required under Section 317 of the Clean Air Act, and is included in the

"Background Information Document for Proposal for Phosphate Rock Plants, Volume I." EPA considered all the information in the economic impact analysis in assessing the cost of the standard.

In addition to economics, the cost effectiveness of alternative standards was evaluated in order to determine the least costly way to reduce emissions and to assure that the controls required by this rule are reasonable relative to other regulations for particulate matter. The cost per ton of pollutant removed was computed for each process affected by the standard, both on an average and incremental basis. The incremental cost ranged from $51 to $235 per ton of particulate removed, which compares favorably with particulate matter control at other industrial sources where costs typically range up to $1,000 per ton and in certain cases may exceed $2,000 per ton. Additional detail on this analysis can be found in the docket.

The information collection activity contained in this Final Rule is not covered by the Paperwork Reduction Act (PRA) because there are fewer than ten respondents.

List of Subjects in 40 CFR Part 60:

Air pollution control, Aluminum, Ammonium sulfate plants, Cement industry, Coal, Copper, Electric power plants, Glass and glass products, Grains, Intergovernmental relations, Iron, Lead, Metals, Motor vehicles, Nitric acid plants, Paper and paper products industry, Petroleum, Phosphate, Sewage disposal, Steel, Sulfuric acid plants, Waste treatment and disposal, Zinc.

Dated: April 9, 1982.

Anne M. Gorsuch,

Administrator.

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

40 CFR Part 60 is amended by adding a new subpart as follows:

Subpart NN—Standards of Performance for Phosphate Rock Plants

Sec.

Authority: Secs. 111 and 301(a) of the Clean Air Act, as amended, (42 U.S.C. 7411, 7601(a)), and additional authority as noted below:

Subpart NN—Standards of Performance for Phosphate Rock Plants

§ 60.400 Applicability and designation of affected facility.

(a) The provisions of this subpart are applicable to the following affected facilities used in phosphate rock plants which have a maximum plant production capacity greater than 3.6 megagrams per hour (4 tons/hr): dryers, calciners, grinders, and ground rock handling and storage facilities, except those facilities producing or preparing phosphate rock solely for consumption in elemental phosphorus production.

(b) Any facility under paragraph (a) of this section which commences construction, modification, or reconstruction after September 21, 1979, is subject to the requirements of this part.

§ 60.401 Definitions.

(a) "Phosphate rock plant" means any plant which produces or prepares phosphate rock product by any or all of the following processes: Mining, beneficiation, crushing, screening, cleaning, drying, calcining, and grinding.

(b) "Phosphate rock feed" means all material entering the process unit including, moisture and extraneous material as well as the following ore minerals: Fluorapatite, hydroxylapatite, chlorapatite, and carbonateapatite.

(c) "Dryer" means a unit in which the moisture content of phosphate rock is reduced by contact with a heated gas stream.

(d) "Calciner" means a unit in which the moisture and organic matter of phosphate rock is reduced within a combustion chamber.

(e) "Grinder" means a unit which is used to pulverize dry phosphate rock to the final product size used in the manufacture of phosphate fertilizer and does not include crushing devices used in mining.

(f) "Ground phosphate rock handling and storage system" means a system which is used for the conveyance and storage of ground phosphate rock from grinders at phosphate rock plants.

(g) "Beneficiation" means the process of washing the rock to remove impurities or to separate size fractions.

§ 60.402 Standard for particulate matter.

(a) On and after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator subject to the provisions of this subpart shall cause to be discharged into the atmosphere:

(1) From any phosphate rock dryer any gases which:

(i) Contain particulate matter in excess of 0.030 kilogram per megagram of phosphate rock feed (0.06 lb/ton), or

(ii) Exhibit greater than 10-percent opacity.

(2) From any phosphate rock calciner processing unbeneficiated rock or blends of beneficiated and unbeneficiated rock, any gases which:

(i) Contains particulate matter in excess of 0.12 kilogram per megagram of phosphate rock feed (0.23 lb/ton), or

(ii) Exhibit greater than 10-percent opacity.

(3) From any phosphate rock calciner processing beneficiated rock any gases which:

(i) Contain particulate matter in excess of 0.055 kilogram per megagram of phosphate rock feed (0.11 lb/ton), or

(ii) Exhibit greater than 10-percent opacity.

(4) From any phosphate rock grinder any gases which:

(i) Contain particulate matter in excess of 0.006 kilogram per megagram of phosphate rock feed (0.012 lb/ton), or

(ii) Exhibit greater than zero-percent opacity.

(5) From any ground phosphate rock handling and storage system any gases which exhibit greater than zero-percent opacity.

§ 60.403 Monitoring of emissions and operations.

(a) Any owner or operator subject to the provisions of this subpart shall install, calibrate, maintain, and operate a continuous monitoring system, except as provided in paragraphs (b) and (c) of this section, to monitor and record the opacity of the gases discharged into the atmosphere from any phosphate rock dryer, calciner, or grinder. The span of this system shall be set at 40-percent opacity.

(b) For ground phosphate rock storage and handling systems, continuous monitoring systems for measuring opacity are not required.

(c) The owner or operator of any affected phosphate rock facility using a wet scrubbing emission control device shall not be subject to the requirements in paragraph (a) of this section, but shall install, calibrate, maintain, and operate the following continuous monitoring devices:

(1) A monitoring device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±250 pascals (±1 inch water) gauge pressure.

(2) A monitoring device for the continuous measurement of the

scrubbing liquid supply pressure to the control device. The monitoring device must be accurate within ±5 percent of design scrubbing liquid supply pressure.

(d) For the purpose of conducting a performance test under § 60.8, the owner or operator of any phosphate rock plant subject to the provisions of this subpart shall install, calibrate, maintain, and operate a device for measuring the phosphate rock feed to any affected dryer, calciner, or grinder. The measuring device used must be accurate to within ±5 percent of the mass rate over its operating range.

(e) For the purpose of reports required under § 60.7(c), periods of excess emissions that shall be reported are defined as all 6-minute periods during which the average opacity of the plume from any phosphate rock dryer, calciner, or grinder subject to paragraph (a) of this section exceeds the applicable opacity limit.

(f) Any owner or operator subject to the requirements under paragraph (c) of this section shall report for each calendar quarter all measurement results that are less than 90 percent of the average levels maintained during the most recent performance test conducted under § 60.8 in which the affected facility demonstrated compliance with the standard under § 60.402.

(Sec. 114, Clean Air Act as amended (42 U.S.C. 7414))

§ 60.404 Test methods and procedures.

(a) Reference methods in Appendix A of this part, except as provided under § 60.8(b), shall be used to determine compliance with § 60.402 as follows:

(1) Method 5 for the measurement of particulate matter and associated moisture content,

(2) Method 1 for sample and velocity traverses,

(3) Method 2 for velocity and volumetric flow rates,

(4) Method 3 for gas analysis, and

(5) Method 9 for the measurement of the opacity of emissions.

(b) For Method 5, the sampling time for each run shall be at least 60 minutes and have a minimum sampled volume of 0.84 dscm (30 dscf). However, shorter sampling times and smaller sample volumes, when necessitated by process variables or other factors, may be approved by the Administrator.

(c) For each run, the average phosphate rock feed rate in megagrams per hour shall be determined using a device meeting the requirements of § 60.403(d).

(d) For each run, emissions expressed in kilograms per megagram of phosphate rock feed shall be determined using the following equation:

$$E = \frac{(CsQs)10^{-6}}{M}$$

where, E = Emissions of particulates in kg/Mg of phosphate rock feed.

Cs = Concentration of particulates in mg/dscm as measured by Method 5.

Qs = Volumetric flow rate in dscm/hr as determined by Method 2.

10^{-6} = Conversion factor for milligrams to kilograms.

M = Average phosphate rock feed rate in mg/hr.

Note.—The reporting and recordkeeping requirements in this section are not subject to Section 3507 of the Paperwork Reduction Act of 1980, 44 U.S.C. 3507, because these requirements are expected to apply to fewer than 10 persons by 1985.

(Sec. 114, Clean Air Act, as amended, (42 U.S.C. 7414))

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