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FINAL STANDARDS SUPPORT AND ENVIRONMENTAL IMPACT STATEMENT VOLUME II: PROMULGATED STANDARDS OF PERFORMANCE FOR LIME MANUFACTURING PLANTS

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

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Emission Standards and Engineering Division

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Final Standards Support and
Environmental Impact Statement

Lime Manufacturing Plants

Type of Action: Administrative

Prepared by

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I. INTRODUCTION

On May 3, 1977, the Environmental Protection Agency (EPA) proposed a standard of performance for the control of particulate matter emissions from new or modified lime manufacturing plants. These standards were proposed under section 111 of the Clean Air Act, as amended. The proposed standards were to limit emissions of particulate matter from new, modified, and reconstructed lime manufacturing plants by the use of the best demonstrated system of emission reduction, considering cost.

At the time the standards were proposed, a standard support and environmental impact statement (SSEIS, Vol. 1) was published and made available to the public. The public was invited to comment on the standards and the SSEIS during a 60-day comment period. Twenty-three comments were received from industry, State and local pollution control agencies, and Federal agencies. On June 16, 1977, a public meeting was held at the EPA facility at Research Triangle Park, North Carolina, to provide the public and the National Lime Association an opportunity to comment on the standards and the support document.

The purpose of this document is to summarize the economic and environmental impacts of the standards and respond to the comments received.

II. SUMMARY OF THE ENVIRONMENTAL IMPACT OF THE STANDARDS

The environmental impact of the final standards is no different from the detailed statement found in the Standards Support and Environmental Impact Statement, Volume I, which support the proposed standards.

It is estimated that the emission standards would reduce national particulate emissions from lime manufacturing plants by about 13 gigagrams (about 14,200 tons) through 1982. The standards would reduce the particulate emissions from new lime kilns by 70 percent below the levels required by a typical State standard for existing sources. The standards would also reduce particulate emissions from new lime hydrators by 85 percent compared to the requirements of the average State standard. The maximum 24-hour average ambient air concentration of particulate matter emitted from a typical lime kiln controlled to the level required by the standards would be about 2.0 micrograms per cubic meter ($\mu g/m^3$).

The secondary environmental impacts of the standard are considered minor. There would be no impact on water pollution. Solid waste handling and disposal problems would be minimal. All of the particulate collected from the hydrators can be returned to the process. When dry control systems are used on the lime kiln, the additional amount of solid waste accumulated is estimated to be about three percent. A negligible amount of particulate

matter, sulfur dioxide, and nitrogen oxides would be discharged into the air by the power plant which supplies the additional electrical power required by the lime plant to meet the standards.

The expected distribution of control techniques to comply with the standards is 80 percent by baghouse control and 20 percent by ESP control.

If dry control systems were used exclusively, no impact on water resources or waste treatment would be incurred and an energy savings of about 1.0 percent for the industry would be realized in 1982.

III. SUMMARY OF THE ECONOMIC IMPACT OF THE STANDARDS

The control costs that new, modified, and reconstructed lime plants would incur to meet the emission level required by the standards are considered reasonable. Total incremental investment costs through 1982 to meet the standards are projected to be about $3 million. The annualized costs in 1982, including depreciation and interest, are estimated to be about $5 million. The capital cost of control for typical new lime plants would be increased by about 3.5 percent. The potential price increase that would result from implementing the standards for new or reconstructed kilns has been estimated to be about 80 cents per megagram of lime produced, or an increase of approximately 2.6 percent.

The detailed economic impact of the standards appears in the Standards Support and Environmental Impact Statement, Volume 1.

IV. SUMMARY OF COMMENTS AND RESPONSES

LIST OF COMMENTERS

Comment No.	
LM-1	Woodville Lime and Chemical Company George Judd
LM-2	National Lime Association George A. Ziegler
LM-3	U. S. Environmental Protection Agency Stationary Source Enforcement Division
LM-4	St. Regis Paper Company H. R. Emery
LM-5	U. S. Environmental Protection Agency Stationary Source Enforcement Division
LM-6	National Lime Association George A. Ziegler
LM-7	U. S. Environmental Protection Agency Stationary Source Enforcement Division
LM-8	Commonwealth of Virginia State Air Pollution Control Board John M. Daniel, Jr.
LM-9	State of Tennessee Department of Public Health Harold E. Hodges
LM-10	State of Indiana State Board of Health Harry D. Williams
LM-11	Dow Chemical USA R. J. Moolenaar

LM-12	Regional Air Pollution Control Agency, Dayton, Ohio William T. Burkhart
LM-13	Bethlehem Steel Corporation David M. Anderson
LM-14	Transcript - Public Meeting Research Triangle Park, North Carolina June 16, 1977
LM-15	State of Alabama Air Pollution Control Commission
LM-16	State of Texas Texas Air Control Board Charles R. Barden
LM-17	U. S. Department of the Interior Larry E. Meirotto
LM-18	Engelhard Minerals and Chemical Corp. C. Y. Hass
LM-19	National Lime Association Corrected Copy of Transcript (LM-14) George A. Ziegler
LM-20	U. S. Department of Health, Education and Welfare Joseph J. Corliss
LM-21	National Lime Association Submission of Monitoring Test Data George A. Ziegler
LM-22	U. S. Energy Research and Development Administration W. H. Pennington
LM-23	U. S. Department of Commerce Sidney R. Galler

The most significant comments submitted following the publication of the proposed standards on May 3, 1977, are summarized and addressed in this section. Because of the detailed, technical nature of comments concerning procedures and test data, the relevant comments are given in full in subsections 1, 2, and 6. The other significant comments are summarized in the other subsections.

1. LM-1

Comments:

(a) Substituting the printed data for Plant B into EPA's formula for ACFM, and solving for P_s, gives the following values:

1A = 30.0045" Hg
1B = 47.4186" Hg
2A = 21.0267" Hg
2B = 39.8689" Hg
3A = 20.4409" Hg
3B = 30.2319" Hg

Because of the extremely low and high pressures indicated by some of the tests, the results published in the paper are highly questionable.

(b) Plant C was operated at only 80.24 percent rated capacity of the ESP and less than 67 percent of the productive capacity rating of the kilns. Plant C burns gas and produces a number of tons of dolomitic lime to treat sea water. Utilizing the highest hydrogen-containing hydrocarbon (CH_4) as the only fuel, it follows that there are 122.5 lb of CO_2/million Btu's on 848.7 lb of air required per million Btu's.

However, 1 mole of gas requires 2 moles of air, and because 1 mole of air produces water and 1 mole of air produces CO_2, then 1 mole of air is reduced 23.301 percent by weight because the O_2 of the air is turned to water,

and is removed from the calculation of gases by using DSCFM, therefore, there are 749.7 lb of air in DSCF, but 75 percent of the weight of the methane is carbon, and therefore 44.55011 x .75 = 33.41 pounds of C must be added to 749.7 lb, or 783.11 lb of DSCF is required for a million Btu's. Of this 749.7 pounds, 122.5 lb is CO_2 which leaves 660.6 lb N_2.

Using 6.5 million Btu's per ton of lime, there would be 280.9 lb of CO_2 per million Btu's since there are 1826 lb CO_2 per ton of lime.

783.11 lb of gases produced by combustion + 280.9 lb of CO_2 = 1064.01 lb of gases produced by one million Btu's. Calculating the weight percent and volume percent of CO_2 and N_2 at 0 percent O_2 gives:

CO_2 = 37.91 percent by wt. or 27.989 percent by vol.
N_2 = 62.09 percent by wt. or 72.011 percent by vol.

But according to the data in the EPA support document, the DSCF percent by volume at 0 percent O_2 is as follows:

CO_2 = 19.55882 percent by vol. or 27.645 percent by wt.
N_2 = 80.44118 percent by vol. or 72.335 percent by wt.

With this information, Plant C has to be burning 14 million Btu's/ton of lime and because of its inefficiency the plant should not be considered unless 14.04 million Btu's is considered an efficient plant.

(c) Plant E has 30,909 DSCFM with 9.2 percent CO_2 and 13.5 percent O_2 in the data for the average. At 0 percent O_2, this corresponds to 11034 DSCFM and 25.76 percent CO_2 and 74.24 percent N_2, by volume. On a weight percent basis, this calculates to be 59239 lb/hr and 34.286 percent CO_2 and 64.714 percent N_2. The lb N_2 per hour is 38336.

When carbon burns, 13.69841 lb of gases/lb of C are produced. Hydrocarbons [$(CH_2)_n$] produce 15,89795 lb of dry gases/lb $(CH_2)_n$. Using the nitrogen as a basis, there would be 47780 lb of combustion gases for $(CH_2)_n$ and 52347 lb of combustion gases for C.

For 55 percent C (.55 x 52347 = 28790) and 45 percent $(CH_2)_n$ (.45 x 47780 = 21501) which equals 50,292 lb of combustion gases.

If all of the coal is (CH_2) then 59,239 - 47780 = 11458 lb of CO_2 from calcination then there would be 7.29163 tons of CaO/hr or 175 tons lime/day. If all of the coal is C, then 59239 - 52347 = 6892 lb of CO_2 from calcination then there would be 4.3859 tons of CaO/hr or 105 tons of lime/day. If the C is 55 percent and $(CH_2)_n$ is 45 percent then 59.239 - 50292 = 8947 lb of CO_2 from calcination then there would be 5.6936 tons of CaO/hr or 137 tons lime/day. Therefore, from the data there could not have been 240 tons per day of lime and is less than 90 percent of rated capacity.

(d) There are questions as to the validity of the information obtained by the groups doing the testing for the EPA. The data from Plant D indicates that considerable difficulty was encountered in getting satisfactory test

results. Plant D had at least four test attempts before satisfactory results were obtained. In addition, special preparation of the operating plant was necessary before satisfactory results could be obtained.

Responses:

(a) Table C-4 of the support document is in error in reporting the actual gas volumetric flow rates for runs 1B, 2A, and 3A. The SCFMD values were inadvertently interchanged and the ACFM and gr/SCF values were calculated from the interchanged values. The correct values are shown below.

Run Number	1A	1B	2A	2B	3A	3B
Flow rate - ACFM	23,894	31,753	20,109	42,289	28,621	30,442
Flow rate - SCFMD	13,241	16,973	11,081	22,481	15,718	16,206
Barometric Pressure (in hg)	30.02	30.02	29.94	29.94	30.22	30.22
Emission rate (gr/ACF)	0.0113	0.0169	0.0115	0.0190	0.0115	0.0253

The reported values for emission rate in gr/DSCF, lb/hr, and lb/ton are, however, correct in the document. These values were used in setting the emission standard. Therefore, the final outcome was not affected by the erroneously reported values.

(b) The theoretical analysis presented assumes that the Orsat data collected during the test program were sufficiently accurate for the purpose of mass energy balances. However, the test report states that the CO_2 results may be too low due to measurement error. Therefore, it is incorrect to conclude that there was an inefficient use of the energy input on the basis of the Orsat data.

In the test report, the Orsat data were used to calculate molecular weight, which, in turn, was used to calculate the volumetric flow rate. Moderate errors in the Orsat analysis generally do not have a significant effect on the flow rate calculation. In this case, the reported Orsat data as compared to the theoretical would introduce less than one percent difference in the volumetric flow rate and in the pounds per ton of feed rate.

(c) As pointed out in (b) above, the calculations rely on the accuracy of the Orsat data. The Orsat data are used to calculate the volumetric flow rate and moderate errors in the Orsat data do not significantly affect the final results.

(d) There were three attempts to complete particulate tests at Plant D. The first tests scheduled were aborted when visible emissions far exceeded expectations and a problem with the operation of the electrostatic

precipitator was discovered. To consider the results from this test as representative would not be valid. Consequently, this test was cancelled. The second series of tests was conducted after the problem with the ESP was thought to be resolved. However, plant personnel determined that some problems with the ESP still existed. Because of this, the plant suggested that a third test be conducted once maintenance, cleaning, and repair of the control system was completed. The third and final test program was conducted and completed without mishap. The production rates for the second two tests were 106 percent and 86 percent of capacity. Since the emission rates for these tests were comparable, the results from both the second and third tests were used in determining the emission standards.

2. LM-6, 14

Comments:

(a) Another factor not considered by EPA in establishing the particulate standard is that, unique to lime kilns, the flue dust contains a large percentage of calcium oxide, (up to 35 percent and higher). When the flue dust is subject to stack test procedures, it has the capability of recarbonating and combining on the filter. This adds gaseous weight, which is not truly a part of the particulate emission, to the weight of the sample reported.

(b) The oxygen determinations, (19.5 percent), that were obtained during the test are questioned and the only logical explanation is that the sample was contaminated. As further proof of this, the heat content calculations show that if 19.5 percent oxygen at the stack were accurate, the kiln gases were gaining heat while passing through the ductwork, I.D. fan and the baghouse. This is thermodynamically impossible since there is no heat source after the gases have left the kiln. The calculations were made from EPA test data of June 11, 1974.

(c) With the extremely low velocities encountered at the gravity stack discharges of a typical baghouse, it is questionable whether the test procedures are accurate enough to justify a regulation as stringent as that proposed. With velocity pressures approaching and even reaching the bottom of the scale of the inclined manometer, (0.01 inches water gauge), the isokinetics and sampling rates must be questioned. In accordance with Method 2, presumably more precise micromanometers may not easily be adaptable to field conditions and are not easy to use with pulsating flow. It is possible therefore, that errors of significant magnitude (as much as 40 percent), could be made.

(d) It is believed that much of the EPA plant data used to justify the proposed standard is technically unsound. For example, test data for Plant E indicate the following errors:

(1) four of the six tests (2-2, 1-2, 3-1, and 3-2) were not isokinetic as specified by EPA Method 5;

(2) the pitot tubes were not within the specified range of Cp = 0.85 $\pm$ 0.02 but were Cp = .807 and .819; and

(3) EPA Method 1 specifies 24 point traverses for stacks of this configuration while 22 point traverses were run.

These test deficiencies would preclude use of the results for demonstrating compliance and consequently, should not be used for setting standards. Plant C data show that the precipitator was receiving emissions from only two kilns while it was designed to handle the gases from three kilns and therefore was operated far below capacity. Plant F was unable to meet the proposed standard and to suggest that a higher valid pressure drop across the scrubber would have made it meet the standard is not valid. Plant D was purposely cut back to 81 percent of capacity to permit testing without excessive emissions, so it does not represent a realistic production system.

(e) It should be noted that the emission rate does not include condensibles and that Method 5 had to be modified to include an orifice meter in the hot box ahead of the impinger train to insure isokinetic conditions. We therefore request that the emissions standard for compliance by lime hydrators be determined by filter catch only, excluding condensibles, and that the proposed modifications to Method 5 be incorporated in the test procedure.

Responses:

(a) The capability of recarbonation exists, the extent to which this occurs is small. In the laboratory, CaO was exposed to pure CO_2 for two hours at ambient conditions. There was only 1.5 percent mass gain. Under elevated temperatures (up to 150°C) that would be experienced during EPA Method 5 sampling, the mass gains were less than 0.5 percent when calcium oxide was exposed to 100 percent CO_2. These laboratory results indicate that this reaction is not a problem when sampling lime plant exhaust. It also should be noted that this reaction is capable of occurring in the stack stream as well as on the filter. If this is the case, $CaCO_3$ would be considered particulate matter.

(b) A check of carbon balance data shows that the measured carbon dioxide values are consistent with the process data but the oxygen data appear to be incorrect. However, these data were used only to establish the molecular weight of the stack gas. A large error in oxygen measurement produces only a small error in the molecular weight determination. As a result, the mass emission rate values are not substantially affected. A 1.0 percent error in molecular weight determination would introduce 0.5 percent error in the mass emission data.

(c) We agree that the measurement of flow velocities is a problem with EPA Method 5, which uses the type-S pitot tube and gauge oil manometer. The lower limit of velocity head measurement accepted within the criteria set by EPA is 0.05 in. H_2O. Using a 0.005 in. H_2O-division manometer, this corresponds to a ± 5 percent accuracy in the velocity measurement. Other alternative methods, e.g. a special velocity pitot, may be used to measure lower gas velocities.

As for the data collected for the standard, three test results were from lime plants controlled by baghouses. Of these three, only Plant B showed a significant number of velocity head value below 0.05 in H_2O. An error analysis of these data showed that the maximum possible negative error in velocity determination which could have occurred for any one run could have been as high as 16.3 percent. The average maximum possible negative error for all test runs was about 10.4 percent. This possible error in velocity measurement would produce a corresponding error in gas flow rate determination and in mass emission rate calculation. Calculating the maximum emission rate resulting from the possible error, the average emission rate value for all runs is 0.243 lb/ton. Since this value is well below the proposed standard of 0.3 lb/ton and since the probable error would be much less, this one test value would have little effect on the emission standard.

(d)(1) In the case of Plant E and the over-isokinetic sampling rates, a maximum adjustment to the emission rate can be made by multiplying the measured concentrations by the isokinetic rate. Applying this adjustment to the results of tests from Plant E produces an adjusted average emission rate of 0.091 lb/ton which is well below the proposed standard.

(d)(2) The magnitude of the pitot tube coefficient is not important as long as it is known. EPA Method 2 specifies a procedure for calibrating type-S pitots. The contractor who tested Plant E supplied calibrated pitots for this work and the procedure outlined in the method was followed. The specification in Method 5 that pitot coefficients be 0.85 ± 0.02 is in reference to the nomograph used for establishing isokinetic sampling rates. If no correction to the nomograph were made for pitots with coefficients other than 0.35 used on the tests at Plant E, then errors will occur. This may account for the non-isokinetic-sampling results. However, as discussed in (d)(1) above, the errors caused by non-isokinetic sampling have little or no effect on the proposed emission standard.

(d)(3) A report prepared for EPA entitled "Particulate Sampling Strategies for Large Power Plants Including Nonumiform Flow" examines the errors incurred by changing the number of sampling points for stack gas particulate sampling. It demonstrates that in general by, the expected error in measurement of particulate concentration decreases with an increase in the number of sample points over 24. The largest expected error for 24 or more sample points was less than 1.0 percent. For Plant E, the decrease in the number of sample points from 48 to 44 cannot be expected to significantly change the emission rate determination by more than 1.0 percent. Because the measured emission rate for this plant is much lower than the proposed emission standard, any error caused by the decreased number of sample points will not affect the proposed emission standard.

(e) The proposed emission standard is determined by the dry catch of the Method 5 train and does not include the catch of the impinger section. The procedure for measurement of sampling rate prior to moisture condensation in the sample train is the recommended procedure in the support document. This recomended procedure will be added to the test methods and procedures section of the final regulation.

3. LM-2

Comments:

In the Response to the Remand . . . in Portland Cement Association vs. Ruckelshaus (EPA-450/2-74-023), EPA carefully considered the extent to which the visual observations of trained observers can be relied upon as well as the issue of whether a 10 percent opacity standard is reasonable for cement kilns. As a result of this study, EPA relaxed the opacity standard to 20 percent to accommodate certain extreme circumstances. The same factors and considerations used by EPA to relax the opacity for cement kilns are equally applicable to the lime industry and to not apply them is neither economically or technically equitable.

In addition, trained observers will err in visual observations by a factor of 7 percent. This could result in an actual 10 percent opacity being read as greater than 15 percent, and therefore in violation of the standard.

Responses:

Careful review of the EPA Response . . . Portland Cement Association vs. Ruckelshaus shows that the standard for this industry was indeed "relaxed to 20 percent opacity to accomodate certain extreme circumstances." (p. 111). In fact, the standard was relaxed to accommodate the complete range of available data. Data were available from a cement facility operating slightly above (0.339 lb/ton) the promulgated mass emission rate (0.300 lb/ton). Emissions from this source averaged 18 percent opacity measured at a stack diameter of 12'6" (slightly greater than 20 percent opacity when converted to a 15' exit diameter). In establishing the standard for lime kiln, the same approach was taken and the 10 percent opacity standard reflects the range and variation of the available lime kiln test data. Mass emissions for Plant D (0.266 and 0.282 lb/ton) were slightly below the proposed mass emission rate (0.30 lb/ton). The actual stack exit diameter at this facilty was 1.6 meters. However, in the SSEIS document for lime kilns all opacity data were extrapolated to an exit diameter of 3 meters to accommodate for the effect of larger stack diameters on opacity. The extrapolated values are given in parenthesis in what follows. For Plant D a single six-minute average opacity reading of 11.5 percent (21 percent) was recorded. But the average opacity for six days of observation encompassing two test periods of July 8-10, 1974 and August 6-8, 1974 was 1.2 percent (2.2 percent). The highest daily average of opacity for a single observer was 4.1 percent (7.6 percent). This facility was operating near the mass emission rate of 0.30 lb/ton and had average opacity emissions well under the proposed 10 percent standard even when the data were extrapolated to a three meter pathlength to account for large stack diameters. Thus, in establishing the opacity standard for lime kilns, the data base supports a 10 percent opacity limit. The cement standard was not increased to account for an observer variation of 7 percent as one commenter suggests. As indicated in the introduction to Method 9, the potential observer error is taken into account when the standard is enforced.

4. LM-11

Comment:

Experience with continuous monitoring systems has not been satisfactory, because opacity readings from the monitors cannot be related to readings by a visual observer. Monitors may give an indication of whether the opacity

is increasing or decreasing, but do not give good absolute numbers. Therefore, it is recommended that continous monitors not be used as a basis for determing compliance with opacity limitation and that the requirement be deleted.

Response:

Instruments meeting EPA specifications have shown good agreement with observers under good viewing conditions and the sort of problem the commenter notes has not proven significant. It is true that observers can understate opacity when visibility is restricted and this may account for the experience cited by the commenter. Without supporting data, it cannot be determined if there is a problem.

5. LM-13, 6

Comments:

(a) Continous monitoring requirements for determing opacity are not reasonable because multiple stack baghouses will require multiple monitoring units unreasonable costs for installation and maintenance.

(b) Continuous monitoring requirements for determing opacity are not reasonable because other enforcement procedures are available to ensure proper operation and maintenance of the control device.

(c) Method 5 testing is not feasible for roof-ridge or other non-stack type baghouses. Construction of such baghouses should not be precluded simply because they cannot be tested by conventional techniques. What testing or equipment modifications would be required for performance testing should be made explicit.

Responses:

(a) EPA never intended to require a monitor on each stack of a multiple stack baghouse. In most cases, only a single monitor would be required but in some cases two may be required at each baghouse installation. Thus, monitoring systems for multiple stack baghouses are not believed to be excessively expensive to install or maintain. The instrument would be installed to simultaneously monitor emissions from several stacks. Since little data are available concerning such installations, requirements have not been established. However, EPA has provided some guidelines for instrument installation and reporting requirements for such situations.

(b) Although periodic unscheduled inspections by enforcement personnel are a form of monitoring, this type of monitoring does not preclude the need for continuous monitoring by instrumentation. This is especially true since there are areas of the country where the manpower available for performing periodic inspections is inadequate.

(c) The regulations does require performance testing for all affected facilities. Furthermore, the regulation states that the method of testing is Reference Method 5 unless approval of an alternative test method is granted by the Administrator. Since each pressurized baghouse is unique in design, establishing a reference test procedure which applies to all baghouses is not

feasible. Because there are no established regulations regarding test procedures for non-stack baghouses at this time, it is necessary that the owner devise a test plan and that approval by the Administrator be obtained before it is implemented.

6. LM-6

Comments:

(a) The various process conditions unique to the lime industry make a 20 percent opacity standard more reasonable than the 10 percent standard proposed.

(b) The proposed 10 percent opacity standard is not valid because erroneous test observation procedures were used which make the test data an invalid basis upon which to set such a stringent standard.

(c) Since it is not possible to take accurate opacity readings on kilns with wet scrubbers, kilns with other types of control would be discriminated against.

Responses:

(a) The test data indicate a 10 percent opacity standard is achievable under the process conditions stated by the commenter. (See response to LM-2)

(b) The alleged erroneous test procedures were reviewed and it was found that none of the derivations from standard procedures would significantly affect the test results. A detailed response to the comments follows.

Plant B

The commenter notes that:

(1) there is no indication of which stacks were observed,

(2) wind direction is recorded as variable,

(3) an improper background was used.

Review of the data indicates the stacks being observed were recorded and the sky was used as the background. Wind direction is not relevant, because to observe the plume at anv other than at a right angle to plume direction, increases observed opacity or there is no affect at all.

Plant C

The commenter notes that on one day of the observations, wind direction was not recorded.

The method states that the observer should take sun angle more into consideration than wind direction when choosing an observation position. Furthermore, failure to read at right angles to the plume direction generally would result in higher opacity readings, or there is no effect at all. Therefore, the test data are valid for the purposes for which they were used.

Plant D

The commenter notes that,

(1) two-thirds of the opacity readings were discarded because they exceeded 10 percent opacity,

(2) on August 6, both observers were facing the sun,

(3) on August 6, one observer was not at right angle to the plume.

The data for the May, 1974, test were discarded, not because the test exceeded the 10 percent opacity, but because the control device was not functioning properly at the time of the observations. The effect on observed opacity caused by the inspectors' positions of either facing the sun or being at right angle to the plume, would be to increase the opacity reading. Therefore, the data are valid for the purposes for which they were used.

(c) The fact that plants with scrubbers may have a slight advantage should not preclude the setting of an opacity standard. In fact, any operator of an affected facility has the choice of choosing the type of control system to be used when the facility is designed. Thus, there is no real discrimination.

7. LM-14

Comment:

It is counter proposed that a new limit of 0.3 kilograms per megagram, or 0.6 pounds per ton for lime kilns be set. This will achieve about one-half of the efficiency improvement embodied in the EPA proposal. A 0.35 pounds per ton limit is proposed for hydrator emissions to replace the 0.15 pound per ton limit proposed by EPA.

Response:

A review of all the data, including test results, cost and the efficiency of control equipment available, and the economic impact the EPA standard would have on the lime industry, indicates that the emission limitations for lime kilns and hydrators are reasonable and achievable. The support data submitted for the counter proposed standards were not adequate to refute the data developed by EPA to support the proposed standards.

APPENDIX A

This is a continuation of section A.3 entitled "Chronolog" of Appendix A, Standards Support and Environmental Impact Statement, Volume I: Proposed Standards of Performance for Lime Manufacturing Plants.

April 20, 1977	Concurrence by EPA Assistant Administrators completed and the proposed standard signed by the EPA Administrator.
May 3, 1977	The proposed standard published in the Federal Register.
June 16, 1977	Public meeting held at Research Triangle Park, North Carolina, for National Lime Association presentation.
September 13 to October 4, 1977	Review of the standards package by the EPA Working Group.
October 26 to November 2, 1977	Review of the standards package by the EPA Steering Committee in Washington, D. C.
October 28, 1977	Drafts of the final standards and the comment and response document sent to commenters, the National Lime Association and several lime companies.

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(Please read Instructions on the reverse before completing)

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15. SUPPLEMENTARY NOTES		

16. ABSTRACT

Standards of performance for the control of particulate matter emissions from affected facilities at new and modified lime manufacturing plants are being promulgated under the authority of sections 111, 114, and 301(a) of the Clean Air Act, as amended The standards would require that particulate matter emissions be reduced by over 99 percent below the uncontrolled levels, and by about 70 percent below the emission levels being achieved by existing sources controlled to meet typical State standards. Volume 1 discusses the proposed standards, and an analysis of the associated environmental and economic impacts is included in this document. This volume contains a summary of the public comments on the proposed standards and EPA's responses, as well as summary economic and environmental impact statements.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution Pollution control Standards of performance Lime manufacturing plants Particulate matter	Air pollution control	

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