Appendix B – Four-Factor Analyses and Control Determinations

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Appendix B.1 - Apex Plant, Lhoist North America

Appendix B.1.a - NDEP Reasonable Progress Determination for Apex Plant

Apex Plant Reasonable Progress Control Determination

Evaluation of existing and potential new control measures at Lhoist North America's Apex Plant necessary to achieve reasonable progress for Nevada's second Regional Haze SIP.

Bureau of Air Quality Planning, Nevada Division of Environmental Protection

June 2022

1 Introduction

This document serves as the official reasonable progress determination for the Apex Plant based on analyses submitted by the owner of the facility. The Long-Term Strategy of Nevada's Regional Haze SIP revision for the second implementation period covering years 2018 through 2028 will rely on the reasonable progress findings of this document. Potential new control measures are evaluated considering the four statutory factors to determine which measures are necessary to achieve reasonable progress. The four statutory factors include: cost of compliance, time necessary for compliance, energy and non-air environmental impacts, and remaining useful life of the source.

This reasonable progress determination references data and analyses provided by Lhoist North America (LNA) in several documents that can be found in Appendix B.1. Table 1-1 below outlines the documents submitted by LNA that supplement this determination document. In some cases, the Nevada Division of Environmental Protection (NDEP) adjusted information submitted by LNA to ensure the analyses relied on to make reasonable progress determinations agree with Regional Haze Rule regulatory language, Regional Haze Rule Guidance for the second implementation period, and EPA Control Cost Manual. Throughout the document, it can be assumed that referenced data and information rely on the following documents submitted by LNA, unless explicitly indicated that NDEP made adjustments.

Table 1-1: LNA Documents Relied upon for Reasonable Progress Determination

Full Document Title	Shortened Document Title (used in this document)	Date	Appendix Location
Regional Haze Second Planning Period Four-Factor Analysis	*LNA Analysis*	March 24, 2021	B.1.b
RE: RHR Apex Plant Update	*LNA Email*	September 13, 2021	B.1.c
RE: Lhoist North America of Arizona, Inc. - Apex Plant Comments on Draft 2021 Regional Haze Four Factor Review and Initial Control Determination	*LNA Comments*	October 13, 2021	B.1.d
Class I Air Quality Operating Permit	Permit		A.1

2 Facility Characteristics

The Apex Plant is a lime production facility located in Clark County, NV just northeast of the Las Vegas metropolitan area and operates four horizontal rotary preheater lime kilns permitted to utilize coal, petroleum coke, and/or natural gas. As stated on page 3-1 of *LNA Analysis*:

"Kilns 1 through 3 are nearly identical in design and operations, although constructed at different times. Kilns 1 and 2 have a nominal production rate of 300 tons per day and Kiln 3 has a nominal production rate of 400 tons per day. Kiln 4 is a newer kiln and has a nominal lime production rate of 1,350 tons per day.

All kilns can utilize natural gas, coal, and petroleum coke as fuels for the lime production process. Typical annual fuel usage rates for all kilns combine are approximately 250,000 million british thermal units

(MMBTU) per year of natural gas (at 19,500 Btu/lb), 94,000 tons per year of coal (at 11,500 Btu/lb) and 20,000 tons per year of coke (at 13,800 But/lb)."

The Apex Plant is regulated by the Clark County Department of Environment and Sustainability (CCDES), but NDEP has coordinated LNA's 4-Factor Analysis for the implementation of Nevada's Regional Haze State Implementation Plan. Any adjustments to LNA Apex Plant's permit due to Regional Haze will be coordinated through CCDES.

3 Emissions Profile

Annual emissions reported by the facility were pulled from the National Emission Inventory (NEI), along with emissions data submitted in the *LNA Analysis* that NDEP confirmed by cross checking the data using EPA's Emission Inventory System (EIS) Gateway. These emissions data were used for the source selection process, which Nevada determined using the Q/d method, and for development of baseline emissions to be relied on in this Four-Factor Analysis.

3.1 Q/d Emissions Profile

NDEP relied on the Q/d method for source selection by quantifying total facility-wide NO_x, SO_2, and PM_{10} emissions, represented as "Q", reported in the 2014 NEIv2. The Q value was then divided by the distance, in kilometers, between the facility and the nearest Class I area (CIA), represented as "d". The nearest CIA to the Apex Plant is Grand Canyon National Park at 88 kilometers away. NDEP elected to set a Q/d threshold of 5. As displayed in Table 3-1, using 2014 emissions, the Apex Plant yields a Q/d value of 18.84, effectively screening the facility into a four-factor analysis requirement for the second round of Regional Haze in Nevada.

Table 3-1: Apex Plant Q/d Derivation

Facility Name	Nearest CIA	Total Q (tpy)	Distance to CIA (km)	Q/d
Apex Plant	Grand Canyon NP	1,662	88	18.84

3.2 Baseline Emissions Profile for Four-Factor Analysis

For the purpose of the following four-factor analyses, NDEP is relying on the baseline emissions profile provided in Section 4, Appendix B, and Appendix C of the *LNA Analysis*. Facility-wide baseline emissions are pulled from Section 4, unit-level SO_2 emissions are pulled from "Appendix B: SO_2 Control Cost Calculations," and unit-level NOx emissions are pulled from "Appendix C: NO_x Control Cost Calculations." Emissions were calculated by taking the average of emissions over the three-year baseline period of 2016 through 2018. Table 3-2 summarizes the baseline emissions profile of each kiln for SO_2, NO_x, and PM_{10} emissions.

Table 3-2: Apex Plant Baseline Emissions used in Four-Factor Analysis

Process Level	SO_2 Emissions (tpy)	NO_x Emissions (tpy)	PM_{10} Emissions (tpy)
Kiln 1	107.30	304	18.46
Kiln 2	5.32	19	1.12
Kiln 3	14.42	154	15.81
Kiln 4	8.21	687	23.04

Facility-Wide (Total)	135	1,164	58.43

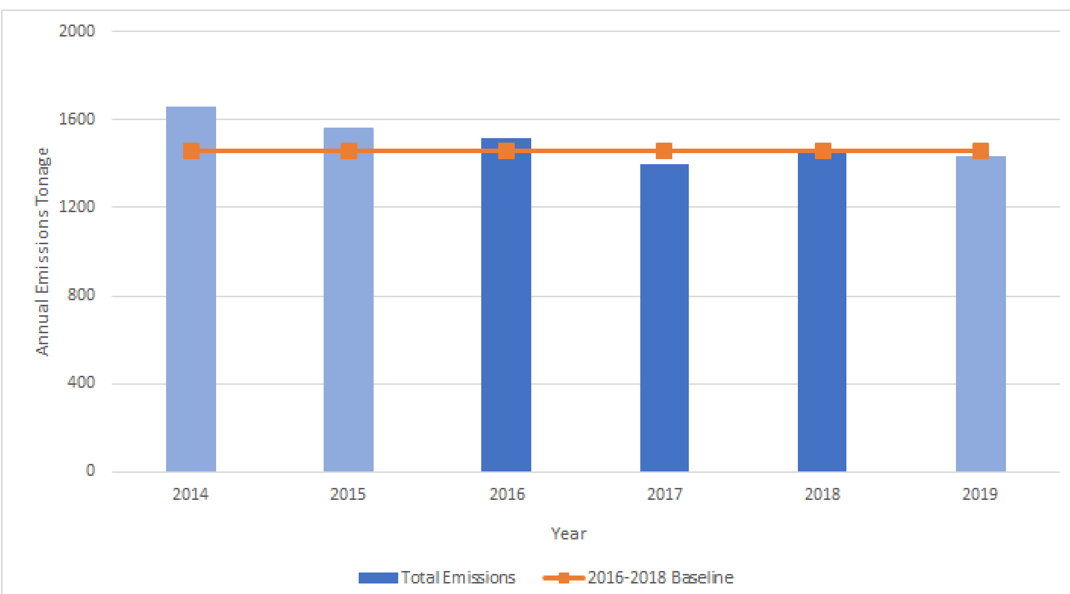
NDEP has pulled annual emissions data reported by the facility from 2014 through 2019 to confirm that the use of average annual emissions between 2016 and 2018 indeed represent normal operations and are appropriate for use as the facility's baseline emissions in this four-factor analysis. Annual emissions include total NO_x, SO_2, and PM_{10} emissions. As seen in Table 3-3, total emissions in 2014 and 2015 are higher than emissions reported in 2016 through 2018. Emissions in 2019 were slightly less than the baseline years.

Table 3-3: Historical Annual Emissions

	Facility Emissions (tpy)					
Pollutant	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
NO_x	1361	1281	1,220	1,109	1,179	1,151
SO_2	152	151	141	140	128	166
PM_{10}	149	129	156	150	148	117
Total	**1,662**	**1,561**	**1,517**	**1,399**	**1,455**	**1,434**

In Figure 3-1, the baseline emissions used in the four-factor analysis, consisting of the average annual emissions from 2016 through 2018, is represented by the orange line (facility emissions of 1,457 tons per year). This shows a 200 tons per year difference between 2014 emissions and roughly 100 tons per year difference between 2015 emissions. In looking at more recent years (2016-2019) the assumed baseline stays within roughly 50 tons per year of actual reported emissions. NDEP considers this a small margin and supports the use of a 2016 through 2018 baseline to represent normal operations considering the most up-to-date emissions data available at the time LNA submitted the *LNA Analysis.*

Figure 3-1: Historical Annual Emissions Compared to Baseline Emissions used for Analysis



4 PM_{10} Control Determination

NDEP is relying on the following statement found on page 1-2 of the *LNA Analysis* in screening out consideration of additional PM_{10} controls for all kilns at the Apex Plant:

"The facility kilns are subject to New Source Performance Standards for Lime Manufacturing Plants listed in 40 CFR Part 60, Subpart HH and/or the National Emissions Standards for Hazardous Air Pollutants listed in 40 CFR Part 63, Subpart AAAAA. The current baghouses used for control of particulate matter emissions from Apex's kilns meet the applicable emission limits of Subparts HH as well as AAAAA and therefore, the baghouses meet the definition of best available control technology (BACT) for Rotary Lime Kilns. As a result, reasonable progress compliant controls are already in place and therefore no additional PM_{10} control technologies are considered as a part of this Analysis."

To further bolster the determination that the consideration of additional PM_{10} control measures be screened out, NDEP cites the total PM_{10} emissions among all four kilns amounting to 59.03 tons per year, found on page 4-1 of the *LNA Analysis.* Considering the existing effective controls paired with low facility emissions for PM_{10}, NDEP concludes that consideration of additional PM_{10} controls should be screened out.

5 SO_2 Control Determination

5.1 Existing Control Measures

For existing SO_2 control measures at the Apex Plant kilns, NDEP refers to the following statement found on page 5-2 of the *LNA Analysis*:

"An important detail to consider is that SO_2 is inherently scrubbed within a lime kiln system due to the presence of large volumes of alkaline materials in the system, including the final product located within the kiln, limestone in the preheater, and lime kiln dust (LKD) in the baghouse. All kiln exhaust gases pass through each process where SO_2 is removed from the gas stream. A typical preheater kiln system, similar to Kilns 1, 2 and 3, scrubs approximately 90% of SO_2 (originating from both fuel sulfur and raw material sulfur) that would otherwise leave the stack. Process engineering at the Facility identifies that Kiln 4 is able to scrub approximately 99% of SO_2 (originating from both fuel sulfur and raw material sulfur) that would otherwise leave the stack. This reduction efficiency is determined using a balance on the sulfur entering and exiting the kiln, and the value falls within the range provided in the Portland Cement Association's 'Formation and Techniques for control of Sulfur Dioxide and Other sulfur Compounds in Portland Cement Kiln Systems.' Though kiln technology differs between the cement and lime industry, it is assumed that inherent scrubbing efficiencies are similar. This in-situ scrubbing mechanism is commonly determined as BACT for preheater rotary kilns being permitted today."

The inherent scrubbing of SO_2 emissions within the system of each lime kiln is not considered a control measure necessary to achieve reasonable progress, however, additional SO_2 control measures are considered further in the following section.

5.2 Potential New Control Measures

Considering that inherent scrubbing already achieves 90% to 99% SO_2 removal in the lime kilns, SO_2 baseline emissions are already relatively low, however, it is still possible to consider a fuel switch to natural gas use only as a potential control measure to reduce SO_2 emissions. NDEP is relying on Lhoist's consideration of potential additional SO_2 control measures outlined in Section 5 of the *LNA Analysis*.

Table 5-1: 4-Factor Summary of Technically Feasible SO_2 Control Measures

Control	Unit	Cost of Compliance	Time Necessary for Compliance	Energy and Non-Air Quality Impacts	Remaining Useful Life
Fuel Switch – Use of Natural Gas Only	Kiln 2	$8,666,204/ton	10 years	Decreased overall plant efficiency resulting in increased electrical usage.	No facility closure date. Does not affect the annualized cost of the measure.
	Kiln 4	N/A			

5.2.1 Identification of Technically Feasible Controls

NDEP is relying on LNA's identification of technically feasible controls in reducing SO_2 emissions outlined in pages 5-1 through 5-8 in the *LNA Analysis*. As shown in the referenced sections, the conversion to Natural Gas use only on kilns 2 and 4 as an alternative low sulfur fuel is considered technically feasible.

As stated on page 5-5 of the *LNA Analysis*, Kilns 1 and 3 are intended to produce dolomitic lime, which cannot be produced using 100% natural gas, as it would result in plugging of the kilns, as well as compromise the quality of the desired lime product. Kilns 2 and 4 are intended to produce HiCal lime product, which can be produced using 100% natural gas, however, LNA estimates a 10% reduction in production. The cost associated with the reduction in production is included in cost of compliance calculations.

Also stated on page 5-5 of the *LNA Analysis*, increased usage of natural gas as fuel does have the ability to reduce SO_2 emissions, however, it can also result in an increase in NO_x emissions. Since NO_x is another primary visibility impairing pollutant of concern, total reductions used in developing a cost-effectiveness value are represented by the sum of SO_2 reductions and NO_x increases. Generally, none of LNA's cost calculations for a fuel switch to increased natural gas usage resulted in a substantial SO_2 reduction without a relatively similar increase in NO_x emissions. This hinders any achievable reduction that would produce a cost-effective cost of compliance.

5.2.2 Cost of Compliance

The following cost calculations outlined in Table 5-2 are pulled from "Appendix B: SO_2 Control Cost Calculations" of the *LNA Analysis.* NDEP is relying on this cost information in determining the cost-effectiveness of potential SO_2 control measures. As shown, the implementation of switching fuel use to 100% natural gas at Kiln 2 is not considered cost-effective at $8,666,204/ton reduced, well above the cost-effectiveness threshold set by NDEP. This is due to high annual costs contributed by a reduction in production that occurs when 100% natural gas is used instead of the preferred fuel blend for each kiln. For both Kiln 2 and Kiln 4, a fuel blend of roughly 65-75% coal and 25-35% coke is preferred in producing quality HiCal lime (outlined in Table 5-2 of the *LNA Analysis*).

Table 5-2: Cost of Compliance Breakdown for Potential SO_2 Control Measures

	Kiln 2	Kiln 4
Annualized Capital Cost ($/year)	$90,333	$90,333
Total Annual Costs ($/year)	$8,708,565	$1,589,821
Baseline SO_2 Emissions (tpy)	3.42	14.30
Baseline NO_x Emissions (tpy)	19.11	686.68
Baseline PM_{10} Emissions (tpy)	1.13	23.48
Baseline Total Emissions (tpy)	23.66	724.46
100% Natural Gas SO_2 Emissions (tpy)	0.0027	0.005
100% Natural Gas NO_x Emissions (tpy)	21.52	848.89
100% Natural Gas PM_{10} Emissions (tpy)	1.1267	23.48
100% Natural Gas Total Emissions (tpy)	22.65	872.38
Total Tons Reduced	1.02	-147.92
Cost-Effectiveness ($/ton)	$8,666,204/ton	N/A

Total capital costs include the cost of upgrading the gas train and burners and modifying the piping to be better suitable for the burning of 100% natural gas. The annualized cost was developed using a capital recovery factor of 0.079, which is based on a 4.75% interest rate. Generally, NDEP instructed all sources conducting a four-factor analysis for the second implementation period to utilize the most recent bank prime interest rate of 3.25%, however, it is clear that adjusting the capital recovery factor to reflect this would not lead to a cost-effectiveness value below the $/ton threshold set by NDEP.

5.2.3 Time Necessary for Compliance

NDEP is relying Lhoist's estimated time necessary for compliance outlined in Section 5.4.2 on page 5-10 of the *LNA Analysis* that states the use of alternative fuels can be implemented during the second long-term planning period.

5.2.4 Energy and Non-Air Quality Environmental Impacts

There are no energy or non-air quality environmental impacts assumed in the consideration of switching to 100% use of natural gas at Kilns 2 and 4.

5.2.5 Remaining Useful Life of the Source

Currently, there is no federally enforceable closure date for the Lhoist Apex Plant. Because of this, an estimated control life of 20 years is assumed for the consideration of switching the fuel blend to 100% natural gas. The 20-year life of the potential control was factored into the capital recovery factor of 0.079, assuming an interest rate of 4.25%.

5.2.6 Determination for Potential New Measures to Control SO_2 Emissions

Based on a cost-effectiveness value of $8,666,204/ton for Kiln 2, and net increase of visibility impairing pollutants (negative cost-effectiveness value) for Kiln 4, NDEP does not consider the replacement of coke and coal blends as fuel with 100% natural gas as controls necessary to achieve reasonable progress during the second implementation period of the Regional Haze Rule for Nevada.

6 NO_x Control Determination

6.1 Existing Control Measures

Kiln 3 and Kiln 4 at the Apex Plant currently use Low-NO_x Burners to achieve a 10% reduction in NO_x emissions at both kilns. Low-NO_x Burners were installed on Kiln 3 in August 2019 and Kiln 4 in April 2021. Low-NO_x Burners were not yet installed on Kiln 4 at the time LNA submitted the *LNA Analysis* and were considered as a potential control measure because of this. For the purpose of NDEP's control determination, NDEP is partially relying on the NO_x four-factor analysis provided in the *LNA Analysis*, with minor adjustments made by NDEP to ensure a more up-to-date analysis that assumes all existing measures are already in use, as well as, ensure the methods used in the analysis agree with EPA's Control Cost Manual.

The existing Low-NO_x Burners on Kilns 3 and 4 are not currently listed or required in the Apex Plant's air quality operating permit. NDEP considers these existing control measures as necessary to achieve reasonable progress during the second implementation period of Nevada's Regional Haze SIP. New NO_x limits are developed in Section 7 of this document to reflect the 10% reduction in NO_x emissions at both kilns.

6.2 Potential New Control Measures

The use of Low-NO_x Burners is considered as a potential additional control to further reduce NO_x emissions at Kilns 1 and 2 only, as Kilns 3 and 4 already operate Low-NO_x Burners. A 10% reduction in NO_x is assumed when implementing Low-NO_x Burners at Kilns 1 and 2. Selective Non-Catalytic Reduction (SNCR) is considered as a potential additional control to further reduce NO_x emissions at all four kilns. Due to differences in kiln configuration, outlined in Section 6.1.2.2 and 6.2.2.2 of the *LNA Analysis,* a 20% NO_x reduction is assumed when implementing SNCR on Kilns 1, 2, and 3, and a 50% NO_x reduction is assumed for Kiln 4. NDEP agrees with LNA's determination of achievable NO_x reduction at each kiln when implementing SNCR. NDEP is relying on information submitted by LNA to evaluate the potential control measures outlined in Table 6-1 below. Cost-effectiveness values to determine cost of compliance, energy and non-air quality impacts, and the remaining useful life are pulled from the *LNA Analysis*. For time necessary for compliance, NDEP is relying on information submitted by LNA in the *LNA Comments* document.

Table 6-1: 4-Factor Summary of Technically Feasible NO_x Control Measures

Control	Unit	Cost of Compliance	Time Necessary for Compliance	Energy and Non-Air Quality Impacts	Remaining Useful Life
Low-NO_x Burners (LNB)	Kiln 1	\$850/ton	2 years	None	20 years
	Kiln 2	\$13,494/ton			
Selective Non-Catalytic Reduction (SNCR)	Kiln 1	\$2,702/ton	2 years	Increase in energy and water usage. Potential ammonia slip.	20 years
	Kiln 2	\$37,847/ton			
	Kiln 3	\$4,995/ton			
	Kiln 4	\$764/ton			

6.2.1 Identification of Technically Feasible Controls

For the identification of technically feasible add-on NO_x controls, NDEP is relying on Sections 6.1, 6.2, and 6.3 of the *LNA Analysis* that identifies Low-NO_x Burners and SNCR as technically feasible add-on controls that could reduce NO_x emissions at the Apex Plant kilns.

6.2.2 Cost of Compliance

NDEP is relying on the cost analyses that evaluate Low-NO_x Burners and SNCR implementation at the Apex kilns outlined in "Appendix C: NO_x Control Cost Calculations" of the *LNA Analysis*. Installation of Low-NO_x Burners on Kilns 1 and 2 is relatively inexpensive, with no additional annual operating costs and annualized capital cost based on a capital recovery factor of 0.069 (3.25% interest for 20 years). Assuming 10% NO_x reduction, Low-NO_x Burners are cost effective for Kiln 1, achieving roughly 30 tons per year in NO_x reduction. Low-NO_x Burners are not considered cost-effective for Kiln 2 at $13,494/ton, achieving only 2 tons per year in NO_x reduction. Kiln 2 does not have significant NO_x emissions, restricting the amount of achievable reductions, and inflating the cost-effectiveness value. Table 6-2 below outlines the major cost components of Low-NO_x Burners on Kilns 1 and 2.

Table 6-2: Cost of Compliance Breakdown for Low-NO_x Burners

	Kiln 1	Kiln 2
Annualized Capital Cost ($/year)	$25,792	$25,792
Baseline NO_x Emissions (tpy)	304	19
Total Tons NO_x Reduced (tpy)	30.35	1.91
Cost-Effectiveness ($/ton)	$850/ton	$13,494/ton

Major cost components of implementing SNCR on all four kilns at the Apex Plant is outlined in Table 6-3 below. Annual capital costs are based on a capital recovery factor of 0.069 (3.25% interest for 20 years) and previous vendor quotes from implementation of SNCR at LNA's Nelson Lime Plant. Annual operating costs include urea costs, operating labor, power usage and cost, and maintenance materials, all accounted for using methods agreeable to EPA's Control Cost Manual. Cost-effectiveness values for Kilns 1, 3, and 4 fall below the threshold set by NDEP and are considered necessary to achieve reasonable progress. Much like considering Low-NO_x Burners on Kiln 2, low baseline NO_x emissions restrict the amount of achievable NO_x reductions, inflating the cost-effectiveness value. NDEP does not consider SNCR on Kiln 2 as necessary to achieve reasonable progress.

Table 6-3: Cost of Compliance Breakdown for SNCR

	Kiln 1	Kiln 2	Kiln 3	Kiln 4
Annualized Capital Cost ($/year)	$40,679	$40,679	$40,679	$40,679
Annual Operating Costs ($/year)	$123,715	$104,003	$113,365	$221,665
Total Annual Costs ($/year)	$164,394	$144,681	$154,044	$262,344
Baseline NO_x Emissions (tpy)	304	19	154	687
Control Efficiency	20%	20%	20%	50%
Total Tons NO_x Reduced (tpy)	60.70	3.82	30.84	343.34
Cost-Effectiveness ($/ton)	$2,708/ton	$37,847/ton	$4,995/ton	$764/ton

6.2.3 Time Necessary for Compliance

For time necessary for compliance, NDEP is relying on the timeline estimated in *LNA Email* and *LNA Comments.* Initially, LNA estimated that Low-NO_x Burners and SNCR could be implemented "during the second planning period" in the *LNA Analysis*. Since then, LNA has provided a more detailed time necessary for compliance, stating the following in the *LNA Email*:

"In regard to the timing of implementation of controls, LNA has already installed Low-NO_x Burners on Kilns 3 and 4. A Low-NO_x Burner would still be required for Kiln 1 and SNCR would be required for Kilns 1, 3, and 4. LNA expects a minimum of two years would be needed to properly design, construct, and optimize additional controls from the time a permit condition requiring the additional controls became enforceable. Applicable emission rates would first be calculated 30-days and 12-months after, as applicable."

Furthermore, LNA provided a compliance deadline date based on a two-year timeline in the *LNA Comments,* stating:

"LNA proposes a compliance deadline of August 1, 2024, or two years after the Regional Haze control requirements are included in a federally enforceable operating permit, whichever is later."

NDEP agrees on the proposed timeline for compliance, however, will be changing the requirement to reflect two years after the approval of Nevada's regional haze SIP instead of two years after the requirements are included in a federally enforceable operating permit. This allows the facility to ensure that the proposed controls and associated limits are required under an approved SIP before implementing such measures. NDEP is also removing the August 1, 2024 deadline as Nevada's RH SIP will be submitted to USEPA in August 2022. This inherently assumes that two years after approval of Nevada's regional haze SIP will occur later than August 1, 2024.

6.2.4 Energy and Non-Air Quality Impacts

NDEP is relying on the *LNA Analysis* in Section 6.4.4.3 that identifies energy and non-air quality impacts from the implementation of SNCR. An expected decrease in efficiency throughout the facility as significant energy and water use is increased to support the SNCR technology is represented as additional power costs in the evaluation of cost of compliance. An additional annual power cost of $16,272 per kiln is estimated based on LNA's previous experience in implementing SNCR on Lhoist's Nelson facility. It is also acknowledged that the use of SNCR, and urea as a reagent, may introduce ammonia slip to the kilns. This is not accounted for in the cost calculations.

No energy and non-air quality impacts were assumed for the implementation of Low-NO_x Burners.

6.2.5 Remaining Useful Life of the Source

Currently, there is no federally enforceable closure date for the Lhoist Apex Plant. Because of this, an estimated control life of 20 years is assumed for the consideration of Low-NO_x Burners and SNCR (EPA Control Cost Manual recommends a 20-year life for both controls). The 20-year life of the potential control was factored into the capital recovery factor of 0.069, assuming an interest rate of 3.25%.

6.2.6 Determination for Potential New Measures to Control NO_x Emissions

As stated previously, NDEP considers the implementation of Low-NO_x Burners on Kiln 1, and SNCR on Kilns 1, 3, and 4, as cost-effective and necessary to achieve reasonable progress during the second implementation period of the Regional Haze Rule for Nevada. New NO_x limits, and other associated requirements, are outlined in the following section of this document.

7 Reasonable Progress Requirements

NDEP considers the continued use of existing Low-NO_x Burners on Kilns 3 and 4 as necessary to achieve reasonable progress. NDEP also considers the implementation of Low-NO_x Burners on Kiln 1, and SCNR on Kilns 1, 3, and 4, as necessary to achieve reasonable progress. NDEP proposes the following emissions limitations, compliance schedules, and other measures necessary to make reasonable progress as conditions to be added to the Apex Plant's air quality operating permit issued by Clark County Department of Environment and Sustainability.

7.1 Emission Limitation and Averaging Period Requirements

NDEP is partially relying on the proposed NO_x emission limits submitted by LNA in *LNA Email* with adjustments made to reductions assumed for Kiln 3. In LNA's proposal, a 30 ton per year reduction in NO_x emissions is assumed for Kiln 3 to reflect a 20% reduction achieved through the use of SNCR. NDEP has adjusted this to incorporate the assumed 10% NO_x reduction achieved through the use of a Low-NO_x Burner installed on Kiln 3 in 2019. This is necessary as the baseline years used to calculate new NO_x limits are the three-year average from 2016 through 2018. Table 7-1 outlines NDEP's adjusted NO_x reductions through the implementation of Low-NO_x Burners and SNCR for Kilns 1, 3, and 4.

Table 7-1: Assumed NO_x Reductions for Apex Kilns

	NO_x Baseline (tpy)	LNB Control Efficiency	LNB NOx Reduction (tpy)	Reduced NO_x (tpy)	SNCR Control Efficiency	SNCR NO_x Reduction (tpy)	Total NO_x Reduction (tpy)
Kiln 1	304	10%	30.4	273.6	20%	54.72	85.12
Kiln 2	19						0
Kiln 3	154	10%	15.4	138.6	20%	27.72	43.12
Kiln 4	687	10%	68.7	618.3	50%	309.15	377.85
Total	1164		114.5			391.59	506.09

Assuming these proposed reductions in NO_x emissions at the Apex Plant kilns, the following new NO_x emission rates are calculated and shown in Table 7-2.

Table 7-2: New NO_x Emission Rates Derived from Assumed NO_x Reductions

	Current Limits			Regional Haze Reductions			
	Production (tpy)	NO_x (tpy)	NO_x (lb/tlp)	NO_x Reduction (tpy)	NO_x (tpy)	NO_x (tpd)	NO_x (lb/tlp)
Kiln 1	109,500	343	6.27	85	258	0.71	4.71
Kiln 2	109,500	350	6.39	0	350	0.96	6.39
Kiln 3	146,000	478	6.55	43	435	1.19	5.96

Kiln 4	475,000	702	2.96	378	324	0.89	1.36
Total	840,000	1,874	4.46	506	1367	3.75	3.26

Based on these emission rates, NDEP proposes the following emissions limitations and averaging periods to be put into the facility's air quality operating permit:

1. **3.75 tons per kiln operating day** based on a 30-day rolling average. Total tons of NO_x from all operating kilns would be totaled on a daily basis. Each days total would be averaged over 30 days and compared to the 3.75 TPD emission limit. If no kilns operated on a particular day, the day would be skipped when calculating the 30-day average.
2. **3.59 lb / ton of lime produced** based on a 12-month rolling average. Total tons of NO_x from all operating kilns would be totaled for each calendar month and added to the total tons of NO_x from the preceding 11 months. Total tons of NO_x from all operating kilns during this 12-month period is then divided by total tons of lime produced during the same 12-month period. You will notice the 3.59 lb/tlp emission limit is higher than the calculated value shown in Table 7-2 (3.26 lb/tlp). A 10% margin is added to the calculated NO_x limit of 3.26 lb/tlp, resulting in 3.59 lb/tlp across all kilns. This is to account for production variability and inefficiencies in circumstances where demand does not account for the full allowable production rate.

7.2 Monitoring, Recordkeeping, and Reporting Requirements

NDEP is proposing the following monitoring, recordkeeping, and reporting requirements.

Monitoring:

1. Effective no later than two years after the EPA's approval of the controls determination associated with the SIP, to demonstrate continuous, direct, compliance with the Kilns 1-4 (EUs: K102, K202, K302, and K402) emissions limits for NO_X as specified in Conditions 3.2.1 and 3.2.2, the permittee shall calibrate, maintain, operate, and certify the continuous emissions monitoring system (CEMS) for NO_X diluent gas and stack exhaust gas.

2. Effective no later than two years after the EPA's approval of the controls determination associated with the SIP, the permittee shall operate the CEMS at all times the Kilns 1-4 (EUs: K102, K202, K302, and K402) are in use, except during malfunctions, maintenance, calibration, and repairs of the CEMS and:

   a. Shall include an automated data acquisition and handling system.

   b. Subject to the provisions of 40 CFR 60 Subpart A, Appendix B and F, as applicable.

3. Effective no later than two years after the EPA's approval of the controls determination associated with the SIP, the CEMS shall monitor and record at least the following data for each kiln (EUs: K102, K202, K302, and K402):

   a. Exhaust gas concentration of NO_X and diluent O_2;

   b. Exhaust gas flow rate;

c. Hourly emissions of NO_X;

d. Hours of CEMS operation; and

e. Dates and hours of CEMS downtime.

4. The permittee shall conduct Relative Accuracy Test Audits (RATA) and other periodic checks of the NO_X and O_2 CEMS at least annually, as required by 40 CFR 60.

5. Effective no later than two years after the EPA's approval of the controls determination associated with the SIP, the permittee shall monitor each kiln (EUs: K102, K202, K302, and K402) to demonstrate compliance with the NO_X emission limit of 3.75 tons per day. Each rolling kiln 30-operating-day average will be calculated per the following procedure:

   a. The permittee shall measure the NO_X emissions using CEMS and sum the hourly pounds of NO_X emitted from Kilns 1, 2, 3, and 4 for the current operating-day period and the preceding 29-operating-day period for each kiln to obtain the total pounds of NO_X for the 30-operating-day period.

   b. The permittee shall divide the total pounds of NO_X by 2000 to calculate the total tons of NO_X emitted over the most recent kiln 30-operating-day period.

   c. The permittee shall divide the total tons of NO_X by 30 to calculate the rolling 30-operating-day NO_X emission rate from all kilns.

   d. The permittee shall estimate NO_X emissions during periods of CEMS downtime using the existing data substitution plan.

6. Effective no later than two years after the EPA's approval of the controls determination associated with the SIP, the permittee shall monitor each kiln to demonstrate compliance with the NO_X emission limit of 3.59 lb/tlp (EUs: K102, K202, K302, and K402). Each 12-month rolling NO_X emission rate will be calculated within 30 days following the end of each calendar month per the following procedure:

   a. The permittee shall measure the NO_X emissions using CEMS and sum the hourly pounds of NO_X emitted from each kiln for the month just completed and the 11 months preceding to calculate the total pounds of NO_X emitted over the most recent 12-month period.

   b. The permittee shall sum the total lime production, in tons, produced from Kilns 1, 2, 3, and 4 during the month just completed and the 11 months to calculate the total lime product produced over the most recent 12-month period. Total lime production is to consist of both saleable and any waste lime produced.

   c. The permittee shall divide the total pounds of NO_X by the total tons of lime product to calculate the 12-month rolling NO_X emission rate in lb/tlp.

   d. The permittee shall estimate NO_X emissions during periods of CEMS downtime using the existing data substitution plan.

7. Effective no later than two years after the EPA's approval of the controls determination associated with the SIP, the permittee shall monitor the amount of the reagent used for the SNCR for each kiln hourly (EUs: K102, K302, and K402).

Recordkeeping:

1. The permittee shall maintain the following records on-site and include, at a minimum:

    a. CEMS data for each kiln (EUs: K102, K202, K302, and K402); and

    b. Hourly records of the amount of reagent used for the SNCR for each kiln (EUs: K102, K302, and K402).

2. The permittee shall maintain the following records on-site that require semiannual reporting and include, at a minimum:

    a. Daily, consecutive 30-day average of total NO_X in tpd from all kilns (EUs: K102, K202, K302, and K402);

    b. Monthly, consecutive 12-month average of total NO_X in lb/tlp from all kilns (EUs: K102, K202, K302, and K402);

    c. The magnitude and duration of excess emissions, notification, monitoring system performance, malfunctions, corrective actions taken, and other data required by 40 CFR Part 60 and the CEMS Quality Assurance Plan (reported as required by Section 4.4.4 of this permit); and

    d. CEMS audit results or accuracy checks, as required by 40 CFR Part 60 and the CEMS Quality Assurance Plan.

Reporting:

1. The permittee shall submit semiannual monitoring reports to DAQ. *[AQR12.4.3.4(a)(10)]*

2. The following requirements apply to semiannual reports: *[AQR12.4.3.4(a)(10)]*

    a. The report shall include item listed in Section 3.5 for semiannual reporting.

    b. The report shall be based on a calendar semiannual period, which includes partial reporting periods.

    c. The report shall be received by DAQ within 30 calendar days after the semiannual period.

7.3 Compliance Deadline

As stated above, NDEP is relying on a compliance deadline of no later than 2 years after approval of the applicable controls determination associated with Nevada's second state implementation plan for regional haze by the USEPA.

8 Confidentiality Review

Lhoist North America requested that some information used in Apex Plant's 4-Factor Analysis be kept confidential for business purposes. NDEP has reviewed and confirmed that the request to keep this information confidential agrees with the NRS 445B.570(6), which defines "confidential information" as

1. Relate to dollar amounts of production or sales;
2. Relate to processes or production unique to the owner or operator; or
3. If disclosed, would tend to affect adversely the competitive position of the owner or operator.

Lhoist North America identified 5 pieces of information as confidential. NDEP reviewed the information and confirmed that the information is reasonable for the 4-factor analysis and compares to other publicly available figures and indicated which definition (e.g. 1, 2, or 3) it pertains to. The below descriptions of the confidential information does not list actual confidential data.

Confidential Information	Data/Figures Reasonable?	Definition it Pertains to
LNA Nelson Plant SNCR process flow diagram	Reasonable. Documentation supports LNA's assumptions in implementing SNCR at Apex.	2
Urea Cost – Vendor Quote	Reasonable. Confirms the source's specific urea cost. Price is within a reasonable range of national averages.	1
LNA Nelson Plant SNCR Vendor Quote	Reasonable. Documentation supports LNA's assumptions in SCNR cost at Apex.	1
LNA Apex Plant Kiln-Specific Sulfur Balances	Reasonable. Confirms SO2 baseline emissions and inherent dry scrubbing.	2
LNA Apex Plant 2020 Fuel Budget	Reasonable. Documentation confirms source specific fuel costs and amount of fuel used. Prices are within reasonable ranges of national averages.	3

Appendix B.1.b - Lhoist North America Four-Factor Analysis for Apex Plant

REGIONAL HAZE SECOND PLANNING PERIOD FOUR-FACTOR ANALYSIS

Lhoist North America > Apex Lime Plant > Source 00003

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(Revised March 2021)

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1. EXECUTIVE SUMMARY

This report documents the results of a four-factor control analysis of the four lime kilns at the Lhoist North America of Arizona Inc. (Lhoist) Apex lime plant (The Facility). All kilns are rotary, preheater type kilns that can produce between 300 and 1,350 tons per day of lime, each.[1] This report is provided in response to the Nevada Department of Environmental Protection (NDEP) request letter dated August 12, 2019 and subsequent clarification dated March 3, 2020, May 28, 2020, August 24, 2020, and January 28, 2021.

The Facility was evaluated during the first regional haze planning period and it was determined that the Facility did not significantly contribute to visibility impairment at nearby Class I areas and a was not a Best Available Retrofit Technology (BART) eligible source. According to Chapter 5 of the Nevada State Implementation Plan (SIP) for the first planning period[2], "A BART-eligible source that is responsible for a 1.0 deciview (dv) change or more is considered to "cause or contribute" to visibility impairment. Although the appropriate threshold may vary, the USEPA guidelines indicate that the cause or contribution threshold used for BART applicability should not exceed 0.5 dv. Thus, Nevada considers a BART-eligible source that is responsible for a 0.5 dv increase or more to cause or contribute to visibility impairment. Any BART-eligible source determined to cause or contribute to visibility impairment in any mandatory Class I area is subject to a BART determination." Table 5-3 of the SIP then goes on to show that the Facility, formerly Chemical Lime Company, is a BART exempt source because the 98th percentile delta deciview at the nearest Class I source (Grand Canyon) is only 0.05. A five-factor analysis was not conducted for the Facility at that time.

During the second planning period for Regional Haze, the U.S. EPA's guidelines in 40 CFR Part 51.308 are used to evaluate control options for the lime kilns. In establishing a reasonable progress goal for any mandatory Class I Federal area within the State, the State must consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources, and include a demonstration showing how these four factors are taken into consideration in selecting the goal (40 CFR 51.308(d)(1)(i)(A)). The most recent guidance, released by the EPA on August 20, 2019, additionally states in reference to Step 5 of the SIP development that:

> ***Importantly, this section assumes that the state will consider visibility benefits as part of the analysis.*** *Section 51.308(f)(2)(i) of the Regional Haze Rule requires consideration of the four factors listed in CAA section 169A(g)(1) and does not mention visibility benefits. However, neither the CAA nor the Rule suggest that only the listed factors may be considered.* ***Because the goal of the regional haze program is to improve visibility, it is reasonable for a state to consider whether and by how much an emission control measure would help achieve that goal.***

As such, all cost effectiveness figures presented in this document should be considered in the context of the original visibility modeling for the first planning period, which demonstrated that the Facility's visibility impact was 1/10th of Nevada's eligibility threshold at all surrounding Class I areas.

The purpose of this report is to provide information to NDEP regarding potential PM_{10}, SO_2 and NO_X emission reduction options for the Facility's four lime kilns with the knowledge that the Facility's visibility impairing impacts are minimal. Based on the Regional Haze Rule, associated EPA guidance, and NDEP's request, Lhoist understands that NDEP will only move forward with requiring emission reductions from the Lhoist Apex lime

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[1] Kilns 1 and 2 are authorized for an annualized throughput limit of 300 tons per day. Kiln 3 is authorized for a throughput limit of 400 tons per day. Kiln 4 is authorized for a throughput limit of 1,350 tons per day.

[2] https://ndep.nv.gov/uploads/air-plan_mod-docs/nv_regional_haze_chapters_11-18-09.zip

kilns if the emission reductions can be demonstrated to contribute to reasonable progress and provide the most cost effective controls among all options available to NDEP. In other words, **control options are only relevant for the Regional Haze Rule if they result in a reduction in the existing visibility impairment in a Class I area needed to meet reasonable progress goals.**

The report identifies the following potential control technologies for the Facility's lime kilns:

PM_{10} Emission Reduction Options

- The Facility kilns are subject to New Source Performance Standards for Lime Manufacturing Plants listed in 40 CFR Part 60, Subpart HH and/or the National Emissions Standards for Hazardous Air Pollutants listed in 40 CFR Part 63, Subpart AAAAA. The current baghouses used for control of particulate matter emissions from Apex's kilns meet the applicable emission limits of Subparts HH as well as AAAAA and therefore, the baghouses meet the definition of best available control technology (BACT) for Rotary Lime Kilns. As a result, reasonable progress compliant controls are already in place and therefore no additional PM_{10} control technologies are considered as a part of this Analysis.

SO_2 Emission Reduction Options

- Alternative Fuel Scenarios: Alternative fuels are considered as a feasible possibility for reducing SO_2 emissions and were evaluated on a kiln by kiln basis. Currently the kilns each fire a unique ratio of coal, coke, and natural gas depending on the product being produced. Switching to all coal, all diesel, or all natural gas could potentially reduce SO_2 emissions but increase the emissions of NOx, another visibility impairing pollutant. However, firing diesel is not an available reduction option for the Facility. Lhoist is not aware of any kilns that have successfully fired 100% diesel fuel, and there are extraordinary technical barriers associated with implementing an unproven technology. Natural gas is available at this location; however based on the fuel blends required for the products being produced at each kiln, only Kilns 2 and 4 are capable of burning 100% natural gas without impacting product quality; however, there would be an impact to the production capability and a significant capital investment to accommodate this change. Replacing coke with a lower sulfur fuel such as coal or natural gas could also be considered as a potential option. However, there are several major roadblocks impeding the complete replacement of coke for SO_2 reductions: 1) due to operational restrictions at the Apex kilns, each kiln has a maximum coal usage which it cannot exceed without negatively impacting operations, as increased coal usage leads to potential plugging of the preheater and ash rings in the kiln, resulting in more frequent shut-downs, cleanings, and restarts of the kiln[3], 2) two types of lime are produced at Apex: hi-cal (HiCal) and dolomitic (dolo) lime, each having a specific fuel blend which results in the desired product quality. At this time, Kiln 3's primary use is for the production of dolomitic lime and Kilns 1, 2, and 4 for hi-cal; however, should Kiln 3 go down, Kiln 1 would be switched to dolomitic production and thus the kilns need the flexibility to burn multiple fuel blends, and 3) coal and natural gas produce more NOx than coke, which is also a visibility impairing precursor pollutant.

  Given the operational limitations, the significant capital investment required, and associated negative impact on NOx emissions, it is not possible to suggest the replacement of any given fuel with another and claim with any certainty that the replacement provides any benefits towards reasonable progress.

[3] EPA August 20, 2019 "Guidance on Regional Haze State Implementation Plans for the Second Implementation Round", states that "*States may also determine that it is unreasonable to consider some fuel-use changes because they would be too fundamental to the operation and design of a source.*"

- Inherent Dry Scrubbing: Dry scrubbing of SO_2 is inherent to the design of rotary lime kilns, as combustion gasses pass over calcined and partially calcined materials in the kiln, preheater, and baghouse. The various alkaline components contained in the processed raw materials reduce approximately 90% (for Kilns 1, 2 and 3) to 99% (for Kiln 4) of the SO_2 that would otherwise leave the stack.

- All other SO_2 reduction options are determined to be technically infeasible at this time.

NO_X Emission Reduction Options

- SNCR: Selective non-catalytic reduction (SNCR) has not been widely implemented on lime kilns in the United States. Lhoist has conducted a trial study at another facility in order to determine whether SNCR technology can be used for the reduction of NOx at preheater lime kilns. The results of this study showed that SNCR was technically feasible at the facility's preheater lime kilns; however, this example of SNCR installation on a preheater rotary lime kiln does not necessarily transfer to other lime kilns. Effectiveness of SNCR is highly site and source dependent, with a variety of factors having the potential to heavily influence the quantities of NO_X controlled. Based on this information, Lhoist determined SNCR to be technically feasible for the Facility's kilns, but will assume a conservatively low control efficiency for select sources when determining cost effectiveness to account for the variability of effectiveness between individual kilns. Cost calculations were conducted for the installation of SNCR on all the facility kilns on an individual and combined basis. SNCR has been demonstrated as an effective control technology for NOx at similar Lhoist facilities and has fairly low costs for Apex Kilns 1 and 4; however, as discussed further in Section 6 of this Analysis, there are significant barriers associated with the implementation of SNCR on these kilns. The installation of SNCR on Kiln 2 is not cost effective at a total cost of $42,014 per ton NOx removal. This cost is above the typical $5,000/ton removal cost threshold implemented during the first planning period.

- Low-NO_X Burners (LNB): The main principle of the LNB is stepwise or staged combustion and localized exhaust gas recirculation (i.e., at the flame). LNBs are designed to reduce flame turbulence, delay fuel/air mixing, and establish fuel-rich zones for initial combustion. The longer, less intense flames resulting from the staged combustion lower flame temperatures and reduce thermal NO_x formation. Kiln 3 currently operates a KFS burner which is classified as a low NOx burner, while Kilns 1, 2, and 4 do not operate LNBs. The cost of installing and operating LNBs on all kilns have been evaluated and are estimated at a combined $709 per ton NOx removal.

- All other NO_x reduction options are determined to be technically infeasible at this time.

Also note that Kiln 4 was permitted under EPA's PSD program and was determined to meet BACT at the time the permit was issued in October, 1995. Because the original visibility modeling for the first planning period demonstrated that the Facility has minimal impacts at all surrounding Class I areas, Lhoist expects that installation of LNB will contribute enough NOx reductions to meet reasonable progress for the second round of regional haze.

This report outlines Lhoist's evaluation of possible options for reducing the emissions of PM_{10}, NO_X and SO_2 at the Facility in North Las Vegas, Nevada. The installation of LNBs on Kilns 1, 2, and 4 has been identified as a technically feasible and cost effective reduction option for the Facility. There are currently no additional technically feasible and cost-effective reduction options available for the Facility that would achieve additional reasonable progress goals for visibility impacts. Therefore, the emissions provided for the 2028 on-the-books/on-the-way modeling baseline will assume the installation of the economically feasible control technologies and use the reduced emission rates as compared to those used in the "control scenario" for the Facility.

2. INTRODUCTION AND BACKGROUND

In the 1977 amendments to the Clean Air Act (CAA), Congress set a national goal to restore national parks and wilderness areas to natural conditions by preventing any future, and remedying any existing, man-made visibility impairment. On July 1, 1999, the U.S. EPA published the final Regional Haze Rule (RHR). The objective of the RHR is to restore visibility to natural conditions in 156 specific areas across with United States, known as Class I areas. The Clean Air Act defines Class I areas as certain national parks (over 6,000 acres), wilderness areas (over 5,000 acres), national memorial parks (over 5,000 acres), and international parks that were in existence on August 7, 1977.

The RHR requires States to set goals that provide for reasonable progress towards achieving natural visibility conditions for each Class I area in their state. In establishing a reasonable progress goal for a Class I area, the state must (40 CFR 51.308(d)(*i*)):

(A) *consider the costs of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, and the remaining useful life of any potentially affected sources, and include a demonstration showing how these factors were taken into consideration in selecting the goal.*

(B) *Analyze and determine the rate of progress needed to attain natural visibility conditions by the year 2064. To calculate this rate of progress, the State must compare baseline visibility conditions to natural visibility conditions in the mandatory Federal Class I area and determine the uniform rate of visibility improvement (measured in deciviews) that would need to be maintained during each implementation period in order to attain natural visibility conditions by 2064. In establishing the reasonable progress goal, the State must consider the uniform rate of improvement in visibility and the emission reduction.*

With the second planning period under way for regional haze efforts, there are a few key distinctions from the processes that took place during the first planning period. Most notably, the second planning period analysis will distinguish between "natural" and "anthropogenic" sources. Using a Photochemical Grid Model (PGM), the EPA will establish what are, in essence, background concentrations both episodic and routine in nature to compare manmade source contributions against.

The purpose of this report is to provide information to NDEP regarding potential PM_{10}, SO_2 and NO_X emission reduction options for the Facility's four lime kilns with the knowledge that the Facility's visibility impairing impacts are minimal. Based on the Regional Haze Rule, associated EPA guidance, and NDEP's request, Lhoist understands that NDEP will only move forward with requiring emission reductions from the Lhoist Apex lime kilns if the emission reductions can be demonstrated to contribute to reasonable progress and provide the most cost effective controls among all options available to NDEP. In other words, control options are only relevant for the Regional Haze Rule if they result in a reduction in the existing visibility impairment in a Class I area needed to meet reasonable progress goals.

The information presented in this report considers the following four factors for the emission reductions:

Factor 1. Costs of compliance
Factor 2. Time necessary for compliance
Factor 3. Energy and non-air quality environmental impacts of compliance
Factor 4. Remaining useful life of the kilns

Factors 1 and 3 of the four factors that are listed above are considered by conducting a step-wise review of emission reduction options in a top-down fashion similar to the top-down approach that is included in the EPA RHR guidelines[4] for conducting a review of Best Available Retrofit Technology (BART) for a unit[5]. These steps are as follows:

Step 1. Identify all available retrofit control technologies
Step 2. Eliminate technically infeasible control technologies
Step 3. Evaluate the control effectiveness of remaining control technologies
Step 4. Evaluate impacts and document the results

Factor 4 is also addressed in the step-wise review of the emission reduction options, primarily in the context of the costing of emission reduction options and whether any capitalization of expenses would be impacted by limited equipment life. Once the step-wise review of control options was completed, a review of the timing of the emission reductions is provided to satisfy Factor 2 of the four factors.

Additionally, as mentioned in Section 1, the visibility modeling that was conducted for the first planning period is taken into consideration as an additional factor as the analysis demonstrated the Facility was a BART exempt source.

A review of the four factors for SO_2 and NOx can be found in Sections 5 and 6 of this report, respectively. PM_{10} has not been evaluated in depth as the Apex kiln baghouses meet BACT for rotary lime kilns and no further emission reduction technologies are considered feasible at this time. Section 4 of this report includes information on the Facility's kilns' existing/baseline emissions.

[4] The BART provisions were published as amendments to the EPA's RHR in 40 CFR Part 51, Section 308 on July 5, 2005.

[5] References to BART and BART requirements in this Analysis should not be construed as an indication that BART is applicable to the Lhoist Apex facility.

3. SOURCE DESCRIPTION

The Lhoist's Apex Plant is located in Clark County, approximately 32 kilometers north of North Las Vegas, Nevada. The nearest Class I area to the plant is Grand Canyon National Park. At its closest point, it is approximately 89 kilometers east of the Facility.

The facility operates four horizontal rotary preheater lime kilns. Kilns 1 through 3 are nearly identical in design and operations, although constructed at different times. Kilns 1 and 2 have a nominal production rate of 300 tons per day and Kiln 3 has a nominal production rate of 400 tons per day. Kiln 4 is a newer kiln and has a nominal lime production rate of 1,350 tons per day.

All kilns can utilize natural gas, coal, and petroleum coke as fuels for the lime production process. Typical annual fuel usage rates for all kilns combined are approximately 250,000 million british thermal units (MMBTU) per year of natural gas (at 19,500 Btu/lb), 94,000 tons per year of coal (at 11,500 Btu/lb) and 20,000 tons per year of coke (at 13,800 Btu/lb).

Further details of the fuel throughputs and emission rates are provided in Section 4.

4. EXISTING EMISSIONS

This section summarizes emission rates that are used as baseline rates in the four factor analyses presented in Sections 5, 6, and 7 of this report.

Baseline annual emissions for PM_{10}, NO_X and SO_2 are calculated by taking the average of emissions over the three year baseline period of 2016-2018. These same baseline rates are provided to NDEP for use in the on-the-books/on-the-way basis for modeling because kiln operations are expected to be similar between now and 2028. The baseline annual emission rates are summarized in Table 4-1.

Table 4-1. Annual Baseline Emission Rates

Pollutant	Kilns 1-4, Combined (ton/yr)
NO_X	1,163.51
SO_2	135.31
PM_{10}	59.03

5. SO_2 FOUR FACTOR EVALUATION

The four-factor analysis is satisfied by conducting a stepwise review of emission reduction options in a top-down fashion. The steps are as follows:

Step 1. Identify all available retrofit control technologies
Step 2. Eliminate technically infeasible control technologies
Step 3. Evaluate the control effectiveness of remaining control technologies
Step 4. Evaluate impacts and document the results

Cost (Factor 1) and energy / non-air quality impacts (Factor 3) are key factors determined in Step 4 of the stepwise review. However, timing for compliance (Factor 2) and remaining useful life (Factor 4) are also discussed in Step 4 to fully address all four factors as part of the discussion of impacts. Factor 4 is primarily addressed in in the context of the costing of emission reduction options and whether any capitalization of expenses would be impacted by a limited equipment life.

The baseline SO_2 emission rate that is used in the SO_2 four-factor analysis is summarized in Table 4-1. The basis of the emission rate is provided in Section 4 of this report. As limestone is converted to lime in the calcination process, the kilns have an inherent limestone/lime scrubbing process which reduce SO_2 emissions from the source. This inherent control is commonly determined as BACT for preheater rotary kilns being permitted today.[6]

5.1. STEP 1: IDENTIFICATION OF AVAILABLE RETROFIT SO_2 CONTROL TECHNOLOGIES

Sulfur dioxide, SO_2, is generated during fuel combustion in a lime kiln, as the sulfur in the fuel is oxidized by oxygen in the combustion air. Sulfur in the raw material (limestone) can also contribute to a kiln's SO_2 emissions, though the proportion of sulfur contained in the raw material is much less than that of the fuel.

Step 1 of the top-down control review is to identify available retrofit control options for SO_2. The available SO_2 retrofit control technologies for the Facility's kilns are summarized in Table 5-1. The retrofit controls include both add-on controls that eliminate SO_2 after it is formed and switching to lower sulfur fuels which reduces the amount of sulfur added to the process.

Table 5-1. Available SO_2 Control Technologies for Apex Kilns

SO_2 Control Technologies
Dry Sorbent Injection
Alternative Low Sulfur Fuels
Wet Scrubbing
Semi-Wet/Dry Scrubbing

[6] See Mississippi Lime permit (IL) from December 2010.

An important detail to consider is that SO_2 is inherently scrubbed within a lime kiln system due to the presence of large volumes of alkaline materials in the system, including the final product located within the kiln, limestone in the preheater, and lime kiln dust (LKD) in the baghouse. All kiln exhaust gases pass through each process where SO_2 is removed from the gas stream. A typical preheater kiln system, similar to Kilns 1, 2 and 3, scrubs approximately 90% of SO_2 (originating from both fuel sulfur and raw material sulfur) that would otherwise leave the stack[7]. Process engineering at the Facility identifies that Kiln 4 is able to scrub approximately 99% of SO_2 (originating from both fuel sulfur and raw material sulfur) that would otherwise leave the stack.[8] This reduction efficiency is determined using a balance on the sulfur entering and exiting the kiln, and the value falls within the range provided in the Portland Cement Association's "Formation and Techniques for control of Sulfur Dioxide and Other sulfur Compounds in Portland Cement Kiln Systems."[9] Though kiln technology differs between the cement and lime industry, it is assumed that inherent scrubbing efficiencies are similar. This in-situ scrubbing mechanism is commonly determined as BACT for preheater rotary kilns being permitted today.[10]

5.1.1. Dry Sorbent Injection

Dry sorbent injection operates under a similar principle to inherent dry scrubbing, using the injection of lime particulate into the process stream to initiate the same reaction. Additional dry sorbent injection is not considered further as the reaction is already taking place inherently as part of the lime kiln process.

5.1.2. Alternative Low Sulfur Fuels

Fuels that can be considered for use in the lime kilns must have sufficient heat content, be dependable and readily available locally in significant quantities so as to not disrupt continuous production. Also, they must not adversely affect product quality.

Currently, the Facility's kilns utilize a blend of natural gas, coal, and petroleum coke during normal operations. The allowable blends are dependent both on kiln technology, type of lime being produced, and market availability. One alternative lower-sulfur fuel that can be considered is diesel, as well as operating scenarios using all natural gas and using coal where petroleum coke was previously used. Low sulfur petroleum coke is another example of an alternative lower-sulfur fuel; however, its presence in the market cannot be relied upon and therefore is not considered further.

In the case of diesel, there are no known examples of preheater rotary kilns that fire 100% diesel fuel for lime production. Therefore, the use of diesel fuel is not a commercially established emission reduction method and is not considered an available, feasible option at this time. In the case of using coal where petroleum coke was previously used, each kiln at the Facility has a maximum coal usage rate where, if exceeded, operational issues occur. These operational issues include plugging of the preheater and ash rings

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[7] Consistent with lime kiln BACT determinations in EPA RACT/BACT/LAER Clearinghouse. For example, Chemical Lime Texas facility, ID TX-0726 has a description for SO_2 control of 92% based on dry scrubbing inherent in system. https://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.PollutantInfo&Facility_ID=27871&Process_ID=109937&Pollutant_ID=189&Per_Control_Equipment_Id=156818

[8] Per recent sulfur balance completed for Kiln 4, see Appendix D for more detail.

[9] http://www2.cement.org/pdf_files/sn2460.pdf (PCA R&D Serial No. 2460), Page 39.

[10] See BACT determinations at Chemical Lime, Ltd. in Comal, TX, Mississippi Lime Company in Randolph, IL, the Clifton Lime Plant in Bosque, TX, and Graymont's facility in Bayfield, WI in the RBLC search in Appendix A.

in the kiln. This results in the need to shutdown, clean and restart the kiln, disrupting production and creating additional emissions.[11]

Alternate scenarios that will be considered include all-natural gas and a combination of natural gas and coal where coal has been used to replace the usage of petroleum coke.

5.1.3. Wet Scrubbing

A wet scrubber is a tail pipe technology that may be installed downstream of the kilns. In a typical wet scrubber, the flue gas flows upward through a reactor vessel that has an alkaline reagent flowing down from the top. The scrubber mixes the flue gas and alkaline reagent using a series of spray nozzles to distribute the reagent across the scrubber vessel. The calcium (or other alkaline reagent) in the reagent reacts with the SO_2 in the flue gas to form calcium sulfite and/or calcium sulfate that is removed with the scrubber sludge and is disposed. Most wet scrubber systems used forced oxidation to assure that only calcium sulfate sludge is produced.

5.1.4. Semi-Wet/Dry Scrubbing

Semi-wet/dry scrubbing uses a scrubber tower installed prior to the baghouse. Atomized hydrated lime slurry is sprayed into the exhaust flue gas. The lime absorbs the SO_2 in the exhaust and turns it into a powdered calcium/sulfur compound. The particulate control device removes the solid reaction products from the gas stream.

5.2. STEP 2: ELIMINATE TECHNICALLY INFEASIBLE SO_2 CONTROL TECHNOLOGIES

Step 2 of the top-down control review is to eliminate technically infeasible SO_2 control technologies that were identified in Step 1.

5.2.1. Alternative Low Sulfur Fuels

The use of entirely natural gas and the use of a combination of natural gas and coal where the coal usage has been increased to replace coke usage are both technically feasible and are considered further; however, there are some limitations to this. As an example, The Facility is unable to utilize more than 50% natural gas on a MMBTU basis and any amount of coal in the production of dolomitic lime. Adding fuel in excess of these rates creates both quality and production concerns.

Per EPA's Guidance on Regional Haze State Implementation Plans for the Second Implementation Period dated August 20, 2019, fuel mixes with inherently lower SO_2, NOx, and/or PM emissions may be determined by the state as reasonable to evaluate so long as the fuel-use changes are not considered too fundamental to the operation and design of a source.[12] Fuels that can be considered for use in the lime kilns must have sufficient heat content, be dependable and readily available locally in significant quantities so as to not disrupt continuous production. Also, they must not adversely affect product quality.

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[11] EPA August 20, 2019 "Guidance on Regional Haze State Implementation Plans for the Second Implementation Round", states that "*States may also determine that it is unreasonable to consider some fuel-use changes because they would be too fundamental to the operation and design of a source.*"

[12] https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

Currently, the Facility's kilns utilize a blend of natural gas, coal, and petroleum coke during typical operations. In order to allow for fluctuations in availability of coal and coke and to not adversely affect the production of either dolomitic or HiCal lime, the kilns must have the flexibility to operate within the fuel blend ranges contained in Table 5-2.

Table 5-2. Required Fuel Blend Ranges

Kiln	Fuels	Typical HiCal Fuel Range	Typical Dolo Fuel Range
	Coal	65%-75%	0%
1	Coke	25%-35%	50% - 80%
	Natural Gas	0%	20% - 50%
	Coal	65%-75%	
2	Coke	25%-35%	-
	Natural Gas	0%	
	Coal	65%-75%	0%
3	Coke	25%-35%	50% - 80%
	Natural Gas	0%	20% - 50%
	Coal	70%-85%	
4	Coke	15%-30%	-
	Natural Gas	0%	

The fuel usage during the baseline period of 2016 to 2018 differs slightly from the ranges provided in Table 5-2 due to fuel availability and product demand at the time. Lhoist has little control over the cost and sulfur content of both coal and coke locally available and as such cannot commit to the use of low-sulfur coke[13] or to the replacement of coke with coal. Additionally, in order to burn a higher percentage of natural gas, Kilns 2, and 4 must have upgrades to their current gas trains in order to meet NFPA standards. All kilns would require additional upgrades to their equipment and piping in order to allow for the usage of 100% natural gas.

[13] Low-sulfur coke is currently being provided by one petroleum refinery in California. Communications with this refinery have indicated that the refinery cannot guarantee a stable supply of low-sulfur coke or the coke's sulfur content due to variability in the refinery's feed streams, market demands and conditions, and other factors.

Kilns 1 and 3 are intended to be used for the production of both dolomitic and HiCal lime product. Dolomitic lime cannot be produced using 100% natural gas as this would result in plugging of the kiln as well as quality issues with the product. Kilns 2 and 4 are intended to be used for the production of only HiCal lime product. HiCal lime can be produced using 100% natural gas without significant plugging of the kiln or impacts on product quality; however a 10% reduction in production would be expected.

An analysis of the emissions associated with the "high" and "low" SO_2 emission ranges has been conducted for each possible operating scenario at each kiln. The intent of this analysis was to determine whether there were any operating scenarios which significantly reduce the emissions of SO_2 without increasing the emissions of NOx, which is also considered to be a visibility impairing pollutant. As demonstrated in Table 5-3, there are no potential scenarios within the required operating ranges which reduces SO_2 emissions without a subsequent increase in NOx.

Although there are no scenarios where the reduction of SO_2 does not result in an increase in NOx, the use of all natural gas will be considered as an alternative scenario for Kilns 2 and 4. There are no other feasible alternatives which will reduce the sulfur content of the fuels and are considered to be dependable and readily available locally in significant quantities so as to not disrupt continuous production and that will not adversely affect product quality.

Table 5-3. Summary of Emission Changes Using Alternative Fuels

Kiln	Product	Fuel Blend Generating	Fuel Blend			SO_2 Emissions		NOx Emissions	
			Coal	Coke	Natural Gas	Total (ton/yr)	Reduction (+ve) vs Increase (-ve) (%)	Total (ton/yr)	Reduction (+ve) vs Increase (-ve) (%)
1	**Baseline**	-	**0%**	**60%**	**40%**	**138**	-	**304**	-
	HiCal	Lowest SO_2	75%	25%	-	73	47%	430	-42%
	HiCal	Highest SO_2	65%	35%	-	94	32%	386	-27%
	Dolo	Lowest SO_2	0%	50%	50%	115	17%	354	-17%
	Dolo	Highest SO_2	0%	80%	20%	184	-33%	201	34%
2	**Baseline**	-	**98%**	**0%**	**2%**	**3**	-	**19**	-
	HiCal	Lowest SO_2	75%	25%	-	12	-258%	17	13%
	HiCal	Highest SO_2	65%	35%	-	16	-360%	16	18%
	HiCal	NG Only	-	-	100%	0	100%	22	-13%
3	**Baseline**	-	**95%**	**4%**	**1%**	**17**	-	**154**	-
	HiCal	Lowest SO_2	75%	25%	-	44	-159%	128	17%
	HiCal	Highest SO_2	65%	35%	-	57	-234%	115	25%
	Dolo	Lowest SO_2	0%	50%	50%	69	-308%	107	31%
	Dolo	Highest SO_2	0%	80%	20%	111	-552%	64	58%
4	**Baseline**	-	**89%**	**10%**	**0%**	**14**	-	**687**	-
	HiCal	Lowest SO_2	85%	15%	-	18	-24%	655	5%
	HiCal	Highest SO_2	70%	30%	-	28	-99%	558	19%
	HiCal	NG Only			100%	0	100%	849	-24%

* Various fuel blends were evaluated. The fuel blends are those that generate the lowest SO_2 emissions, the highest SO_2 emissions, as well as the combustion of natural gas only as a fuel. For each blend, the corresponding SO_2 and NOx emissions are presented as well as the change relative to the baseline emissions of these pollutants.

5.2.2. Semi-Wet/Dry Scrubbing

A semi-dry scrubbing system consists of a scrubber tower followed by a particulate matter control device. Flue gas enters the scrubber tower and is sprayed with an atomized hydrated lime slurry. The lime absorbs the SO_2 in the exhaust and turns the SO_2 into solid calcium/sulfur compounds. The particulate matter control device removes the solids from the exhaust stream.

Water is required to make the hydrated lime slurry needed for semi-dry scrubbing. Lhoist previously contacted a supplier of SO_2 scrubbing systems to understand the water requirements associated with a semi-dry system capable of achieving a 90% reduction in SO_2 emissions at another Lhoist facility with similar kilns to those operated at the Facility. The supplier estimated that an average of 58 gpm of water per kiln for a total of 232 gpm. Further details on this supplier estimate are provided in Appendix D.

The Facility is permitted to use approximately 81,580,000 gallons of water per year in total under State of Nevada Division of Water Resources permit 63261 and 64880, or approximately 155 gpm. Historically, the Apex plant has used at minimum 50% of their water allotment for current operation, often using up to 100% of the allotment. Documentation of the historical water usage at the Apex plant is provided in Appendix D. This usage would leave at most 78 gpm to be used for semi-dry scrubbing operations. Additionally, the Apex water basin is overpermitted for the recharge rate and the state has stopped issuing water permits within the basin. Based on the water demands that Lhoist has been provided for a semi-dry scrubbing (232 gpm), Lhoist concludes that the water demand for this type of system is not feasible to achieve.

Since the water necessary for a semi-dry scrubbing system at the Apex Plant is currently unavailable and ability to reasonably access additional water is not available, this technology will not be considered further in this review for SO_2.

5.2.3. Wet Scrubbing

In a typical wet scrubber, the flue gas flows upward through a reactor vessel that has an alkaline reagent flowing down from the top. The scrubber mixes the flue gas and alkaline reagent using a series of spray nozzles to distribute the reagent across the scrubber vessel. The calcium (typically) in the reagent reacts with the SO_2 in the flue gas to form calcium sulfite and/or calcium sulfate that is removed with the scrubber sludge and is disposed. Most wet scrubber systems use forced oxidation to assure that only calcium sulfate sludge is produced.

Lhoist does not have specific information on the water requirements for wet scrubbers for the kilns but such scrubbers require more water than semi-dry scrubbing systems. Since there is not enough water available for semi-dry scrubbing systems for the kilns, there is also not enough water available for wet scrubbing. Since sufficient water is not available for a wet scrubbing system, wet scrubbing technology will not be considered further.

5.3. STEP 3: RANK OF TECHNICALLY FEASIBLE SO_2 CONTROL OPTIONS BY EFFECTIVENESS

Step 3 of the top-down control review is to rank the technically feasible options by effectiveness. Table 5-4 presents potential SO_2 control technologies for the kilns and their associated control efficiencies. Each kiln fires a unique combination of natural gas, coal, and petroleum coke. As a result, the control efficiency of each alternative fuel scenario varies by kiln.

Table 5-4. Ranking of SO_2 Control Technologies by Effectiveness

Pollutant	Control Technology	Potential Control Efficiency[a] (%)
Kiln 2	Alternative Low Sulfur Fuel – All Natural Gas	99.92
Kiln 4	Alternative Low Sulfur Fuel – All Natural Gas	99.62

[a] The alternative fuel scenario reduction efficiency is calculated using a material balance on the fuel sulfur. Fuel sulfur emissions reductions are assumed to be independent of feed sulfur emissions.

The alternative fuel scenarios have a calculated control efficiency that takes into account two key assumptions:

- Changing the primary fuel will fully reduce sulfur of each fuel type equally, affecting only the emissions directly resulting from sulfur contained in the fuel. SO_2 emitted from sulfur contained in the raw material that is processed in the kilns is assumed unaffected.
- The control efficiencies assume the same level of in-situ scrubbing reduction takes place under all fuel scenarios. These alternative fuel efficiency values are the incremental control efficiencies that take place as a result of the fuel switching beyond the inherent control.

Given the complexity of the inherent scrubbing's impact on SO_2 resulting from fuel sulfur vs. raw material sulfur, assuming the fuel switching fully reduces sulfur by the difference in sulfur levels between the fuel types is particularly conservative. Inherent SO_2 reduction (on a percent basis) would likely be reduced when the SO_2 concentration in the exhaust stream is also reduced.

5.4. STEP 4: EVALUATION OF IMPACTS FOR FEASIBLE SO_2 CONTROLS

Step 4 of the top-down control review is the impact analysis. The impact analysis considers the:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

5.4.1. Cost of Compliance

The alternative fuel scenario calculations are determined using the fuel costs associated with plant operations during baseline emission years and the expected costs of upgrading the gas trains and equipment needed to burn 100% natural gas.

5.4.1.1. Control Costs

The cost of the fuel switching used in the cost effectiveness calculations is determined by calculating the current annual cost of using a natural gas, coal and coke blend and determining the increased cost of switching to replacing coke with coal and natural gas. Details are provided in Appendix B.

Switching fuel will require changes to the burners and the fuel storage, processing, and delivery system. These factors are significant and have been included in this evaluation. The control cost for each option is summarized in Table 5-5.

5.4.1.2. *Annual Tons Reduced*

Though switching to lower sulfur fuels has the potential to reduce the SO_2 emissions associated with the kilns, it also has the potential to increase other visibility impairing pollutant emissions. The direct and precursor pollutants that can impair visibility include SO_2, NOx, and PM.[14] The annual tons reduced that are used in the cost effectiveness calculations are determined by subtracting the estimated reduction in annual emission rates for all visibility impairing pollutants from the baseline annual emission rates. The baseline annual emissions are calculated using the baseline fuel usage calculated as an average of the fuel usage at each kiln during the years 2016 to 2018.

The SO_2 emissions are calculated using a fuel sulfur balance. This methodology differs slightly from what is reported in the historic emissions inventories which are used for the overall baseline determination; however the methodology does not differ so significantly that these emissions should not be considered representative. For alternative fuel scenarios, the controlled annual emission rates are estimated by conducting a mass balance on the sulfur in the various fuels relative to the current baseline. The coal and coke sulfur content is obtained from recent analyses (0.42% and 5.51%, respectively). For natural gas, it is assumed that supplies would contain less than 0.2 grains sulfur per 100 standard cubic feet.

The NOx emissions are calculated using fuel-specific emission factors and are scaled up to reflect the actual baseline emissions as reported in the emissions inventories from 2016 to 2018.[15]

An estimate of the amount of SO_2 that may be reduced annually for each of the proposed options is summarized in Table 5-5 and detailed calculations are provided in Appendix B.

5.4.1.3. *Cost Effectiveness*

The cost effectiveness is determined by dividing the annual control cost by the annual tons reduced. Table 5-5 summarizes the results.

[14] https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_ _regional_haze_guidance_final_guidance.pdf

[15] Total baseline NOx emissions are calculated as the average of the NOx emissions reported in Lhoist's emissions inventories for years 2016 to 2018. The emissions inventory uses an overall lb/ton limit emission factor which is not fuel dependent. For this analysis, fuel-specific NOx emission factors have been used to determine the NOx contribution to the baseline from each fuel. The fuel-based emissions calculated are then scaled up by the ratio of the total NOx emissions calculated on a fuels basis for the baseline period to the total NOx emissions calculated from the emissions inventories.

Table 5-5. Cost of Compliance Based on Visibility Impairing Pollutant Emissions Reduction

Unit	Control Cost ($/yr)[1]	Baseline Visibility Impairing Emission Level (tons)	Emission Change (tons) Reduction (+ve) vs Increase (-ve)	Cost Effectiveness ($/ton removed)[1]
Kiln 2	$8,708,565	23.66	1.02	$8,666,204
Kiln 4	$1,589,821	724.46	-147.92	-
Kilns 2 and 4 Combined	$10,298,386	748.13	-146.90	-

[1] Control costs were determined using information available on fuel train upgrade costs from Apex Kilns 1 and 3 and fuel prices and annual consumption for Kilns 2 and 4 from Apex's 2020 fuel budget. See Appendix B for detailed calculations.

[2] Note that no cost effectiveness evaluation is completed for Kilns 4 and "Kilns 2 and 4 Combined" because the switch to natural gas increases the emissions of the visibility impairing pollutants relative to the baseline.

5.4.2. Timing for Compliance

Lhoist believes that reasonable progress compliant controls are already in place as is apparent by the existing Title V Permit solid fuel sulfur input limits for Kilns 1, 2, and 3. There are no technically feasible reduction options available for SO_2. However, if NDEP determines that one of the SO_2 control options analyzed in this report is necessary to achieve reasonable progress, it is anticipated that the use of alternative fuels can be implemented during the period of the second long-term planning period for regional haze (approximately ten years following EPA's reasonable progress determination).

5.4.3. Energy Impacts

The cost of energy required to operate the control devices has been included in the cost analyses found in Appendix B. To operate any of the add-on control devices, there would be decreased overall plant efficiency due to the operation of these add-on controls. At a minimum, this would require increased electrical usage by the plant with an associated increase in indirect (secondary) emissions from nearby power stations.

5.4.4. Environmental Impacts

Most of the alternative SO_2 control options that have been discussed in this analysis also have additional non-air quality impacts associated with them. Specifically, while the replacement of coke with other fuels reduces SO_2 emissions, coal and natural gas have higher NOx emission factors compared to coke, which means that replacement of coke with coal and natural gas would increase NOx emissions from the kilns, as summarized in Table 5-3. NOx itself is a precursor pollutant affecting visibility, as such the reduction of SO_2 with an associated increase in NOx implies that there is no optimal configuration for the reduction of visibility impairing compounds, and the most favorable configuration is the one that represents maximum production efficiency for the facility. This has been accounted for in the cost evaluation in Table 5-5.

5.4.5. Remaining Useful Life

The remaining useful life of the kilns does not impact the annualized cost for the various fuel scenarios that are evaluated.

5.5. SO_2 Conclusion

The lime production process inherently removes the majority of SO_2 that is created from the process. This inherent control measure was BACT for Kiln 4 when it was originally constructed[16] and is still commonly BACT for rotary kilns recently permitted under the PSD program.

In this analysis, no available reduction options for SO_2 emissions are identified that are cost effective and technically feasible for the Facility.

[16] Authority to Construct issued October 27, 1995.

The four-factor analysis is satisfied by conducting a stepwise review of emission reduction options in a top-down fashion. The steps are as follows:

Step 1. Identify all available retrofit control technologies
Step 2. Eliminate technically infeasible control technologies
Step 3. Evaluate the control effectiveness of remaining control technologies
Step 4. Evaluate impacts and document the results

Cost (Factor 1) and energy / non-air quality impacts (Factor 3) are key factors determined in Step 4 of the stepwise review. However, timing for compliance (Factor 2) and remaining useful life (Factor 4) are also discussed in Step 4 to fully address all four factors as part of the discussion of impacts. Factor 4 is primarily addressed in in the context of the costing of emission reduction options and whether any capitalization of expenses would be impacted by a limited equipment life.

The baseline NO_X emission rates that are used in the NO_X four-factor analysis are summarized in Table 4-1. The basis of the emission rates is provided in Section 4 of this report. Kiln 3 currently utilizes a low NO_X burner (LNB), as described in Section 6.1.1.2, below.

6.1. STEP 1: IDENTIFICATION OF AVAILABLE RETROFIT NO_X CONTROL TECHNOLOGIES

NO_X is produced during fuel combustion when nitrogen contained in the fuel and combustion air is exposed to high temperatures. The origin of the nitrogen (i.e. fuel vs. combustion air) has led to the use of the terms "thermal" NO_X and "fuel" NO_X when describing NO_X emissions from the combustion of fuel. Thermal NO_X emissions are produced when elemental nitrogen in the combustion air is oxidized in a high temperature zone. Fuel NO_X emissions are created during the rapid oxidation of nitrogen compounds contained in the fuel.

Most of the NO_X formed within a rotary lime kiln is classified as thermal NO_X. Virtually all the thermal NO_X is formed in the region of the flame at the highest temperatures, approximately 3,000 to 3,600 degrees Fahrenheit. A small portion of NO_X is formed from nitrogen in the fuel that is liberated and reacts with the oxygen in the combustion air.

Step 1 of the top-down control review is to identify available retrofit control options for NO_X. The available NO_X retrofit control technologies for the Facility's kilns are summarized in Table 6-1.

Table 6-1. Available NO_x Control Technologies for Apex Kilns

NO_x Control Technologies	
Combustion Controls	Reduce Peak Flame Zone Temperature Low NO_x Burners (LNB) Proper Kiln Operation Preheater Kiln Design
Post-Combustion Controls	Selective Catalytic Reduction (SCR) Selective Non-Catalytic Reduction (SNCR)

NO_X emissions controls, as listed in Table 6-1, can be categorized as combustion or post-combustion controls. Combustion controls reduce the peak flame temperature and excess air in the kiln burner, which minimizes NO_X formation. Post-combustion controls, such as selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR) convert NO_X in the flue gas to molecular nitrogen and water.

6.1.1. Combustion Controls

6.1.1.1. Reduce Peak Flame Zone Temperature

These are methods of reducing the temperature of combustion products in order to inhibit the formation of thermal NO_X. They include (1) using fuel rich mixtures to limit the amount of oxygen available; (2) using fuel lean mixtures to limit amount of energy input; (3) injecting cooled, oxygen depleted flue gas into the combustion air; and (4) injecting water or steam.

6.1.1.2. Low NO_X Burners

LNBs reduce the amount of NO_X initially formed in the flame. The principle of all LNBs is the same: stepwise or staged combustion and localized exhaust gas recirculation (i.e., at the flame). LNBs are designed to reduce flame turbulence, delay fuel/air mixing, and establish fuel-rich zones for initial combustion. The longer, less intense flames reduce thermal NO_X formation by lowering flame temperatures. Control of air turbulence and speed is often controlled via mixing air fans. Some of the burner designs produce a low-pressure zone at the burner center by injecting fuel at high velocities along the burner edges. Such a low-pressure zone tends to recirculate hot combustion gas which is retrieved through an internal reverse flow zone around the extension of the burner centerline. The recirculated combustion gas is deficient in oxygen, thus producing the effect of flue gas recirculation. Reducing the oxygen content of the primary air creates a fuel-rich combustion zone that then generates a reducing atmosphere for combustion. Due to fuel-rich conditions and lack of available oxygen, formation of thermal NO_X and fuel NO_X are minimized[17].

6.1.1.3. Preheater Kiln Design/ Proper Combustion Practices

The use of staged combustion and preheating alone can lead to effective reduction of NO_X emissions. By allowing for initial combustion in a fuel-rich, oxygen-depleted zone, necessary temperatures can be achieved without concern for the oxidation of nitrogen. This initial combustion is then followed by a secondary combustion zone that burns at a lower temperature, allowing for the addition of additional combustion air without significant formation of NO_X.[18]

6.1.2. Post Combustion Controls

6.1.2.1. Selective Catalytic Reduction

Selective catalytic reduction (SCR) is an exhaust gas treatment process in which ammonia (NH_3) is injected into the exhaust gas upstream of a catalyst bed. On the catalyst surface, NH_3 and nitric oxide (NO) or nitrogen dioxide (NO_2) react to form diatomic nitrogen and water. The overall chemical reactions can be expressed as follows:

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[17] USEPA, Office of Air Quality Planning and Standards. Alternative Control Technologies Document – NOx Emissions from Cement Manufacturing. EPA-453/R-94-004, Page 5-5 to 5-8.

[18] Ibid, Page 58.

$$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$$

$$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$$

When operated within the optimum temperature range of 480°F to 800°F, the reaction can result in removal efficiencies between 70 and 90 percent.[19] The rate of NO_X removal increases with temperature up to a maximum removal rate at a temperature between 700°F and 750°F. As the temperature increases above the optimum temperature, the NO_X removal efficiency begins to decrease. As of this report, there are no known instances of SCRs installed on lime kilns.

6.1.2.2. Selective Non-Catalytic Reduction

In SNCR systems, a reagent is injected into the flue gas within an appropriate temperature window. The NO_X and reagent (ammonia or urea) react to form nitrogen and water. A typical SNCR system consists of reagent storage, multi-level reagent-injection equipment, and associated control instrumentation. The SNCR reagent storage and handling systems are similar to those for SCR systems. However, both ammonia and urea SNCR processes require three to four times as much reagent as SCR systems to achieve similar NO_X reductions.

Like SCR, SNCR uses ammonia or a solution of urea to reduce NO_X through a similar chemical reaction.

$$2NO + 4NH_3 + 2O_2 \rightarrow 3N_2 + 6H_2O$$

SNCR residence time can vary between 0.001 seconds and 10 seconds.[20] However, increasing the residence time available for mass transfer and chemical reactions at the proper temperature generally increases the NO_X removal. There is a slight gain in performance for residence times greater than 0.5 seconds. The EPA Control Cost Manual indicates that SNCR requires a higher temperature range than SCR of between approximately 1,650°F and 2,100°F (urea solution),[21] due to the lack of a catalyst to lower the activation energies of the reactions; however, the control efficiencies achieved by SNCR vary across that range of temperatures. That said, the effectiveness of SNCR on lime kilns is largely unproven. Lime kilns present unique technical challenges not experienced by cement kilns. While mid-kiln injection is often the most effective method of implementing SNCR on cement kilns, injection at that location is not feasible for a lime kiln. Lime kilns experience lower NO_X concentrations at a given point in the kiln, have shorter residence times, and face issues in the stability of temperature profiles when compared to cement kilns. At higher temperatures, NO_X reduction is less effective.[22] In addition, a greater residence time is required when operating at lower temperatures.

Lhoist has installed an SNCR control system at its Nelson facility in Peach Springs, AZ and O'Neal facility in Calera, AL. Both installations have demonstrated that SNCR is a successful control option for NOx emissions from preheater lime kilns. With that in mind, there are substantial differences between the

[19] Air Pollution Control Cost Manual, Section 4, Chapter 2, Selective Catalytic Reduction, NOx Controls, EPA/452/B-02-001, Page 2-9 and 2-10.

[20] Air Pollution Control Cost Manual, Section 4, Chapter 1, Selective Non-Catalytic Reduction, NOx Controls, EPA/452/B-02-001, Page 1-8

[21] Ibid, Page 1-6

[22] USEPA, Office of Air Quality Planning and Standards. Alternative Control Technologies Document – NO_X Emissions from Cement Manufacturing. EPA-453/R-94-004, Section 5.2.2, Page 5-21.

kilns at the Nelson and O'Neal facilities as compared to Kilns 1, 2, and 3 at Apex. The primary differences include kiln production/fuel rate, combustion gas residence time in the transfer chute (the ideal location for reagent injection), and area available for injection of reagent. These differences are described in more detail in Table 6-2. Given the variability in kiln operation and design, the control efficiency demonstrated by SNCR at the other Lhoist facilities cannot be guaranteed at the Apex kilns.

Table 6-2. Comparison of Nelson, O'Neal and Apex Kilns

	O'Neal		Nelson		Apex			
	Kiln 1	Kiln 2	Kiln 1	Kiln 2	Kiln 1	Kiln 2	Kiln 3	Kiln 4
Stack Test Data								
Stack Temp (F)	429	363	406	437	327	338	344	392
O2 Content at Stack (%)	8.7	10.8	10.8	9.9	13.6	12.0	11.5	8.0
Stack Flow Rate (dscfm)	88,018	89,060	85,970	98,055	44,580	48,032	43,635	119,067
Kiln Data								
Transfer Chute Temp (F)	2,039	1,854	2,054	2,091	1,823	1,834	1,839	2,047
Preheater Temp (F)	-	-	1,910	2,032	1,724	1,775	1,832	2,067
O2 Content at Transfer Chute (%)	1.0	1.0	0.9	0.6	2.9	2.5	2.7	2.3
Kiln Design Data								
Transfer Chute Height (ft)	9.82	9.85	5.9	9.9	4.60	4.60	10	10
Transfer Chute Width (ft)	10.5	10.5	10.4	13.8	8.5	8.5	5	9
Transfer Chute Length (ft)	10.5	9	10.4	13.8	4	4	5	9
Approx Volume of Transfer Chute (ft3)	1,083	931	639	1,874	290	290	250	783
No. SNCR Lances	2	2	4	4	-	-	-	-
Kiln Firing Rate (MMBtu/hr)	281	281	275.6	412.7	81.25	81.25	91.1	281.25
Permitted Production Rate (tpd)	1,500	1,500	800	1,000	300	300	400	1,300
Calculated Data								
Inleakage from kiln exit to stack (%)	63%	96%	97%	84%	145%	106%	93%	44%
Kiln Exit/Transfer Chute Flow (dscfm)	54,131	45,421	43,648	53,249	18,196	23,304	22,615	82,710
Kiln Exit/Transfer Chute Flow (acfm)	260,141	202,122	211,023	261,228	79,887	102,806	99,984	398,758
Transfer Chute Cross Sectional Area (ft2)	110.25	94.5	108.7849	189.3376	34	34	25	81
Gas Velocity in Transfer Chute (ft/m)	2,360	2,139	1,940	1,380	2,350	3,024	3,999	4,923
Residence Time in Transfer Chute (s)	0.25	0.28	0.18	0.43	0.12	0.09	0.15	0.12

6.2. STEP 2: ELIMINATE TECHNICALLY INFEASIBLE NO_X CONTROL TECHNOLOGIES

Step 2 of the top-down control review is to eliminate technically infeasible NO_X control technologies that were identified in Step 1.

6.2.1. Combustion Controls

6.2.1.1. Reduce Peak Flame Zone Temperature

In a lime kiln, product quality is co-dependent on temperature and atmospheric conditions within the system. Although low temperatures inhibit NO_X formation, they also inhibit the calcination of limestone. For this reason, methods to reduce the peak flame zone temperature in a lime kiln burner are technically infeasible.

6.2.1.2. Low NO_X Burners

Kiln 3 currently operates a KFS burner which is classified as low NOx, while Kilns 1, 2, and 4 do not operate LNBs. Vendor documentation of KFS burners operating as LNBs is included in Appendix D. LNBs are considered a technically feasible control technology and have been evaluated further for cost effectiveness. (Please note the use of LNB's does add some operational risk, including high kiln shell temperatures, premature refractory failures, and adverse flame shapes which has the potential to affect the kiln production rate and/or increase the rate of routine maintenance). The expected NOx removal efficiency of implementing LNBs on Kilns 1, 2, and 4 is approximately 10% based on performance achieved at Lhoist's Nelson facility. Vendor guarantee of the reduction efficiency of KFS burners at the Nelson Facility has been provided in Appendix D.

The LNB for Kiln 3 was installed during 2019. As such, the emissions from Kiln 3 were reduced by 10% as well in the LNB analysis for all four kilns. Therefore, baseline emissions for Kiln 3 are not reflective of the operation of these low NO_X burners.

6.2.1.3. Preheater Kiln Design/Proper Combustion Practices

Proper combustion practices and preheater kiln design are considered technically feasible for the Facility. These practices are already being applied at the Facility and considered part of the baseline.

6.2.2. Post Combustion Controls

6.2.2.1. Selective Catalytic Reduction

Efficient operation of the SCR process requires constant exhaust temperatures (usually ± 200°F).[23] Fluctuation in exhaust gas temperatures reduces removal efficiency. If the temperature is too low, ammonia slip occurs. Ammonia slip is caused by low reaction rates and results in both higher NO_X emissions and appreciable ammonia emissions. If the temperature is too high, oxidation of the NH_3 to NO can occur. Also, at higher removal efficiencies (beyond 80 percent), an excess of NH_3 is necessary, thereby resulting in some ammonia slip. Other emissions possibly affected by SCR include increased PM emissions (as ammonia salts result from the reduction of NO_X and are emitted in a detached plume) and increased SO_3 emissions (from oxidation of SO_2 on the catalyst).

To reduce fouling the catalyst bed with the PM in the exhaust stream, an SCR unit can be located downstream of the particulate matter control device (PMCD). However, due to the low exhaust gas temperature exiting the PMCD (approximately 350°F), a heat exchanger system would be required to reheat the exhaust stream to the desired reaction temperature range of between 480°F to 800°F. The source of heat for the heat exchanger would be the combustion of fuel, with combustion products that would enter the process gas stream and generate additional NO_X. Therefore, in addition to storage and handling equipment for the ammonia, the required equipment for the SCR system will include a catalytic reactor, heat exchanger and potentially additional NO_X control equipment for the emissions associated with the heat exchanger fuel combustion.

High dust and semi-dust SCR technologies are still highly experimental. A high dust SCR would be installed prior to the dust collectors, where the kiln exhaust temperature is closer to the optimal operating range for an SCR. It requires a larger volume of catalyst than a tail pipe unit, and a mechanism for periodic cleaning of catalyst. A high dust SCR also uses more energy than a tail pipe system due to catalyst cleaning and pressure losses.

A semi-dust system is similar to a high dust system. However, the SCR is placed downstream of an ESP or cyclone.

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[23] Ibid, Page 2-11

The main concern with high dust or semi-dust SCR is the potential for dust buildup on the catalyst, which can be influenced by site specific raw material characteristics present in the facility's quarry, such as trace contaminants that may produce a stickier particulate than is experienced at sites where the technology is being demonstrated. This buildup could reduce the effectiveness of the SCR technology, and make cleaning of the catalyst difficult, resulting in kiln downtime and significant costs.[24]

No lime kiln in the United States is using any of these SCR technologies. For the technical issues noted above, tail pipe, high dust and semi-dust SCR's are considered technically infeasible at this time.

6.2.2.2. Selective Non-Catalytic Reduction

At temperatures above 2,100°F, NO_X generation starts to occur as shown in the reaction below:

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$

This reaction causes ammonia to oxidize and form NO instead of removing NO. When temperatures exceed 2,200°F, NO formation dominates. This would likely be the case if ammonia were directly injected into the kiln. At temperatures below the required range, appreciable quantities of un-reacted ammonia will be released to the atmosphere via ammonia slip.

Based on the temperature profile, there are three locations in a rotary preheater lime kiln system where the ammonia /urea injection could theoretically occur: the stone/preheater chamber, the transfer chute, or after the PMCD. A fourth location that will be considered in this analysis is the kiln itself. For SNCR to be technically feasible, at least one of these locations must meet the following criteria: placement of injector to ensure adequate mixing of the ammonia or urea with the combustion gases, residence time of the ammonia with the combustion gases, and temperature profile for ammonia injection.

Figure 6-1 provides a schematic of a preheater/kiln system including typical process temperatures in the system.

[24] Preamble to NSPS subpart F, 75 FR 54970.

Figure 6-1. Preheater – Cross Section

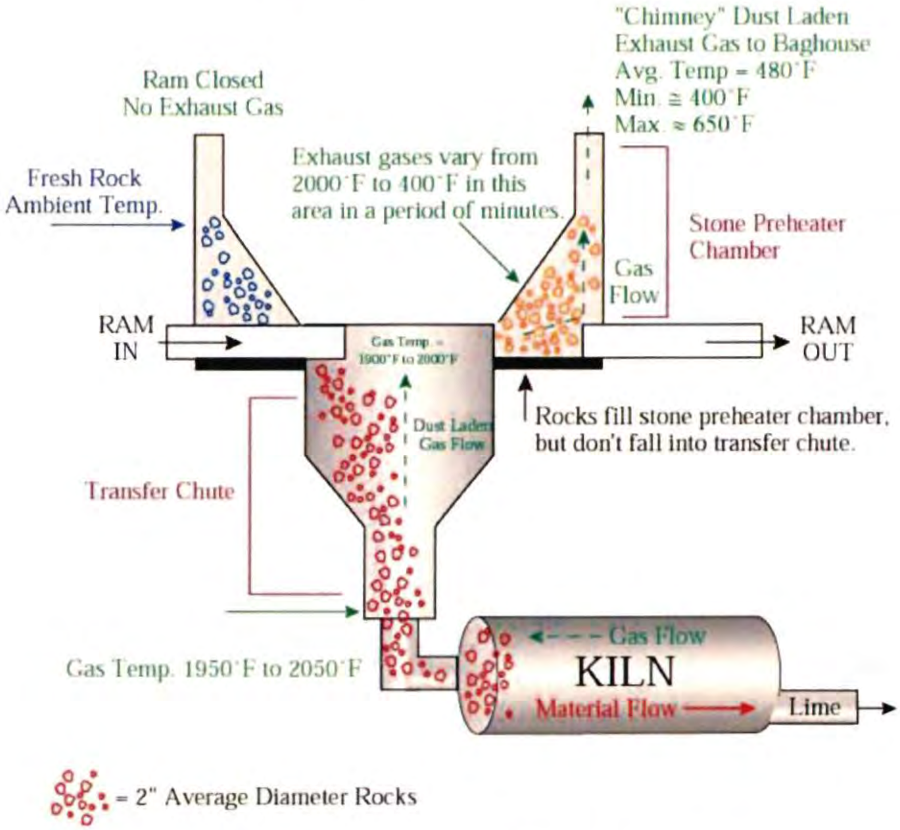

*Figure represents a typical lime kiln preheater, and is not specific to the kilns at the Facility

An SNCR trial has been conducted at a different Lhoist facility in order to determine the best location and nozzle configuration for reagent injection and to determine whether SNCR can be considered an economically viable alternative for NOx reduction. During this trial, data was collected by the plant CEMS and ammonia slip was monitored. The results of this trial concluded that SNCR should be considered technically feasible as a reduction option for preheater lime kilns. In this case, the preheater cone with four nozzles represented the best configuration with approximately 50% reduction shown.

While the findings of this trial are certainly promising, this one example of SNCR installation on a preheater rotary lime kiln does not necessarily transfer to other lime kilns. Effectiveness of SNCR is highly source-dependent, with a variety of factors having the potential to heavily influence the quantities of NO_X controlled. Specifically, the following design parameters on Apex Kilns 1, 2, and 3 may reduce the SNCR removal efficiency, as compared to the kilns at Nelson and O'Neal (see Table 6-2):

- **Residence Time**: While the residence time for Kilns 1, 2, and 3 falls within the timeframe required for the SNCR reaction to take place, the calculated residence time for the Apex kilns is less than that observed at the reference kilns. As noted previously, SNCR performance is expected to increase with residence time in the range from 0 to 0.5 seconds.
- **Area for Injection**: In comparison to Apex Kilns 1, 2, and 3, the reference kilns are much larger in size in terms of daily production rate and size of the transfer chute where the reaction is expected to take place. The O'Neal and Nelson kilns utilize a series of 2 and 4 lances, respectively to achieve the required reagent distribution and NOx reduction. See Appendix E for

a process flow diagram of the SNCR configuration at Nelson. Given Apex Kilns 1, 2, and 3 operate at less than 50% of the flow rate and have approximately 1/3 of the area for injection, it is unknown if multiple lances can be arranged in the space allowed to achieve similar removal efficiencies. Additionally, LNA is not aware of any SNCR installations on lime kilns with a production capacity less than 800 tons per day. Kilns 1, 2, and 3 each are permitted at less than 50% of this known production rate. Given the high rate of urea injection that will likely be required to accommodate a high removal efficiency and the small area for injection available, there is significant concern of over-injection of urea, resulting in high levels of ammonia slip at Kilns 1, 2, and 3.

Due to the differences in kiln technology between the reference facilities, it is unclear whether the Apex kilns will meet those required for successful SNCR implementation. Given the significant range (35-58%) of control efficiencies found for cement kilns, a control efficiency considerably lower than the average for cement of 40% is expected given ideal temperature scenarios (many kilns in the cement industry that utilize SNCR do so in the combustion zone in the calciner, where temperatures are lower than in the kiln). Lime kilns experience significant technical barriers to successful SNCR implementation not shared by the cement industry. When compared to the cement process, lower NO_X concentrations, shorter residence times, and temperatures more frequently outside the optimal range for SNCR application yield lower control efficiencies for lime kilns. Therefore, a control efficiency of no more than 20% at Kiln 1, 2, and 3, and no more than 50% at Kiln 4, can be guaranteed at the Facility's kilns without testing. Trying to achieve a 50% removal efficiency on Kilns 1, 2, and 3 is more likely to result in ammonia slip which can cause its own health and visibility problems as described in the EPA Cost Control Manual (Figure 6-2).[25]

Figure 6-2. Potential Ammonia Slip at Various NO_X Reduction Efficiencies

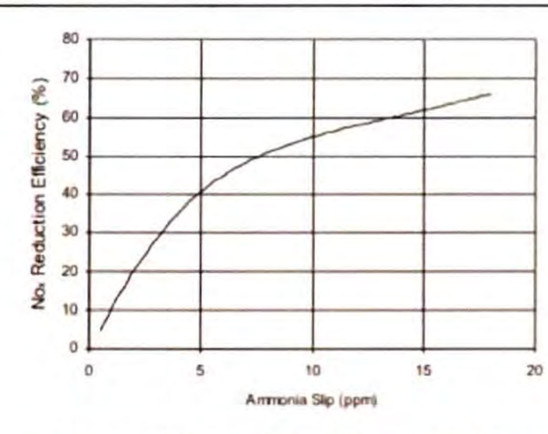

Figure 1.7: NO_x Reduction for Various Ammonia Slip Levels

Though there are potential challenges in implementing this technology, SCNR is considered as a technically feasible option and cost calculations for the implementation of SNCR are included.

[25] Air Pollution Control Cost Manual, Section 4, Chapter 1, Selective Non-Catalytic Reduction, NOx Controls, EPA/452/B-02-001, Page 1-12

6.3. STEP 3: RANK OF TECHNICALLY FEASIBLE NOX CONTROL OPTIONS BY EFFECTIVENESS

Step 3 of the top-down control review is to rank the technically feasible options to effectiveness. Table 6-3 presents potential NOx control technologies for the kilns and their associated control efficiencies.

Table 6-3. Ranking of NO_X Control Technologies by Effectiveness

Pollutant	Control Technology	Potential Control Efficiency (%)
NO_x	SNCR	20-50*
	Low NO_x Burner	10**

* 20% - 50% control efficiency is used for cost evaluation based on evaluation of feasibility of SNCR at a similar facility.

** 10% control efficiency is used for cost evaluation based on evaluation of LNBs at a similar facility.

6.4. STEP 4: EVALUATION OF IMPACTS FOR FEASIBLE NO_X CONTROLS

Step 4 of the top-down control review is the impact analysis. The impact analysis considers the:

- Cost of compliance
- Energy impacts
- Non-air quality impacts; and
- The remaining useful life of the source

6.4.1. Low NOx Burners

6.4.1.1. Cost of Compliance

The capital costs of installing Low NOx Burners on Kilns 1, 2, and 4 were evaluated using the cost of installation at a similar Lhoist facility. The capital cost of installation was annualized assuming a 20-year life span for depreciation, as well as an interest rate of 3.25%. No additional operational costs associated with Low-NOx burners were identified. The LNB for Kiln 3 was installed during 2019 and therefore the 10% reduction has not been accounted for in the baseline emissions. As a result, the NO_x reductions from Kiln 3's burner are included in the combined cost effectiveness determination. The total costs and cost effectiveness of control are summarized for all kilns in Table 6-4 below. Detailed calculations are provided in Appendix C.

Table 6-4. LNB Cost Calculation Summary

Unit	Total Capital Investment	Total Annual Cost	NOx Emissions Removed (tpy)	Cost Effectiveness ($/ton removed)
Kiln 1	$375,000	$25,792	30.35	$850

Kiln 2	$375,000	$25,792	1.91	$13,494
Kiln 3	--	--	-	--
Kiln 4	$450,000	$30,950	68.67	$451
Kiln 1-4 Combined	$1,200,000	$82,535	116.35	$709

6.4.1.1. Timing for Compliance

It is anticipated that this change could be implemented during the second planning period of regional haze, approximately ten years following EPA's reasonable progress determination. Lhoist would undergo a demonstration period to confirm the control efficiency estimates from this analysis.

6.4.1.2. Energy Impacts and Non-Air Quality Impacts

As previously stated, there are no additional operation costs associated with the installation of LNBs, other than the potential for high shell temperatures, premature refractory wear, etc. (these potential costs have not been included as it is unknown if these issues will arise). Additionally, there are no adverse environmental impacts associated with this technology that has been identified for the purposes of this evaluation.

6.4.1.3. Remaining Useful Life

Lhoist has assumed this control equipment will last for the entirety of the 20-year amortization period, which is reflected in the cost calculations.

6.4.2. SNCR

6.4.2.1. Cost of Compliance

In order to assess the cost of compliance for the installation of SNCR, installation and annual operation costs from Lhoist's Nelson facility were used and scaled up to represent 2019 costs. Capital costs for the installation of the SNCR assumed a 20-year life span for depreciation, as well as an interest rate of 3.25%. The total capital investment includes the capital cost for the SNCR itself and the dry urea system. Annual costs consist of operational costs estimated from a similar Lhoist facility which includes urea costs, power costs, operating labor costs, maintenance material costs, and the annualized capital costs as a capital recovery value. The amount of NOx emissions removed and the cost effectiveness value were determined using the same baseline emission rate as the LNB analysis. The total costs and cost effectiveness of control are summarized for Kilns 1-4 in Table 6-5., below. Detailed calculations are provided in Appendix C.

Table 6-5. SNCR Cost Calculation Summary

Unit	Total Capital Investment	Total Annual Cost	NOx Emissions Removed (tpy)	Cost Effectiveness ($/ton removed)
Kiln 1	$591,441	$164,394	60.70	$2,708

Kiln 2	$591,441	$144,681	3.82	$37,847
Kiln 3	$591,441	$154,044	30.84	$4,995
Kiln 4	$591,441	$262,344	343.34	$764
Kilns 1-4 Combined	$2,365,764	$725,463	438.71	$1,654

6.4.2.2. Timing for Compliance

Lhoist believes that reasonable progress compliant controls can be achieved with the installation of LNB at Kilns 1, 2, and 4. However, if NDEP determines that SNCR is necessary to achieve reasonable progress, it is anticipated that SNCR can be implemented during the period of the second long-term planning period for regional haze (approximately ten years following EPA's reasonable progress determination).

6.4.2.3. Energy Impacts and Non-Air Quality Impacts

The installation is expected to decrease the efficiency of the overall facility, particularly as significant energy and water use is needed beyond current plan operation requirements. The power costs associated with successful operation of the SNCR are estimated to be $16,272 per kiln based on data from Lhoist's Nelson facility. Additionally, the implementation of SNCR would introduce some degree of ammonia slip, which in itself generates visibility impairing compounds.

6.4.2.4. Remaining Useful Life

Lhoist has assumed this control equipment will last for the entirety of the 20-year amortization period, which is reflected in the cost calculations.

6.4.3. Installing Low-NOx Burners Before SNCR

The following sections provide an assessment associated with installing SNCR as well LNB with the assumption that the Facility already has LNB installed and operational (which is not the current case for Kilns 1, 2, and 4). LNB costs are not included in the evaluations.

6.4.3.1. Cost of Compliance

In the event that Lhoist must install NOx controls, Lhoist has prioritized the implementation of Low-NOx burners over SNCR due to lower capital costs and annual operating costs. As requested by NDEP, Lhoist has evaluated the cost of SNCR assuming that Low-NOx burners have been installed and the anticipated 10% reduction occurred prior to SNCR installation. In order to assess the incremental cost of compliance for the installation of SNCR, installation and annual operation costs from Lhoist's Nelson facility were used and scaled up to represent 2019 costs. Capital costs for the installation of the SNCR assumed a 20-year life span for depreciation, as well as an interest rate of 3.25%. The total capital investment includes the capital cost for the SNCR itself and the dry urea system. Annual costs consist of operational costs estimated from a similar Lhoist facility which includes urea costs, power costs, operating labor costs, maintenance material costs, and the annualized capital costs as a capital recovery value. The amount of NOx emissions removed, and the cost effectiveness value were determined using a 10% reduction from the baseline emission rate used in the LNB analysis. The total costs and cost effectiveness of control are summarized for Kilns 1-4 in Table 6-6. below.

Table 6-6. LNB then SNCR Cost Calculation Summary

Unit	Total Capital Investment	Total Annual Cost	NOx Emissions Removed (tpy)	Cost Effectiveness ($/ton removed)
Kiln 1	$591,441	$162,290	54.63	$2,971
Kiln 2	$591,441	$144,549	3.44	$42,014
Kiln 3	$591,441	$154,044	30.84	$4,995
Kiln 4	$591,441	$250,445	309.01	$810
Kilns 1-4 Combined	$2,365,764	$711,328	397.92	$1,788

6.4.3.2. Timing for Compliance

Lhoist believes that reasonable progress compliant controls can be achieved with the installation of LNB at Kilns 1, 2, and 4. However, if NDEP determines that LNB's in conjunction with SNCR is necessary to achieve reasonable progress, it is anticipated that these controls can be implemented during the period of the second long-term planning period for regional haze (approximately ten years following EPA's reasonable progress determination). The cost for adding LNB's in conjunction with SNCR is included in Section 6.4.4.

6.4.3.3. Energy Impacts and Non-Air Quality Impacts

The installation is expected to decrease the efficiency of the overall facility, particularly as significant energy and water use is needed beyond current plan operation requirements. The power costs associated with successful operation of the SNCR are estimated to be $16,272 per kiln based on data from Lhoist's Nelson facility. Additionally, the implementation of SNCR would introduce some degree of ammonia slip, which in itself generates visibility impairing compounds.

6.4.3.4. Remaining Useful Life

Lhoist has assumed this control equipment will last for the entirety of the 20-year amortization period, which is reflected in the cost calculations.

6.4.4. Average Cost of Installing Low-NOx Burners and SNCR

The following sections provide an assessment associated with installing SNCR as well LNB with the assumption that the Facility does not have LNB installed and operational (i.e., LNB as well as SNCR costs are included in the evaluations).

6.4.4.1. Cost of Compliance

In order to evaluate the average cost of the installation of NOx controls at the facility, the average cost of installing Low-NOx burners and SNCR has been evaluated (note – the cost of adding an LNB to Kiln 3 in this scenario has not been included as Kiln 3 already utilizes an LNB). This average cost was determined by dividing the annual costs for both LNB and SNCR installation by the annual emissions reductions. The annual costs and emissions reduced for each control technology was determined as detailed above. The total costs and cost effectiveness of control are summarized for Kilns 1-4 in Table 6-7, below.

Table 6-7. SNCR and LNB Average Cost Calculation Summary

Unit	Total Capital Investment	Total Annual Cost	NOx Emissions Removed (tpy)	Cost Effectiveness ($/ton removed)
Kiln 1	$966,441	$188,082	84.98	$2,213
Kiln 2	$966,441	$170,341	5.35	$31.828
Kiln 3	$591,441	$154,044	30.84	$4,995
Kiln 4	$1,041,441	$281,396	377.68	$745
Kilns 1-4 Combined	$3,565,764	$793,863	498.85	$1,591

6.4.4.2. Timing for Compliance

Lhoist believes that reasonable progress compliant controls can be achieved with the installation of LNB at Kilns 1, 2, and 4. However, if NDEP determines that LNB's and SNCR are necessary to achieve reasonable progress, it is anticipated that these controls can be implemented during the period of the second long-term planning period for regional haze (approximately ten years following EPA's reasonable progress determination).

6.4.4.3. Energy Impacts and Non-Air Quality Impacts

The installation is expected to decrease the efficiency of the overall facility, particularly as significant energy and water use is needed beyond current plan operation requirements. The power costs associated with successful operation of the SNCR are estimated to be $16,272 per kiln based on data from Lhoist's Nelson facility. Additionally, the implementation of SNCR would introduce some degree of ammonia slip, which in itself generates visibility impairing compounds.

6.4.4.4. Remaining Useful Life

Lhoist has assumed this control equipment will last for the entirety of the 20-year amortization period, which is reflected in the cost calculations.

6.5. NO_X CONCLUSION

The facility currently uses a low NO_X burner in Kiln 3 to minimize NO_X emissions. The use of low NO_X burners is a commonly applied technology in current BACT determinations for new rotary preheater lime kilns today. The cost of installing low NOx burners on the remaining kilns is below the anticipated $5,000 per ton cost effectiveness threshold and will be installed should NDEP deem the installation necessary in order to achieve reasonable progress. The application of SCR has never been attempted on a lime kiln. SNCR has been demonstrated as an effective control technology for NOx at similar Lhoist facilities and has fairly low costs for Apex Kilns 1, 3, and 4; however, as previously discussed there are significant barriers associated with the implementation of SNCR on the smaller kilns at Apex. Kilns 1 through 3 have various design and process differences which creates some uncertainty if SNCR will achieve even the 20% control efficiency assumed in this analysis. Kiln 4 is more similar in design to the reference kilns and is not expected to face the same technical challenges with implementation of SNCR as Kilns 1 through 3; however Kiln 4 met BACT for Rotary Lime Kilns at the time it was permitted in October 1995. If necessary to achieve reasonable progress, Lhoist is proposing the installation of LNBs on Kilns 1, 2, and 4 which will result in the installation of NOx controls exceeding those implemented at other lime production facilities. At Kiln 2, SNCR has been determined to be cost-ineffective at the Facility assuming that LNBs will be installed on the kilns. Therefore, the installation of LNBs is considered the most effective control technology evaluated on a $/ton basis for NOx reduction.

7. CONCLUSION

This report outlines Lhoist's evaluation of possible options for reducing the emissions of NO_X and SO_2 at its Apex facility in North Las Vegas, Nevada. The installation of low NOx burners on Kilns 1, 2, and 4 has been identified as a technically feasible and cost-effective reduction option at the Apex facility should it be deemed necessary in order to achieve reasonable progress. There are currently no additional technically feasible and cost-effective reduction options available for the Apex facility that would achieve additional reasonable progress goals for visibility impacts. Therefore, the emissions provided for the 2028 on-the-books/on-the-way modeling baseline will assume the installation of the economically feasible control technologies and use the reduced emission rates as compared to those used in the "control scenario" for the Facility.

APPENDIX A : RBLC SEARCH RESULTS

COMPREHENSIVE REPORT
Report Date:11/14/2019

Facility Information

RBLC ID:	TX-0869 (draft)	**Date Determination Last Updated:**	11/06/2019
Corporate/Company Name:	LHOIST NORTH AMERICA OF TEXAS, LTD.	**Permit Number:**	7808, PSDTX256M3, GHGPSDTX187
Facility Name:	LIME MANUFACTURING PLANT	**Permit Date:**	11/06/2019 (actual)
Facility Contact:	AARON JONES 830-625-0552	**FRS Number:**	110001866712
Facility Description:	Authorization of a new natural gas-fired vertical kiln along with associated material handling equipment including conveyors, crushers, vibrating screens, and product loading. increase the facility's lime production capacity. The new kiln will have a production rate of 660 short tons per day on a 30-day average basis.	**SIC Code:**	3274
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	327410
Permit URL:			
EPA Region:	6	**COUNTRY:**	USA
Facility County:	COMAL		
Facility State:	TX		
Facility ZIP Code:			
Permit Issued By:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name) MICHAEL PARTEE(Agency Contact) (512) 239-3312 michael.partee@tceq.texas.gov		
Other Agency Contact Info:	Mr. Joel Stanford, (512) 239-0270, Joel.Stanford@tceq.texas.gov		
Permit Notes:			

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	TX	Big Bend NP	> 250 km

Process/Pollutant Information

PROCESS NAME: Vertical Lime Kiln

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: NATURAL GAS

Throughput: 660.00 T/DAY

Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.3500 LB/TON
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) Proper kiln design (vertical PFR), good combustion techniques, Natural Gas Fuel ,no add-on controls.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Particulate matter, total (TPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)
CAS Number: CO2e
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1: 3.6100 HHV/TON
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) Proper kiln design (vertical PFR), good combustion techniques, Natural Gas Fuel ,no add-on controls.
Est. % Efficiency:

Cost Effectiveness: 0 \$/ton
Incremental Cost Effectiveness: 0 \$/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

Process/Pollutant Information

PROCESS NAME: Material Handling (Conveyors and Feeders)

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 \$/ton
Incremental Cost Effectiveness: 0 \$/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 10 μ (FPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

Process/Pollutant Information

PROCESS NAME: Stone Handling Area Crusher
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 1428.00 TON/H
Process Notes: 521200 TON/YR

POLLUTANT NAME: Particulate matter, total (TPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS

Control Method: (A) WATER SPRAYS

Est. % Efficiency: 70.000

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS

Control Method: (A) WATER SPRAYS

Est. % Efficiency: 70.000

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS

Control Method: (A) WATER SPRAYS
Est. % Efficiency: 70.000
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

Process/Pollutant Information

PROCESS NAME: Lime Belt Crusher

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes:

POLLUTANT NAME: Particulate matter, total (TPM)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

Process/Pollutant Information

PROCESS NAME: Product Loadout
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 240900.00 TON/YR
Process Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)

CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Control Method:	(A) BAGHOUSE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	NSPS OOO

Facility Information

RBLC ID:	WI-0291 (draft)	**Date Determination Last Updated:**	08/30/2019
Corporate/Company Name:	GRAYMONT WESTERN LIME-EDEN	**Permit Number:**	18-RAB-010
Facility Name:	GRAYMONT WESTERN LIME-EDEN	**Permit Date:**	01/28/2019 (actual)
Facility Contact:		**FRS Number:**	110000593910
Facility Description:	Lime Manufacturing	**SIC Code:**	3274
Permit Type:	D: Both B (Add new process to existing facility) &C (Modify process at existing facility)	**NAICS Code:**	327410
Permit URL:	https://dnr.wi.gov/cias/am/amexternal/AM_DownloadObject.aspx?id=800031		
EPA Region:	5	**COUNTRY:**	USA
Facility County:	FOND DU LAC		
Facility State:	WI		
Facility ZIP Code:	53019		
Permit Issued By:	WISCONSIN DEPT OF NATURAL RESOURCES; AIR MGMT. PROGRAM (Agency Name) MS. KRISTIN HART(Agency Contact) (608)266-6876 kristin.hart@wisconsin.gov		
Permit Notes:	Replacing burners on Kiln #1 and Kiln #2 to allow the kilns to fire natural gas. The permit also allows for the installation of a natural gas heater and diesel emergency generator.		

Facility-wide Emissions:

Pollutant Name:	**Facility-wide Emissions Increase:**
Carbon Monoxide	243.2600 (Tons/Year)
Nitrogen Oxides (NOx)	178.4500 (Tons/Year)
Particulate Matter (PM)	9.6900 (Tons/Year)
Sulfur Oxides (SOx)	32.1200 (Tons/Year)
Volatile Organic Compounds (VOC)	3.7300 (Tons/Year)

Process/Pollutant Information

PROCESS NAME:	P33 Lime Kiln #1
Process Type:	90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:	Natural Gas/Coal

Throughput: 0

Process Notes: Maximum Continuous Rating Natural Gas: 85 mmBTU/hr Coal: 109 mmBTU/hr

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE
Test Method: Unspecified
Pollutant Group(s):
Emission Limit 1: 15.0000 % OPACITY 6-MINUTE AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling nitrogen oxides emissions.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 43.8000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 1.5000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices and the Use of Low-NOx Burners
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NOx emissions during startup, shutdown, or low-load (8.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 58.3000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 2.0000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: CO emissions during startup, shutdown, or low-load (8.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

Process/Pollutant Information

PROCESS NAME: P34 Lime Kiln #2
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel: Natural Gas/Coal
Throughput: 0
Process Notes: Maximum Continuous Rating Natural Gas: 113 mmBTU/hr Coal: 123 mmBTU/hr

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: Unspecified
Pollutant Group(s):
Emission Limit 1: 15.0000 % OPACITY 6-MINUTE AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , NSPS
Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling nitrogen oxides emissions.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 68.8000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 1.5000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices and the Use of Low-NOx Burners
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NOx emissions during startup, shutdown, or low-load (13.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 45.8000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 1.0000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: CO emissions during startup, shutdown, or low-load (13.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

Process/Pollutant Information

PROCESS NAME: P04 Emergency Diesel Generator

Process Type: 17.210 (Fuel Oil (ASTM # 1,2, includes kerosene, aviation, diesel fuel))

Primary Fuel: Diesel Fuel

Throughput: 0.22 mmBTU/hr

Process Notes: Generac Industrial Diesel Generator Set, 3.4 liter, 35kW

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: Unspecified

Pollutant Group(s):

Emission Limit 1: 10.0000 % OPACITY 6-MINUTE AVERAGE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP

Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling particulate matter, sulfur dioxide, and nitrogen oxides emissions.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 4.7000 G/KWH

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP

Control Method: (P) Good Combustion Practices

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: The total hours of operation of each emergency generator may not exceed 500 hours during each consecutive 12-month period.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 5.0000 G/KWH
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: The total hours of operation of each emergency generator may not exceed 500 hours during each consecutive 12-month period.

Process/Pollutant Information

PROCESS NAME: P05 Natural Gas Fired Line Heater
Process Type: 13.310 (Natural Gas (includes propane and liquefied petroleum gas))
Primary Fuel: Natural Gas
Throughput: 1.50 mmBTU/hr
Process Notes:

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: Unspecified
Pollutant Group(s):
Emission Limit 1: 10.0000 % OPACITY 6-MINUTE AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling particulate matter, sulfur dioxide, and nitrogen oxides emissions.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 0.1000 LB/MMBTU

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Good Combustion Practices

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 0.0820 LB/MMBTU

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Good Combustion Practices

Est. % Efficiency:

Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

Facility Information

RBLC ID:	AL-0313 (final)	**Date Determination Last Updated:**	11/30/2017
Corporate/Company Name:	LHOIST NORTH AMERICA OF ALABAMA, LLC	**Permit Number:**	411-0008
Facility Name:	MONTEVALLO PLANT	**Permit Date:**	05/04/2016 (actual)
Facility Contact:	MICHAEL WILL 2054021553 MICHAEL.WILL@LHOIST.COM	**FRS Number:**	Not Found
Facility Description:	LIME MANUFACTURING FACILITY	**SIC Code:**	3274
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	327410
Permit URL:	HTTP:		
EPA Region:	4	**COUNTRY:**	USA
Facility County:	SHELBY		
Facility State:	AL		
Facility ZIP Code:	35040		
Permit Issued By:	ALABAMA DEPT OF ENVIRONMENTAL MGMT (Agency Name) MR. DALE HURST(Agency Contact) (334) 271-7882 ADH@ADEM.STATE.AL.US		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME:	LIMESTONE FEED SYSTEM
Process Type:	90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:	N/A
Throughput:	110000.00 LB/H
Process Notes:	110,000 LB/H THROUGHPUT OF LIMESTONE

POLLUTANT NAME:	Particulate matter, fugitive
CAS Number:	PM
Test Method:	Other
Other Test Method:	
Pollutant Group(s):	
Emission Limit 1:	7.0000 % OPACITY 6 MIN AVG
Emission Limit 2:	

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Control Method:	(A) WET LIMESTONE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	METHOD 9

POLLUTANT NAME:	Particulate matter, filterable (FPM)
CAS Number:	PM
Test Method:	EPA/OAR Mthd 5
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	7.0000 % OPACITY 6 MIN AVG
Emission Limit 2:	0.0140 GR/DSCF
Standard Emission:	

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT
Control Method:	(P) WET LIMESTONE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

Process/Pollutant Information

PROCESS NAME:	VERTICAL LIME KILN
Process Type:	90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:	NATURAL GAS
Throughput:	100.00 MMBTU/H
Process Notes:	

POLLUTANT NAME:	Particulate matter, total < 10 µ (TPM10)
CAS Number:	PM

Test Method: EPA/OAR Mthd 201 and 202
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2: 3.7700 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: TEST METHODS: METHOD 5 OF 40 CFR PART 60 OR METHOD 201/201A AND METHOD 202 OF 40 CFR PART 60

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)
CAS Number: PM
Test Method: Other
Other Test Method:
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0040 GR/DSCF
Emission Limit 2: 1.6800 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: TEST METHODS: METHOD 5 OF 40 CFR PART 60 OR METHOD 201/201A AND METHOD 202 OF 40 CFR PART 60

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 27.5000 LB/H 3 HR AVG

Emission Limit 2: 0.5000 LB/TON LIME PRODUCED 30 DAY ROLLING AVG

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: MACT

Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN DESIGN GOOD COMBUSTION AND PROCESS CONTROL TECHNIQUES

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: COMPLIANCE DETERMINED BY CEMS

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)

CAS Number: CO2e

Test Method: Unspecified

Pollutant Group(s): (Greenhouse Gasses (GHG))

Emission Limit 1: 4.0000 MMBTU HHV/TON LIME 12 MONTH AVG

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) PARALLEL FLOW REGENERATIVE KILN DESIGN ENERGY EFFICIENT OPERATING PRACTICES

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Methane

CAS Number: 74-82-8

Test Method: Unspecified

Pollutant Group(s): (Greenhouse Gasses (GHG) , Organic Compounds (all) , Organic Non-HAP Compounds)

Emission Limit 1: 4.0000 MMBTU HHV/TON LIME

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: MACT
Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN ENERGY EFFICIENT OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrous Oxide (N2O)
CAS Number: 10024-97-2
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 4.0000 MMBTU HHV/TON LIME
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN DESIGN ENERGY EFFICIENT OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 36.0000 LB/H
Emission Limit 2: 1.3000 LB/TON LIME PRODUCED
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN DESIGN GOOD COMBUSTION AND PROCESS CONTROL TECHNOLOGIES
Est. % Efficiency:

Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2: 3.7700 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: DIESEL EMERGENCY GENERATOR
Process Type: 11.220 (Distillate Fuel Oil (ASTM # 1,2, includes kerosene, aviation, diesel fuel))
Primary Fuel: DIESEL
Throughput: 500.00 BHP
Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7A
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 4.0000 G/KW-H
Emission Limit 2: 0.0066 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.5000 G/KW-H
Emission Limit 2: 0.0058 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2300 G/KW-H
Emission Limit 2: 0.0004 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2300 G/KW-H
Emission Limit 2: 0.0004 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2300 G/KW-H
Emission Limit 2: 0.0004 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)

CAS Number: CO2e
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1: 7000.0000 BTU/HP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Methane
CAS Number: 74-82-8
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , Organic Compounds (all) , Organic Non-HAP Compounds)
Emission Limit 1: 7000.0000 BTU/HP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrous Oxide (N2O)
CAS Number: 10024-97-2
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 7000.0000 BTU/HP-H
Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(N) TIER 3 ENGINE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

Process/Pollutant Information

PROCESS NAME:	PRODUCT HANDLING SYSTEM
Process Type:	90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:	N/A
Throughput:	55000.00 LB/H OF LIME
Process Notes:	

POLLUTANT NAME:	Particulate matter, filterable < 10 µ (FPM10)
CAS Number:	PM
Test Method:	EPA/OAR Mthd 201
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	0.0020 GR/DSCF
Emission Limit 2:	
Standard Emission:	

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	FILTERABLE PM10 EMISSIONS SHALL BE DETERMINED IN ACCORDANCE WITH METHOD 5 OF 40 CFR 60 OR METHOD 201/201A OF 40 CFR PART 60.

POLLUTANT NAME:	Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number:	PM

Test Method: Other
Other Test Method:
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0020 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: FILTERABLE PM2.5 EMISSIONS SHALL BE DETERMINED IN ACCORDANCE WITH METHOD 5 OF 40 CFR 60 OR METHOD 201/201A OF 40 CFR PART 60

Process/Pollutant Information

PROCESS NAME: CA-08 EAST LKD
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel: N/A
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Other
Other Test Method:
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0020 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: FILTERABLE PM2.5 EMISSIONS SHALL BE DETERMINED IN ACCORDANCE WITH METHOD 5 OF 40 CFR 60 OR METHOD 201/201A OF 40 CFR PART 60.

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: EPA/OAR Mthd 201
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0020 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: KILN HEATER
Process Type: 11.310 (Natural Gas (includes propane and liquefied petroleum gas))
Primary Fuel: NATURAL GAS
Throughput: 6.20 MMBTU/H
Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:
Control Method: (A) LOW NOX BURNER
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GOOD COMBUSTION TECHNIQUES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)

CAS Number: PM
Test Method: EPA/OAR Mthd 201
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)

CAS Number: PM
Test Method: Other
Other Test Method:
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Carbon Dioxide Equivalent (CO_2e)

CAS Number: CO2e
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) NATURAL GAS ENERGY EFFICIENT OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Methane
CAS Number: 74-82-8
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , Organic Compounds (all) , Organic Non-HAP Compounds)
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) NATURAL GAS ENERGY EFFICIENT OPERATING OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrous Oxide (N2O)
CAS Number: 10024-97-2
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(P) NATURAL GAS ENERGY EFFICIENT OPERTING PRECTICES
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

Facility Information

RBLC ID:	IL-0117 (final)	**Date Determination Last Updated:**	07/06/2016
Corporate/Company Name:	MISSISSIPPI LIME COMPANY	**Permit Number:**	08100063
Facility Name:	MISSISSIPPI LIME COMPANY	**Permit Date:**	09/29/2015 (actual)
Facility Contact:	KIMBERLY BAUMAN 573-883-4046 KSLBAUMAN@MISSISSIPPILIME.COM	**FRS Number:**	00066
Facility Description:	Lime manufacturing plant at existing limestone mine located in Prairie Du Rocher. The lime manufacturing plant would include two pre-heater rotary kilns; limestone crushing, storing and handling; fuel storage and handling; lime dehydrators; lime storage, handling and loadout; and other ancillary operations.	**SIC Code:**	3274
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	327410
Permit URL:	http://yosemite.epa.gov/r5/in_permt.nsf/6f1ebc583aad45448625763f0053e08e/56b26b2c13f02af686257f410057b897/$FILE/ATTHCVP9.pdf/08100063.pdf		
EPA Region:	5	**COUNTRY:**	USA
Facility County:	RANDOLPH		
Facility State:	IL		
Facility ZIP Code:	63127		
Permit Issued By:	ILLINOIS EPA, BUREAU OF AIR (Agency Name) MR. RAY PILAPIL(Agency Contact) (217) 782-2113 ray.pilapil@illinois.gov		
Other Agency Contact Info:	Minesh Patel, 217-785-5152		
Permit Notes:			

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	1095.0000 (Tons/Year)
Nitrogen Oxides (NOx)	1533.0000 (Tons/Year)
Particulate Matter (PM)	98.6300 (Tons/Year)
Sulfur Oxides (SOx)	219.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	22.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Two Rotary Kilns

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: Coal; petroleum coke

Throughput: 50.00 tons lime/hour, each

Process Notes: Ultra low sulfur distillate fuel oil with sulfur content of 15 ppm by weight or other ultra low sulfur fuels will be used during startup, malfunction and breakdown.

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Other

Other Test Method: CEMS

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 3.5000 LBS/TON LIME PRODUCE 30-DAY ROLLING AVERAGE

Emission Limit 2: 2.6100 LBS/TON LIME PRODUCE 12-MONTH ROLLING AVERAGE

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP

Control Method: (B) Low excess air to minimize formation of NOx and selective non-catalytic reduction (SNCR) technology.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 175.0 lbs NOx/hr, 1-hour avg continues to apply during these periods and serves as BACT. Note: 12-month running average limit (2.61 lb/ton) may be lowered based on the demonstrated performance of SNCR technology.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Other

Other Test Method: CEMS

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 2.5000 LBS/TON LIME 24-HOUR AVERAGE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) Good combustion practices to minimize CO emissions.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 125.0 lbs CO/hr, 24-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Other
Other Test Method: CEMS
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.5000 LBS/TON LIME 30-DAY ROLLING AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (P) Natural absorptive capacity of lime kiln dust.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 40.0 lbs SO2/hr, 1-hour avg and 32.3 lbs SO2/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.1400 LB/TON 3-HOUR AVERAGE
Emission Limit 2:
Standard Emission: 0.1400 LB/T 3-HOUR AVERAGE
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP , SIP

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 7.1 lbs PM/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM

Test Method: EPA/OAR Mthd 201A and 202

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.1800 LBS/TON 3-HOUR AVERAGE

Emission Limit 2:

Standard Emission: 0.1800 LB/T 3-HOUR AVERAGE

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NESHAP , NSPS , SIP

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 8.8 lbs PM10/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.1050 LBS/TON 3-HOUR AVERAGE

Emission Limit 2:

Standard Emission: 0.1050 LB/T 3-HOUR AVERAGE

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP , SIP

Control Method: (A) Baghouse

Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 5.24 lbs PM2.5/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)
CAS Number: CO2e
Test Method: Other
Other Test Method: CEMS
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1: 2744.0000 LBS/TON LIME 12-MONTH ROLLING AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) Use of preheater or other similar heat recovery system, selection of refractory and implementation of kiln seal management program.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: Limit may be lowered based on the demonstrated performance of kilns.

Process/Pollutant Information

PROCESS NAME: Limestone Handling Operations (Stack Emissions)
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 0
Process Notes: Limestone handling operation includes storage bins, conveying system, transfer points, bulk loading or unloading system, screening operations, bucket elevators, and belt conveyors subject to 40 CFR 63 Subpart 5A. Limestone handling operation also includes crushers, grinding mills, screening operations, bucket or belt conveyors, conveyor transfer points, storage bins and enclosed truck loading station subject to 40 CFR 60 Subpart OOO.

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM

Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0140 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP , SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: 7 percent opacity

Process/Pollutant Information

PROCESS NAME: Limestone Handling Operations (Fugitive Emissions)
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP , SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No

Pollutant/Compliance Notes: Limit 1: opacity of emissions less than 7%. Limit 2: opacity of emissions less than 12% for each crusher without capture system.

Process/Pollutant Information

PROCESS NAME: Limestone Handling Operations (Enclosed Building Emissions)

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes:

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: EPA/OAR Mthd 9

Pollutant Group(s):

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP , SIP

Control Method: (P) Enclosure

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: No visible emissions from buildings.

Process/Pollutant Information

PROCESS NAME: Solid Fuel Handling

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes:

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: EPA/OAR Mthd 22
Pollutant Group(s):
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: If not in a building: Fugitive: Opacity < 10%; and Stack: 0.004 gr/dscf; opacity < 7% If unit is enclosed in a building:

Process/Pollutant Information

PROCESS NAME: Lime Barge Loadout
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0040 GR/SCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (A) Telescoping loading spout with suction or aspiration at discharge end and a filter system.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No

Pollutant/Compliance Notes: Opacity from fugitive emissions: 20% Opacity from control device: 7%

Process/Pollutant Information

PROCESS NAME: Truck and Rail Loadout

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes: Loadout of quicklime and off-specification lime

POLLUTANT NAME: Particulate matter, filterable (FPM)

CAS Number: PM

Test Method: EPA/OAR Mthd 5

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.0040 GR/SCF

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP

Control Method: (A) Partial enclosure; fabric filters to treat displaced air during loadout; and loadout practices to minimize spillage.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Opacity: 7%

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: EPA/OAR Mthd 22

Pollutant Group(s):

Emission Limit 1: VE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP

Control Method:	(A) Partial enclosure; fabric filters to treat displaced air during loadout; and loadout practices to minimize spillage.
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	No
Pollutant/Compliance Notes:	No visible emissions of fugitive PM except for periods not to exceed a total of 2.5 minutes in any one hour period.

Facility Information

RBLC ID:	FL-0341 (final)	**Date Determination Last Updated:**	05/05/2016
Corporate/Company Name:	JACKSONVILLE LIME	**Permit Number:**	0310583-001-AC
Facility Name:	JACKSONVILLE LIME	**Permit Date:**	02/20/2014 (actual)
Facility Contact:	NICK CAGGIANO NICK.CAGGIANO@CARMEUSENA.COM	**FRS Number:**	110040335161
Facility Description:	Lime manufacturing plant with two twin-shaft vertical parallel-flow regenerative lime kilns, capable of firing petcoke, coal, natural gas, and wood chips. Nominal average production rate is 330 tons/day of lime (maximum 396 tons/day).	**SIC Code:**	3274
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	327410
Permit URL:	http://arm-permit2k.dep.state.fl.us/nontv/0310583.002.AC.F.ZIP		
EPA Region:	4	**COUNTRY:**	USA
Facility County:	DUVAL		
Facility State:	FL		
Facility ZIP Code:	32206		
Permit Issued By:	FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (Agency Name) MR. DAVID READ(Agency Contact) (850) 717-9000 David.Read@dep.state.fl.us		
Permit Notes:	Technical evaluation of BACT available at http://arm-permit2k.dep.state.fl.us/nontv/0310583.002.AC.D.ZIP		

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	GA	Okefenokee	< 100 km
CLASS1	GA	Wolf Island	100km - 50km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	412.0000 (Tons/Year)
Nitrogen Oxides (NOx)	345.0000 (Tons/Year)
Particulate Matter (PM)	62.0000 (Tons/Year)
Sulfur Oxides (SOx)	157.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	19.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Two vertical lime kilns

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: Natural gas

Throughput: 330.00 tons of lime per day

Process Notes: Fueled by natural gas, petcoke, coal, and wood chips. Nominal production rate of 330 tons of lime per day per kiln (maximum of 396 tons/day per kiln). Twin-shaft vertical parallel flow regenerative lime kilns (Cimprogetti – FS Design, or equivalent). Approx. 44 MMBtu/hr heat input per kiln

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Other

Other Test Method: NOx CEMS

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 350.0000 MG / N CU METER 30-DAY ROLLING AVG, FOR COAL & PETCOKE

Emission Limit 2: 100.0000 MG / N CU METER 30-DAY ROLLING AVG, FOR NATURAL GAS

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Production capacity cap of 396 tons of lime per day per kiln. Operations, Maintenance and Monitoring (OM&M) Plan and Startup, Shutdown, and Malfunction (SSM) Plan required. Required to maintain low-temperature combustion to reduce thermal NOx emissions. Required to use efficient PFR kiln design to minimize fuel use and pollutant emissions.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NOx CEMS required. Compliance is based on 30-operating-day rolling average, based on the relative heat inputs of the four authorized fuels. Petcoke/coal: 350 milligrams per normal cubic meter (approx. 31.9 lb/hr) Natural gas: 100 milligrams per normal cubic meter (approx. 8.3 lb/hr) Wood chips: 500 milligrams per normal cubic meter (approx. 43.6 lb/hr) Permittee must maintain records of the use of the various permitted fuels.

POLLUTANT NAME: Sulfur Dioxide (SO2)

CAS Number: 7446-09-5

Test Method: Other

Other Test Method: SO2 CEMS

Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))

Emission Limit 1: 200.0000 MG / N CU METER 30-DAY ROLLING AVERAGE, PETCOKE & COAL

Emission Limit 2: 50.0000 MG / N CU METER 30-DAY ROLLING AVERAGE, NAT GAS & WOOD

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) -Inherent scrubbing of burning zone exhaust gases by hot lime and of kiln exhaust gases by incoming limestone to reduce SO2 and sulfuric acid mist (SAM); -Use of fabric filters (baghouses) to control emissions of PM, PM10 and PM2.5 and provide further control of SO2 and SAM on the filter cake. - Overall lime production cap

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: SO2 CEMS required. Compliance based on 30-day rolling average and weighted 30-day fuel usage records. Petcoke & coal: 200 milligrams per normal cubic meter (approx. 18.2 lb/hr) Natural gas & wood: 50 milligrams per normal cubic meter (approx. 4.2 lb/hr) Record of fuel usage required.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: EPA/OAR Mthd 10

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 400.0000 MG / N CU METER PETCOKE, COAL, WOOD

Emission Limit 2: 200.0000 MG / N CU METER NATURAL GAS

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) -Efficient, vertical twin shaft PFR kiln design to minimize fuel use and resulting emissions of all pollutants; -Thorough mixing and residence time through preheat section to complete burnout of CO and volatile organic compounds (VOC); -Lime production cap

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Method 10 stack tests -- one compliance test for solid fuels, and one for natural gas.

POLLUTANT NAME: Particulate matter, total (TPM)

CAS Number: PM

Test Method: Other

Other Test Method: EPA Method 5

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 10.0000 MG / N CU METER

Emission Limit 2: 0.1000 LB / TON STONE FEED

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NESHAP

Control Method: (A) -Baghouse for each kiln; -Efficient, vertical twin shaft PFR kiln design to minimize fuel use and resulting emissions of all pollutants;

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: 0.10 lb/ton of stone feed from NESHAP Subpart AAAAA 10 milligrams per normal standard cubic meter for BACT PM standard, may be demonstrated using any combination of fuels.

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Compliance using the methods for BACT PM, SO2 and NOX shall indicate compliance with BACT for PM10 and PM2.5.

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Compliance using the methods for BACT PM, SO2 and NOX shall indicate compliance with BACT for PM10 and PM2.5.

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: Other

Other Test Method: Continuous opacity monitor

Pollutant Group(s):

Emission Limit 1: 15.0000 % OPACITY NTE 15% IN ANY 6-MIN BLOCK

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: COMS in lieu of bag leak detection system or PM detector, per NESHAP Subpart AAAAA

Process/Pollutant Information

PROCESS NAME: Material Handling Operations

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes: a. Limestone Handling and Storage Process, including: conveyors; surge hopper; pan feeders; enclosed building containing a screen used to segregate limestone according to size and transferred into a charging bin; two enclosures containing surge bins; reject bin; load-out weigh bins; truck loadout area; two mechanical (blower) rooms; and baghouses throughout the process. b. Lime Handling, Crushing, Rejects, and Lime Kiln Dust Process, including: four hoppers each equipped with a pan feeder; conveyors; vents; an enclosed building containing 2-deck screen, 4-roller crusher and baghouse; two weigh bins; two rotary feeders; blowers; a kiln reject dust bin; two portable tote containers; rotary feeder; truck loadout area; and baghouses throughout the process. c. Lime Handling, Screening and Storage Process, including: vents; conveyors, an enclosed building containing a 3-deck screen and a baghouse; chute magnets; lime bins equipped with a self contained dustless truck loading spout; an enclosure containing a silo truck load-out area equipped with a truck scale; railcar load-out area; and baghouses throughout the process. d. Fuel Handling Processes: (1) Wood Grinding System, including: walking floor truck and screw conveyor area; raw wood storage bin; conveyors; an enclosure containing a mill; CO2 systems; ground chip storage, shared ribbon mixer, dosing bin, blowers, baghouses; and a stack. (2) Petroleum Coke/Coal Grinding System, including: front-end loader/dump truck area; dump hopper; conveyors; feeders; petroleum coke and coal storage bin; an enclosure containing bowl mill, 3.5 Million British thermal units/hour (MMBtu/hour) heater; CO2 systems; ground coke bin, dosing bin; shared ribbon mixer; blowers; baghouses; and a stack.

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: EPA/OAR Mthd 22

Pollutant Group(s):

Emission Limit 1: 5.0000 % OPACITY

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP

Control Method: (A) Wet suppression, fabric filters, partial enclosure, and enclosure to reduce PM and visible emissions. Baghouse must have design removal efficiency of at least 99%.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NSPS OOO and NESHAP AAAAA prescribe 7% opacity standard. The compliance procedures specified by NSPS Subpart OOO and NESHAP Subpart AAAAA shall be used to demonstrate compliance with 5% opacity (instead of 7%).

Facility Information

RBLC ID: PA-0283 (final)

Date Determination Last Updated: 01/29/2018

Corporate/Company Name: GRAYMONT PA INC

Permit Number: 14-00002N

Facility Name: GRAYMONT PA INC/PLEASANT GAP & BELLEFONTE PLTS

Permit Date: 11/19/2012 (actual)

Facility Contact: JOHN MAITLAND 814-353-2106

FRS Number: 25-1527520-1

SIC Code: 3274

Facility Description: This plan approval is for the Kiln No. 8 project. WASTE OIL HEATER [BEL], PROPANE HEATER, PULVERIZED LIMESTONE SYSTEM, 136 HP DIESEL GENERATOR [PG], MISCELLANEOUS EMERGENCY GENERATORS, KILN NO. 8 PROJECT STONE RECLAMATION SYSTEM, PROCESSED STONE HANDLING, LIME KILN DUST HANDLING AND LOADING SYSTEM, LIME HANDLING AND STORAGE SYSTEM, LIME LOADING SYSTEM, EMERGENCY GENERATOR-ENGINES FOR COOLING FANS, PLS FABRIC COLLECTOR, ROTARY DRYER FABRIC COLLECTOR, STONE RECLAMATION FABRIC COLLECTOR, PROCESSED STONE AND LKD FABRIC COLLECTOR, LIME HANDLING AND STORAGE FABRIC COLLECTOR, LIME LOADING FABRIC COLLECTOR, KILN 6 BAGHOUSE, LIME

KILN 7 SEMI-WET SCRUBBER, LIME KILN 7 FABRIC COLLECTOR, KILN NO. 8 BAGHOUSE NATURAL GAS SUPPLY BITUMINOUS COAL SUPPLY PETROLEUM COKE SUPPLY NO. 2 FUEL OIL STORAGE PROPANE STORAGE DIESEL FUEL STORAGE SPACE HEATER EXHAUSTS PLS FABRIC COLLECTOR STACK DRYER FABRIC COLLECTOR STACK GENERATOR STACK MISC EMERGENCY GENERATORS STACKS FABRIC COLLECTOR VENT FABRIC COLLECTOR STACK FABRIC COLLECTOR STACK FABRIC COLLECTOR STACK GENERATOR-ENGINE STACKS KILN 6 STACK LIME KILN 7 STACK KILN NO. 8 STACK PROPANE HEATER EMISSIONS

Permit Type: U: Unspecified **NAICS Code:** 327410

Permit URL:

EPA Region: 3 **COUNTRY:** USA

Facility County: CENTRE

Facility State: PA

Facility ZIP Code: 16823

Permit Issued By: PENNSYLVANIA DEPT OF ENVIRONMENTAL PROTECTION, BUREAU OF AIR QUALITY (Agency Name)
MR. ROBERT COOK(Agency Contact) (717)772-3974 rwcook@pa.gov

Other Agency Contact Info: MUHAMMAD Q. ZAMAN,
ENVIRONMENTAL PROGRAM MANAGER, NORTHCENTRAL REGION
570-327-3648

Permit Notes: Pursuant to the plantwide applicability limit (PAL) provisions of 40 CFR § 52.21(aa)(7), the total combined sulfur dioxide (SO2) emissions, including fugitive emissions, from the facility shall not exceed 302.6 tons in any 12 consecutive month period.

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Sulfur Oxides (SOx)	302.6000 (Tons/Year)
Volatile Organic Compounds (VOC)	50.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: KILN NO. 8

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: Pipeline quality natural gas

Throughput: 0

Process Notes: Source ID P418 consists of a 660 tons per day, twin-shaft vertical lime kiln, designated as Kiln No. 8, that is equipped with 66 natural gas fuel delivery lances (2 sets of 33) with a total approximate heat input (HHV) equal to 100.4 MMBtu/hr. The air contaminant emissions from the kiln shall be controlled by the installation of ID C418 which is a pulse jet fabric collector, designated as 328-PDC-870. The fabric collector shall have a minimum fabric area of 25,536 square feet and handle no more than 75,000 actual cubic feet per minute. The permittee shall install, maintain, certify and operate a continuous emission monitoring system (CEMS) for nitrogen oxides (expressed as NO2), carbon monoxide, and sulfur oxides (expressed as SO2) emissions and opacity monitoring.

POLLUTANT NAME: Particulate matter, total (TPM)

CAS Number: PM

Test Method: EPA/OAR Mthd 17 and 202

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 2.2500 LB/H FILTERABLE AND CONDESABILE PM
Emission Limit 2: 0.0040 GRAIN/DSCF FILTERABLE PM
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (A) Baghouse
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0030 GRAINS/DSCF FILTERABLE
Emission Limit 2: 1.9100 LB/H FILTERABLE AND CONDENSABLE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (A) Baghouse
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0020 GRAINS/DSCF FILTERABLE
Emission Limit 2: 1.5600 LB/H FILTERABLE AND CONDENSABLE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE

Other Applicable Requirements: OTHER
Control Method: (A) Baghouse
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Oxides (SOx)
CAS Number: 7446
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 23.0000 LB/H ROLLING 30-DAY AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: Unspecified
Pollutant Group(s):
Emission Limit 1: 10.0000 % OPACITY FOR ANY 6-MINUTE BLOCK PERIOD
Emission Limit 2: 20.0000 % OPACITY 20-60% FOR ANY 3-MINUTE BLOCK PERIOD
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Volatile Organic Compounds (VOC)
CAS Number: VOC
Test Method: Unspecified
Pollutant Group(s): (Volatile Organic Compounds (VOC))
Emission Limit 1: 0.1000 LB/TON OF LIME
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 7.9000 LB/H ROLLING 30-DAY AVERAGE
Emission Limit 2: 34.6000 T/YR IN ANY 12 CONSECUTIVE MONTH PERIOD
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: Expressed as NO2

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0

Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 6.9600 LB/H ROLLING 30-DAY AVERAGE
Emission Limit 2: 26.5000 T/YR ANY 12 CONSECUTIVE MONTH PERIOD
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Methane
CAS Number: 74-82-8
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , Organic Compounds (all) , Organic Non-HAP Compounds)
Emission Limit 1: 3.6500 MMBTU/TON LIME (HHV)
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 500.0000 PPMVD 1-HOUR BLOCK AVERAGE
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: OTHER
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Facility Information

RBLC ID: TX-0726 (final)

Date Determination Last Updated: 05/16/2016

Corporate/Company Name: CHEMICAL LIME, LTD

Permit Number: 7808 AND PSD-TX-256M3

Facility Name: ROTARY LIME KILN AND ASSOCIATED EQUIPMENT

Permit Date: 02/22/2010 (actual)

Facility Contact: STEVEN CURRERI (817) 806-1548

FRS Number: 110001866712

Facility Description: Chemical Lime operates a lime production plant in Comal County consisting of two operational kilns: Kiln 2 and Kiln 3. Kiln 2 (and associated supporting equipment) is authorized under Permit 5640A; Kiln 3 (and associated supporting equipment) is authorized under Permit 7808. Both kilns are authorized under a federal Prevention of Significant Deterioration (PSD) permit; this modification to the PSD permit will make the current permit number PSDTX256M3. Limestone is quarried on-site or delivered from off-site sources, crushed to specific size requirements, and charged to the kilns along with coal, coke and/or natural gas to produce the product lime. The quarry is owned by Chemical Lime, but is currently operated under separate permits by an independent contractor. After exiting the kilns, the product lime is cooled and transferred to silos for intermediate storage. At this point, the lime is either sized to customer specifications or is hydrated and then shipped. Product lime is transported from the plant by rail and truck. Lime is also packaged in bulk bags and shipped by truck to customers. Hydrated product is shipped in bulk or bags.

SIC Code: 3274

Permit Type: C: Modify process at existing facility

NAICS Code: 327410

Permit URL:

EPA Region: 6

COUNTRY: USA

Facility County: COMAL

Facility State: TX

Facility ZIP Code: 78132

Permit Issued By: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name)
MICHAEL PARTEE(Agency Contact) (512) 239-3312 michael.partee@tceq.texas.gov

Other Agency Contact Info: Tan Nguyen 512-239-3445

Permit Notes:

Affected Boundaries:	Boundary Type:	Class 1 Area State:	Boundary:	Distance:

CLASS1 TX Big Bend NP > 250 km

Process/Pollutant Information

PROCESS NAME: Rotary Kiln 2

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: natural gas, coal, and petroleum coke

Throughput: 504.00 tons per day

Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 5.0000 LB/TON OF LIME PROD

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)

CAS Number: 7446-09-5

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) Limiting the fuel sulfur input, in addition to the dry scrubbing inherent in these systems.

Est. % Efficiency: 92.000

Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) The use of fabric filter to achieve a 0.01 gr/dscf filterable and condensable PM10.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfuric Acid (mist, vapors, etc)
CAS Number: 7664-93-9
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) Proper kiln design and operation.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 3.0000 LB/TON FEED

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Proper kiln design and operation (good engineering practice/best management practice) to minimize the products of incomplete combustion.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: Rotary Kiln 3

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: natural gas, coal, and petroleum coke

Throughput: 850.00 tons per day

Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 2.6000 LB/TON OF LIME PROD

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) Limiting the fuel sulfur input, in addition to the dry scrubbing inherent in these systems.
Est. % Efficiency: 92.000
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) The use of fabric filter to achieve a 0.01 gr/dscf filterable and condensable PM10.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Sulfuric Acid (mist, vapors, etc)

CAS Number: 7664-93-9
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) Proper kiln design and operation.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 2.2000 LB/TON FEED
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) Proper kiln design and operation (good engineering practice/best management practice) to minimize the products of incomplete combustion.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Facility Information

RBLC ID: WI-0250 (final)
Date Determination Last Updated: 10/26/2009
Corporate/Company Name: GRAYMONT (WI) LLC
Permit Number: 08-DCF-103

Facility Name:	GRAYMONT (WI) LLC	**Permit Date:**	02/06/2009 (actual)
Facility Contact:	PHIL MARQUIS 7153925146 PMARQUIS@GRAYMONT.COM	**FRS Number:**	UNKNOWN
Facility Description:	LIME MANUFACTURING FACILITY (FORMER CLM)	**SIC Code:**	3274
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	327410
Permit URL:			
EPA Region:	5	**COUNTRY:**	USA
Facility County:	BAYFIELD		
Facility State:	WI		
Facility ZIP Code:	54880		
Permit Issued By:	WISCONSIN DEPT OF NATURAL RESOURCES; AIR MGMT. PROGRAM (Agency Name) MS. KRISTIN HART(Agency Contact) (608)266-6876 kristin.hart@wisconsin.gov		
Other Agency Contact Info:	DON C. FAITH III, (608) 267-3135		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME: P50 (S50). PREHEATER EQUIPPED, ROTARY LIME KILN

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: COAL

Throughput: 54.00 T/H STONE

Process Notes: KILN LIMITED TO 2% S COAL OR COAL / PET COKE BLEND. NATURAL GAS USED FOR STARTUP. KILN STACK EQUIPPED WITH CEMS FOR NOX, SO2, CO (AND OPACITY). FABRIC FILTER (MEMBRANE TYPE) HIGH TEMPERATURE BAGHOUSE. KILN CAPACITY IDENTIFIED AND PERMITTED AT 54 TONS PER HOUR OF STONE (LIMESTONE) FEED. SOME OF THE STONE USED HAS A HIGHER ORGANIC (CARBON) CONTENT, AND SEPARATE LIMITS ESTABLISHED FOR USE OF THIS TYPE OF LIMESTONE.

POLLUTANT NAME:	Particulate matter, fugitive
CAS Number:	PM
Test Method:	Unspecified
Pollutant Group(s):	
Emission Limit 1:	0.4600 LB/T HIGH ORGANIC CARBON STONE
Emission Limit 2:	0.1500 LB/T LOW ORGANIC CARBON STONE
Standard Emission:	0.1000 LB/T FRONT HALF ONLY (MACT/ BACT)

Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT , SIP , NSPS
Control Method:	(A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:	

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: TOTAL PM (AND PM10) INCLUDES BACK HALF, EXCEPT WHERE SPECIFICALLY EXCLUDED. HIGH ORGANIC CARBON STONE HAD ORGANIC CONTENT OF 0.05% OR MORE. FABRIC FILTER BAGHOUSE REQUIRED TO ACHIEVE 0.010 GR/DSCF (FRONT HALF (FILTERABLE, NON-CONDENSIBLE) ONLY).

POLLUTANT NAME: Sulfur Dioxide (SO2)

CAS Number: 7446-09-5

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))

Emission Limit 1: 0.6200 LB/T 24 HOUR AVERAGE

Emission Limit 2: 2.0000 PERCENT S FUEL SULFUR LIMIT

Standard Emission: 33.7000 LB/H 3 HOUR AVERAGE

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) FUEL SULFUR LIMIT, INHERENT PROCESS COLLECTION OF SULFUR OXIDES.

Est. % Efficiency: 92.000

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: 54 T/H STONE FEED RATE (24 HOUR AVERAGE). 2% FUEL SULFUR CONTENT LIMIT. PROCESS (PREHEATER KILN WITH BAGHOUSE) IS REQUIRED TO ACHIEVE AT LEAST 92% COLLECTION OF FUEL SULFUR. LIMIT ESTABLISHED IN PRIOR PERMIT (05-DCF-412).

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 1.8300 LB/T 24 HOUR AVG.

Emission Limit 2: 0.7000 LB/MMBTU MONTHLY AVG.

Standard Emission: 98.8000 LB/H 3 HOUR AVG.

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) GOOD COMBUSTION CONTROL, OPTIMIZATION

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NOX CEM. OPTIMIZATION IS THE USE OF TUNING AND ANALYSIS TO MINIMIZE NOX (IN ADDITION TO MEETING ALL OF THE BACT LIMITS, INCLUDING CO AND VOC LIMITS). LIMIT ESTABLISHED IN PRIOR PERMIT (05-DCF-412).

POLLUTANT NAME: Volatile Organic Compounds (VOC)

CAS Number: VOC

Test Method: Unspecified

Pollutant Group(s): (Volatile Organic Compounds (VOC))

Emission Limit 1: 33.0000 LB/H USING HIGH ORGANIC CONTENT LIMESTONE

Emission Limit 2: 5.4000 LB/H USING LOW ORGANIC CONTENT LIMESTONE

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP

Control Method: (P) USE OF A PREHEATER KILN AND GOOD OPERATING PRACTICES: GOOD COMBUSTION CONTROL

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: HIGH ORGANIC CONTENT LIMESTONE CONTAINS 0.05% OR MORE ORGANIC CARBON. VOC LIMIT IS CITED " AS PROPANE." THE 33 LBS/HR VOC LIMIT IS PROVISIONAL, AND MAY BE INCREASED TO 38.6 LBS/HR.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 1.5600 LB/T 24 HR AVG., FIRING LOW ORGANIC STONE

Emission Limit 2: 71.2000 T/ MO. 12 MO. AVG.

Standard Emission: 310.0000 LB/H 3 HR AVG., FIRING HIGH ORGANIC STONE

Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) PREHEATER KILN, GOOD OPERATING PRACTICES (GOOD COMBUSTION CONTROL)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: HIGH ORGANIC CONTENT STONE IS A LIMESTONE CONTAINING 0.05 WT% ORGANIC CARBON CONTENT OR HIGHER. 54 TON PER HOUR LIMESTONE BASIS / LIMITATION (24 HR. AVG.)

POLLUTANT NAME: Sulfuric Acid (mist, vapors, etc)

CAS Number: 7664-93-9

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Particulate Matter (PM))

Emission Limit 1: 1.5000 LB/H

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements:

Control Method: (P) FUEL SULFUR LIMIT (2%) AND INHERENT COLLECTION FROM PREHEATER / FABRIC FILTER (92% OF S COMPOUNDS).

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Hazardous Air Pollutants (HAP)

CAS Number: HAP

Test Method: Unspecified

Pollutant Group(s): (Hazardous Air Pollutants (HAP))

Emission Limit 1: 2.8500 LB/H BENZENE

Emission Limit 2: 4.9000 LB/H VINYL CHLORIDE

Standard Emission: 2.0000 LB/H FORMALDEHYDE

Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown

Case-by-Case Basis: N/A

Other Applicable Requirements: OTHER

Control Method: (P) USE OF PREHEATER KILN USING GOOD OPERATING PRACTICES (GOOD COMBUSTION PRACTICES)

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: LIMITS BASED ON STATE (ONLY) HAZARDOUS AIR RULE. USE OF HIGH ORGANIC CARBON LIMESTONE (0.05 WT. % ORGANIC CARBON) WAS FOUND TO RESULT IN CONSIDERABLE PRODUCTS OF INCOMPLETE COMBUSTION WHEN PREHEATER KILN WAS OPERATED AT THE PERMITTED CAPACITY.

COMPREHENSIVE REPORT
Report Date:11/14/2019

Facility Information

RBLC ID:	TX-0869 (draft)	**Date Determination Last Updated:**	11/06/2019
Corporate/Company Name:	LHOIST NORTH AMERICA OF TEXAS, LTD.	**Permit Number:**	7808, PSDTX256M3, GHGPSDTX187
Facility Name:	LIME MANUFACTURING PLANT	**Permit Date:**	11/06/2019 (actual)
Facility Contact:	AARON JONES 830-625-0552	**FRS Number:**	110001866712
Facility Description:	Authorization of a new natural gas-fired vertical kiln along with associated material handling equipment including conveyors, crushers, vibrating screens, and product loading. increase the facility's lime production capacity. The new kiln will have a production rate of 660 short tons per day on a 30-day average basis.	**SIC Code:**	3274
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	327410
Permit URL:			
EPA Region:	6	**COUNTRY:**	USA
Facility County:	COMAL		
Facility State:	TX		
Facility ZIP Code:			
Permit Issued By:	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) (Agency Name) MICHAEL PARTEE(Agency Contact) (512) 239-3312 michael.partee@tceq.texas.gov		
Other Agency Contact Info:	Mr. Joel Stanford, (512) 239-0270, Joel.Stanford@tceq.texas.gov		
Permit Notes:			

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	TX	Big Bend NP	> 250 km

Process/Pollutant Information

PROCESS NAME: Vertical Lime Kiln

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: NATURAL GAS

Throughput: 660.00 T/DAY

Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 0.3500 LB/TON
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) Proper kiln design (vertical PFR), good combustion techniques, Natural Gas Fuel ,no add-on controls.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Particulate matter, total (TPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)
CAS Number: CO2e
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1: 3.6100 HHV/TON
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (P) Proper kiln design (vertical PFR), good combustion techniques, Natural Gas Fuel ,no add-on controls.
Est. % Efficiency:

Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS HH

Process/Pollutant Information

PROCESS NAME: Material Handling (Conveyors and Feeders)
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

Process/Pollutant Information

PROCESS NAME: Stone Handling Area Crusher
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 1428.00 TON/H
Process Notes: 521200 TON/YR

POLLUTANT NAME: Particulate matter, total (TPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS

Control Method: (A) WATER SPRAYS

Est. % Efficiency: 70.000

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS

Control Method: (A) WATER SPRAYS

Est. % Efficiency: 70.000

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS

Control Method: (A) WATER SPRAYS
Est. % Efficiency: 70.000
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

Process/Pollutant Information

PROCESS NAME: Lime Belt Crusher
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, total (TPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2:
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Control Method:	(A) BAGHOUSE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	NSPS OOO

POLLUTANT NAME:	Particulate matter, total < 2.5 µ (TPM2.5)
CAS Number:	PM
Test Method:	Unspecified
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	0.0090 GR/DSCF
Emission Limit 2:	
Standard Emission:	

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(A) BAGHOUSE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	NSPS OOO

Process/Pollutant Information

PROCESS NAME:	Product Loadout
Process Type:	90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:	
Throughput:	240900.00 TON/YR
Process Notes:	

POLLUTANT NAME:	Particulate matter, filterable (FPM)
CAS Number:	PM
Test Method:	Unspecified

Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NSPS OOO

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0050 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Control Method:	(A) BAGHOUSE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	NSPS OOO

Facility Information

RBLC ID:	WI-0291 (draft)	**Date Determination**	
		Last Updated:	08/30/2019
Corporate/Company Name:	GRAYMONT WESTERN LIME-EDEN	**Permit Number:**	18-RAB-010
Facility Name:	GRAYMONT WESTERN LIME-EDEN	**Permit Date:**	01/28/2019 (actual)
Facility Contact:		**FRS Number:**	110000593910
Facility Description:	Lime Manufacturing	**SIC Code:**	3274
Permit Type:	D: Both B (Add new process to existing facility) &C (Modify process at existing facility)	**NAICS Code:**	327410
Permit URL:	https://dnr.wi.gov/cias/am/amexternal/AM_DownloadObject.aspx?id=800031		
EPA Region:	5	**COUNTRY:**	USA
Facility County:	FOND DU LAC		
Facility State:	WI		
Facility ZIP Code:	53019		

Permit Issued By: WISCONSIN DEPT OF NATURAL RESOURCES; AIR MGMT. PROGRAM (Agency Name)
MS. KRISTIN HART(Agency Contact) (608)266-6876 kristin.hart@wisconsin.gov

Permit Notes: Replacing burners on Kiln #1 and Kiln #2 to allow the kilns to fire natural gas. The permit also allows for the installation of a natural gas heater and diesel emergency generator.

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	243.2600 (Tons/Year)
Nitrogen Oxides (NOx)	178.4500 (Tons/Year)
Particulate Matter (PM)	9.6900 (Tons/Year)
Sulfur Oxides (SOx)	32.1200 (Tons/Year)
Volatile Organic Compounds (VOC)	3.7300 (Tons/Year)

Process/Pollutant Information

PROCESS NAME:	P33 Lime Kiln #1
Process Type:	90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:	Natural Gas/Coal

Throughput: 0

Process Notes: Maximum Continuous Rating Natural Gas: 85 mmBTU/hr Coal: 109 mmBTU/hr

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE
Test Method: Unspecified
Pollutant Group(s):
Emission Limit 1: 15.0000 % OPACITY 6-MINUTE AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling nitrogen oxides emissions.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 43.8000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 1.5000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices and the Use of Low-NOx Burners
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NOx emissions during startup, shutdown, or low-load (8.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 58.3000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 2.0000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: CO emissions during startup, shutdown, or low-load (8.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

Process/Pollutant Information

PROCESS NAME: P34 Lime Kiln #2
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel: Natural Gas/Coal
Throughput: 0
Process Notes: Maximum Continuous Rating Natural Gas: 113 mmBTU/hr Coal: 123 mmBTU/hr

POLLUTANT NAME: Visible Emissions (VE)
CAS Number: VE
Test Method: Unspecified
Pollutant Group(s):
Emission Limit 1: 15.0000 % OPACITY 6-MINUTE AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NESHAP , NSPS
Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling nitrogen oxides emissions.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 68.8000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 1.5000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices and the Use of Low-NOx Burners
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: NOx emissions during startup, shutdown, or low-load (13.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: Unspecified
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 45.8000 LB/HR 30 DAY AVERAGE
Emission Limit 2: 1.0000 LB/TON STONE FEED 365 DAY AVERAGE
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP
Control Method: (P) Good Combustion Practices
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: CO emissions during startup, shutdown, or low-load (13.8 tons/hr) operation of the kiln shall not be used in determining compliance with the BACT emission

Process/Pollutant Information

PROCESS NAME: P04 Emergency Diesel Generator

Process Type: 17.210 (Fuel Oil (ASTM # 1,2, includes kerosene, aviation, diesel fuel))

Primary Fuel: Diesel Fuel

Throughput: 0.22 mmBTU/hr

Process Notes: Generac Industrial Diesel Generator Set, 3.4 liter, 35kW

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: Unspecified

Pollutant Group(s):

Emission Limit 1: 10.0000 % OPACITY 6-MINUTE AVERAGE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP

Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling particulate matter, sulfur dioxide, and nitrogen oxides emissions.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 4.7000 G/KWH

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP

Control Method: (P) Good Combustion Practices

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: The total hours of operation of each emergency generator may not exceed 500 hours during each consecutive 12-month period.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 5.0000 G/KWH

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP

Control Method: (P) Good Combustion Practices

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: The total hours of operation of each emergency generator may not exceed 500 hours during each consecutive 12-month period.

Process/Pollutant Information

PROCESS NAME: P05 Natural Gas Fired Line Heater

Process Type: 13.310 (Natural Gas (includes propane and liquefied petroleum gas))

Primary Fuel: Natural Gas

Throughput: 1.50 mmBTU/hr

Process Notes:

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: Unspecified

Pollutant Group(s):

Emission Limit 1: 10.0000 % OPACITY 6-MINUTE AVERAGE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) The available options described for controlling visible emissions are generally the controls for controlling particulate matter, sulfur dioxide, and nitrogen oxides emissions.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 0.1000 LB/MMBTU

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Good Combustion Practices

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Unspecified

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 0.0820 LB/MMBTU

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Good Combustion Practices

Est. % Efficiency:

Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Facility Information

RBLC ID:	AL-0313 (final)	**Date Determination Last Updated:**	11/30/2017
Corporate/Company Name:	LHOIST NORTH AMERICA OF ALABAMA, LLC	**Permit Number:**	411-0008
Facility Name:	MONTEVALLO PLANT	**Permit Date:**	05/04/2016 (actual)
Facility Contact:	MICHAEL WILL 2054021553 MICHAEL.WILL@LHOIST.COM	**FRS Number:**	Not Found
Facility Description:	LIME MANUFACTURING FACILITY	**SIC Code:**	3274
Permit Type:	B: Add new process to existing facility	**NAICS Code:**	327410
Permit URL:	HTTP:		
EPA Region:	4	**COUNTRY:**	USA
Facility County:	SHELBY		
Facility State:	AL		
Facility ZIP Code:	35040		
Permit Issued By:	ALABAMA DEPT OF ENVIRONMENTAL MGMT (Agency Name) MR. DALE HURST(Agency Contact) (334) 271-7882 ADH@ADEM.STATE.AL.US		
Permit Notes:			

Process/Pollutant Information

PROCESS NAME: LIMESTONE FEED SYSTEM
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel: N/A
Throughput: 110000.00 LB/H
Process Notes: 110,000 LB/H THROUGHPUT OF LIMESTONE

POLLUTANT NAME: Particulate matter, fugitive
CAS Number: PM
Test Method: Other
Other Test Method:
Pollutant Group(s):
Emission Limit 1: 7.0000 % OPACITY 6 MIN AVG
Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (A) WET LIMESTONE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: METHOD 9

POLLUTANT NAME: Particulate matter, filterable (FPM)

CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 7.0000 % OPACITY 6 MIN AVG
Emission Limit 2: 0.0140 GR/DSCF
Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (P) WET LIMESTONE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: VERTICAL LIME KILN
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel: NATURAL GAS
Throughput: 100.00 MMBTU/H
Process Notes:

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM

Test Method:	EPA/OAR Mthd 201 and 202
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	0.0090 GR/DSCF
Emission Limit 2:	3.7700 LB/H
Standard Emission:	

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT
Control Method:	(A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	TEST METHODS: METHOD 5 OF 40 CFR PART 60 OR METHOD 201/201A AND METHOD 202 OF 40 CFR PART 60

POLLUTANT NAME:	Particulate matter, total < 2.5 µ (TPM2.5)
CAS Number:	PM
Test Method:	Other
Other Test Method:	
Pollutant Group(s):	(Particulate Matter (PM))
Emission Limit 1:	0.0040 GR/DSCF
Emission Limit 2:	1.6800 LB/H
Standard Emission:	

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	MACT
Control Method:	(A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	TEST METHODS: METHOD 5 OF 40 CFR PART 60 OR METHOD 201/201A AND METHOD 202 OF 40 CFR PART 60

POLLUTANT NAME:	Nitrogen Oxides (NOx)
CAS Number:	10102
Test Method:	EPA/OAR Mthd 7
Pollutant Group(s):	(InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:	27.5000 LB/H 3 HR AVG

Emission Limit 2: 0.5000 LB/TON LIME PRODUCED 30 DAY ROLLING AVG
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN DESIGN GOOD COMBUSTION AND PROCESS CONTROL TECHNIQUES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: COMPLIANCE DETERMINED BY CEMS

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)
CAS Number: CO2e
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1: 4.0000 MMBTU HHV/TON LIME 12 MONTH AVG
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) PARALLEL FLOW REGENERATIVE KILN DESIGN ENERGY EFFICIENT OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Methane
CAS Number: 74-82-8
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , Organic Compounds (all) , Organic Non-HAP Compounds)
Emission Limit 1: 4.0000 MMBTU HHV/TON LIME
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: MACT
Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN ENERGY EFFICIENT OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrous Oxide (N2O)
CAS Number: 10024-97-2
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 4.0000 MMBTU HHV/TON LIME
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN DESIGN ENERGY EFFICIENT OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 36.0000 LB/H
Emission Limit 2: 1.3000 LB/TON LIME PRODUCED
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (P) PARALLEL FLOW REGENERATIVE VERTICAL KILN DESIGN GOOD COMBUSTION AND PROCESS CONTROL TECHNOLOGIES
Est. % Efficiency:

Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0090 GR/DSCF
Emission Limit 2: 3.7700 LB/H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: MACT
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: DIESEL EMERGENCY GENERATOR
Process Type: 11.220 (Distillate Fuel Oil (ASTM # 1,2, includes kerosene, aviation, diesel fuel))
Primary Fuel: DIESEL
Throughput: 500.00 BHP
Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7A
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 4.0000 G/KW-H
Emission Limit 2: 0.0066 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1: 3.5000 G/KW-H
Emission Limit 2: 0.0058 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2300 G/KW-H
Emission Limit 2: 0.0004 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2300 G/KW-H
Emission Limit 2: 0.0004 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.2300 G/KW-H
Emission Limit 2: 0.0004 LB/HP-H
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)

CAS Number: CO2e
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1: 7000.0000 BTU/HP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Methane
CAS Number: 74-82-8
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , Organic Compounds (all) , Organic Non-HAP Compounds)
Emission Limit 1: 7000.0000 BTU/HP-H
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (N) TIER 3 ENGINE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrous Oxide (N2O)
CAS Number: 10024-97-2
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1: 7000.0000 BTU/HP-H
Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (N) TIER 3 ENGINE

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: PRODUCT HANDLING SYSTEM

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: N/A

Throughput: 55000.00 LB/H OF LIME

Process Notes:

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)

CAS Number: PM

Test Method: EPA/OAR Mthd 201

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.0020 GR/DSCF

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) FABRIC FILTER BAGHOUSE

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: FILTERABLE PM10 EMISSIONS SHALL BE DETERMINED IN ACCORDANCE WITH METHOD 5 OF 40 CFR 60 OR METHOD 201/201A OF 40 CFR PART 60.

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)

CAS Number: PM

Test Method: Other
Other Test Method:
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0020 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: FILTERABLE PM2.5 EMISSIONS SHALL BE DETERMINED IN ACCORDANCE WITH METHOD 5 OF 40 CFR 60 OR METHOD 201/201A OF 40 CFR PART 60

Process/Pollutant Information

PROCESS NAME: CA-08 EAST LKD
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel: N/A
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Other
Other Test Method:
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0020 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: FILTERABLE PM2.5 EMISSIONS SHALL BE DETERMINED IN ACCORDANCE WITH METHOD 5 OF 40 CFR 60 OR METHOD 201/201A OF 40 CFR PART 60.

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: EPA/OAR Mthd 201
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0020 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

Process/Pollutant Information

PROCESS NAME: KILN HEATER
Process Type: 11.310 (Natural Gas (includes propane and liquefied petroleum gas))
Primary Fuel: NATURAL GAS
Throughput: 6.20 MMBTU/H
Process Notes:

POLLUTANT NAME: Nitrogen Oxides (NOx)
CAS Number: 10102
Test Method: EPA/OAR Mthd 7
Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:
Control Method: (A) LOW NOX BURNER
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Carbon Monoxide
CAS Number: 630-08-0
Test Method: EPA/OAR Mthd 10
Pollutant Group(s): (InOrganic Compounds)
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) GOOD COMBUSTION TECHNIQUES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM
Test Method: EPA/OAR Mthd 201
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Particulate matter, filterable < 2.5 µ (FPM2.5)
CAS Number: PM
Test Method: Other
Other Test Method:
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (A) FABRIC FILTER BAGHOUSE
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: EMISSIONS COMBINED WITH VERTICAL KILN STACK. KILN EMISSIONS LIMITS APPLY.

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)

CAS Number: CO2e
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Unknown
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) NATURAL GAS ENERGY EFFICIENT OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Methane
CAS Number: 74-82-8
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , Organic Compounds (all) , Organic Non-HAP Compounds)
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: Y
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) NATURAL GAS ENERGY EFFICIENT OPERATING OPERATING PRACTICES
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes:

POLLUTANT NAME: Nitrous Oxide (N2O)
CAS Number: 10024-97-2
Test Method: Unspecified
Pollutant Group(s): (Greenhouse Gasses (GHG) , InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: Y

Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	
Control Method:	(P) NATURAL GAS ENERGY EFFICIENT OPERTING PRECTICES
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	Unknown
Pollutant/Compliance Notes:	

Facility Information

RBLC ID:	IL-0117 (final)	**Date Determination Last Updated:**	07/06/2016
Corporate/Company Name:	MISSISSIPPI LIME COMPANY	**Permit Number:**	08100063
Facility Name:	MISSISSIPPI LIME COMPANY	**Permit Date:**	09/29/2015 (actual)
Facility Contact:	KIMBERLY BAUMAN 573-883-4046 KSLBAUMAN@MISSISSIPPILIME.COM	**FRS Number:**	00066
Facility Description:	Lime manufacturing plant at existing limestone mine located in Prairie Du Rocher. The lime manufacturing plant would include two pre-heater rotary kilns; limestone crushing, storing and handling; fuel storage and handling; lime dehydrators; lime storage, handling and loadout; and other ancillary operations.	**SIC Code:**	3274
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	327410
Permit URL:	http://yosemite.epa.gov/r5/in_permt.nsf/6f1ebc583aad45448625763f0053e08e/56b26b2c13f02af686257f410057b897/$FILE/ATTHCVP9.pdf/08100063.pdf		
EPA Region:	5	**COUNTRY:**	USA
Facility County:	RANDOLPH		
Facility State:	IL		
Facility ZIP Code:	63127		
Permit Issued By:	ILLINOIS EPA, BUREAU OF AIR (Agency Name) MR. RAY PILAPIL(Agency Contact) (217) 782-2113 ray.pilapil@illinois.gov		
Other Agency Contact Info:	Minesh Patel, 217-785-5152		
Permit Notes:			

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	1095.0000 (Tons/Year)
Nitrogen Oxides (NOx)	1533.0000 (Tons/Year)
Particulate Matter (PM)	98.6300 (Tons/Year)
Sulfur Oxides (SOx)	219.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	22.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Two Rotary Kilns

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: Coal; petroleum coke

Throughput: 50.00 tons lime/hour, each

Process Notes: Ultra low sulfur distillate fuel oil with sulfur content of 15 ppm by weight or other ultra low sulfur fuels will be used during startup, malfunction and breakdown.

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Other

Other Test Method: CEMS

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 3.5000 LBS/TON LIME PRODUCE 30-DAY ROLLING AVERAGE

Emission Limit 2: 2.6100 LBS/TON LIME PRODUCE 12-MONTH ROLLING AVERAGE

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP

Control Method: (B) Low excess air to minimize formation of NOx and selective non-catalytic reduction (SNCR) technology.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 175.0 lbs NOx/hr, 1-hour avg continues to apply during these periods and serves as BACT. Note: 12-month running average limit (2.61 lb/ton) may be lowered based on the demonstrated performance of SNCR technology.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: Other

Other Test Method: CEMS

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 2.5000 LBS/TON LIME 24-HOUR AVERAGE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Control Method: (P) Good combustion practices to minimize CO emissions.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 125.0 lbs CO/hr, 24-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Sulfur Dioxide (SO2)
CAS Number: 7446-09-5
Test Method: Other
Other Test Method: CEMS
Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))
Emission Limit 1: 0.5000 LBS/TON LIME 30-DAY ROLLING AVERAGE
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (P) Natural absorptive capacity of lime kiln dust.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 40.0 lbs SO2/hr, 1-hour avg and 32.3 lbs SO2/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.1400 LB/TON 3-HOUR AVERAGE
Emission Limit 2:
Standard Emission: 0.1400 LB/T 3-HOUR AVERAGE
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP , SIP

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 7.1 lbs PM/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM

Test Method: EPA/OAR Mthd 201A and 202

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.1800 LBS/TON 3-HOUR AVERAGE

Emission Limit 2:

Standard Emission: 0.1800 LB/T 3-HOUR AVERAGE

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NESHAP , NSPS , SIP

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 8.8 lbs PM10/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.1050 LBS/TON 3-HOUR AVERAGE

Emission Limit 2:

Standard Emission: 0.1050 LB/T 3-HOUR AVERAGE

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP , SIP

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Emission 3: BACT limit does not apply during periods when the kiln is on hot stand-by with no stone feed to kiln or kiln is operating at less than 30 percent of capacity, provided, however, the emission limit of 5.24 lbs PM2.5/hr, 3-hour avg continues to apply during these periods and serves as BACT.

POLLUTANT NAME: Carbon Dioxide Equivalent (CO2e)

CAS Number: CO2e

Test Method: Other

Other Test Method: CEMS

Pollutant Group(s): (Greenhouse Gasses (GHG))

Emission Limit 1: 2744.0000 LBS/TON LIME 12-MONTH ROLLING AVERAGE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Use of preheater or other similar heat recovery system, selection of refractory and implementation of kiln seal management program.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Limit may be lowered based on the demonstrated performance of kilns.

Process/Pollutant Information

PROCESS NAME: Limestone Handling Operations (Stack Emissions)

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes: Limestone handling operation includes storage bins, conveying system, transfer points, bulk loading or unloading system, screening operations, bucket elevators, and belt conveyors subject to 40 CFR 63 Subpart 5A. Limestone handling operation also includes crushers, grinding mills, screening operations, bucket or belt conveyors, conveyor transfer points, storage bins and enclosed truck loading station subject to 40 CFR 60 Subpart OOO.

POLLUTANT NAME: Particulate matter, filterable (FPM)

CAS Number: PM

Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0140 GR/DSCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP , SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No
Pollutant/Compliance Notes: 7 percent opacity

Process/Pollutant Information

PROCESS NAME: Limestone Handling Operations (Fugitive Emissions)
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: Unspecified
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: NSPS , NESHAP , SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No

Pollutant/Compliance Notes: Limit 1: opacity of emissions less than 7%. Limit 2: opacity of emissions less than 12% for each crusher without capture system.

Process/Pollutant Information

PROCESS NAME: Limestone Handling Operations (Enclosed Building Emissions)

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes:

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: EPA/OAR Mthd 9

Pollutant Group(s):

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NSPS , NESHAP , SIP

Control Method: (P) Enclosure

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: No visible emissions from buildings.

Process/Pollutant Information

PROCESS NAME: Solid Fuel Handling

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes:

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: EPA/OAR Mthd 22
Pollutant Group(s):
Emission Limit 1:
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: U
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (N)
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: Unknown
Pollutant/Compliance Notes: If not in a building: Fugitive: Opacity < 10%; and Stack: 0.004 gr/dscf; opacity < 7% If unit is enclosed in a building:

Process/Pollutant Information

PROCESS NAME: Lime Barge Loadout
Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)
Primary Fuel:
Throughput: 0
Process Notes:

POLLUTANT NAME: Particulate matter, filterable (FPM)
CAS Number: PM
Test Method: EPA/OAR Mthd 5
Pollutant Group(s): (Particulate Matter (PM))
Emission Limit 1: 0.0040 GR/SCF
Emission Limit 2:
Standard Emission:
Did factors, other then air pollution technology considerations influence the BACT decisions: N
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements: SIP
Control Method: (A) Telescoping loading spout with suction or aspiration at discharge end and a filter system.
Est. % Efficiency:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Compliance Verified: No

Pollutant/Compliance Notes: Opacity from fugitive emissions: 20% Opacity from control device: 7%

Process/Pollutant Information

PROCESS NAME: Truck and Rail Loadout

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel:

Throughput: 0

Process Notes: Loadout of quicklime and off-specification lime

POLLUTANT NAME: Particulate matter, filterable (FPM)

CAS Number: PM

Test Method: EPA/OAR Mthd 5

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 0.0040 GR/SCF

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP

Control Method: (A) Partial enclosure; fabric filters to treat displaced air during loadout; and loadout practices to minimize spillage.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: No

Pollutant/Compliance Notes: Opacity: 7%

POLLUTANT NAME: Visible Emissions (VE)

CAS Number: VE

Test Method: EPA/OAR Mthd 22

Pollutant Group(s):

Emission Limit 1: VE

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: N

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: SIP

Control Method:	(A) Partial enclosure; fabric filters to treat displaced air during loadout; and loadout practices to minimize spillage.
Est. % Efficiency:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Compliance Verified:	No
Pollutant/Compliance Notes:	No visible emissions of fugitive PM except for periods not to exceed a total of 2.5 minutes in any one hour period.

Facility Information

RBLC ID:	FL-0341 (final)	**Date Determination Last Updated:**	05/05/2016
Corporate/Company Name:	JACKSONVILLE LIME	**Permit Number:**	0310583-001-AC
Facility Name:	JACKSONVILLE LIME	**Permit Date:**	02/20/2014 (actual)
Facility Contact:	NICK CAGGIANO NICK.CAGGIANO@CARMEUSENA.COM	**FRS Number:**	110040335161
Facility Description:	Lime manufacturing plant with two twin-shaft vertical parallel-flow regenerative lime kilns, capable of firing petcoke, coal, natural gas, and wood chips. Nominal average production rate is 330 tons/day of lime (maximum 396 tons/day).	**SIC Code:**	3274
Permit Type:	A: New/Greenfield Facility	**NAICS Code:**	327410
Permit URL:	http://arm-permit2k.dep.state.fl.us/nontv/0310583.002.AC.F.ZIP		
EPA Region:	4	**COUNTRY:**	USA
Facility County:	DUVAL		
Facility State:	FL		
Facility ZIP Code:	32206		
Permit Issued By:	FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (Agency Name) MR. DAVID READ(Agency Contact) (850) 717-9000 David.Read@dep.state.fl.us		
Permit Notes:	Technical evaluation of BACT available at http://arm-permit2k.dep.state.fl.us/nontv/0310583.002.AC.D.ZIP		

Affected Boundaries:

Boundary Type:	Class 1 Area State:	Boundary:	Distance:
CLASS1	GA	Okefenokee	< 100 km
CLASS1	GA	Wolf Island	100km - 50km

Facility-wide Emissions:

Pollutant Name:	Facility-wide Emissions Increase:
Carbon Monoxide	412.0000 (Tons/Year)
Nitrogen Oxides (NOx)	345.0000 (Tons/Year)
Particulate Matter (PM)	62.0000 (Tons/Year)
Sulfur Oxides (SOx)	157.0000 (Tons/Year)
Volatile Organic Compounds (VOC)	19.0000 (Tons/Year)

Process/Pollutant Information

PROCESS NAME: Two vertical lime kilns

Process Type: 90.019 (Lime/Limestone Handling/Kilns/Storage/Manufacturing)

Primary Fuel: Natural gas

Throughput: 330.00 tons of lime per day

Process Notes: Fueled by natural gas, petcoke, coal, and wood chips. Nominal production rate of 330 tons of lime per day per kiln (maximum of 396 tons/day per kiln). Twin-shaft vertical parallel flow regenerative lime kilns (Cimprogetti – FS Design, or equivalent). Approx. 44 MMBtu/hr heat input per kiln

POLLUTANT NAME: Nitrogen Oxides (NOx)

CAS Number: 10102

Test Method: Other

Other Test Method: NOx CEMS

Pollutant Group(s): (InOrganic Compounds , Oxides of Nitrogen (NOx) , Particulate Matter (PM))

Emission Limit 1: 350.0000 MG / N CU METER 30-DAY ROLLING AVG, FOR COAL & PETCOKE

Emission Limit 2: 100.0000 MG / N CU METER 30-DAY ROLLING AVG, FOR NATURAL GAS

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) Production capacity cap of 396 tons of lime per day per kiln. Operations, Maintenance and Monitoring (OM&M) Plan and Startup, Shutdown, and Malfunction (SSM) Plan required. Required to maintain low-temperature combustion to reduce thermal NOx emissions. Required to use efficient PFR kiln design to minimize fuel use and pollutant emissions.

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: NOx CEMS required. Compliance is based on 30-operating-day rolling average, based on the relative heat inputs of the four authorized fuels. Petcoke/coal: 350 milligrams per normal cubic meter (approx. 31.9 lb/hr) Natural gas: 100 milligrams per normal cubic meter (approx. 8.3 lb/hr) Wood chips: 500 milligrams per normal cubic meter (approx. 43.6 lb/hr) Permittee must maintain records of the use of the various permitted fuels.

POLLUTANT NAME: Sulfur Dioxide (SO2)

CAS Number: 7446-09-5

Test Method: Other

Other Test Method: SO2 CEMS

Pollutant Group(s): (InOrganic Compounds , Oxides of Sulfur (SOx))

Emission Limit 1: 200.0000 MG / N CU METER 30-DAY ROLLING AVERAGE, PETCOKE & COAL

Emission Limit 2: 50.0000 MG / N CU METER 30-DAY ROLLING AVERAGE, NAT GAS & WOOD

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) -Inherent scrubbing of burning zone exhaust gases by hot lime and of kiln exhaust gases by incoming limestone to reduce SO2 and sulfuric acid mist (SAM); -Use of fabric filters (baghouses) to control emissions of PM, PM10 and PM2.5 and provide further control of SO2 and SAM on the filter cake. - Overall lime production cap

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: SO2 CEMS required. Compliance based on 30-day rolling average and weighted 30-day fuel usage records. Petcoke & coal: 200 milligrams per normal cubic meter (approx. 18.2 lb/hr) Natural gas & wood: 50 milligrams per normal cubic meter (approx. 4.2 lb/hr) Record of fuel usage required.

POLLUTANT NAME: Carbon Monoxide

CAS Number: 630-08-0

Test Method: EPA/OAR Mthd 10

Pollutant Group(s): (InOrganic Compounds)

Emission Limit 1: 400.0000 MG / N CU METER PETCOKE, COAL, WOOD

Emission Limit 2: 200.0000 MG / N CU METER NATURAL GAS

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (P) -Efficient, vertical twin shaft PFR kiln design to minimize fuel use and resulting emissions of all pollutants; -Thorough mixing and residence time through preheat section to complete burnout of CO and volatile organic compounds (VOC); -Lime production cap

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Method 10 stack tests -- one compliance test for solid fuels, and one for natural gas.

POLLUTANT NAME: Particulate matter, total (TPM)

CAS Number: PM

Test Method: Other

Other Test Method: EPA Method 5

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1: 10.0000 MG / N CU METER

Emission Limit 2: 0.1000 LB / TON STONE FEED

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: NESHAP

Control Method: (A) -Baghouse for each kiln; -Efficient, vertical twin shaft PFR kiln design to minimize fuel use and resulting emissions of all pollutants;

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: 0.10 lb/ton of stone feed from NESHAP Subpart AAAAA 10 milligrams per normal standard cubic meter for BACT PM standard, may be demonstrated using any combination of fuels.

POLLUTANT NAME: Particulate matter, total < 2.5 µ (TPM2.5)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements:

Control Method: (A) Baghouse

Est. % Efficiency:

Cost Effectiveness: 0 $/ton

Incremental Cost Effectiveness: 0 $/ton

Compliance Verified: Unknown

Pollutant/Compliance Notes: Compliance using the methods for BACT PM, SO2 and NOX shall indicate compliance with BACT for PM10 and PM2.5.

POLLUTANT NAME: Particulate matter, total < 10 µ (TPM10)

CAS Number: PM

Test Method: Unspecified

Pollutant Group(s): (Particulate Matter (PM))

Emission Limit 1:

Emission Limit 2:

Standard Emission:

Did factors, other then air pollution technology considerations influence the BACT decisions: U

Case-by-Case Basis: BACT-PSD

Other Applicable Requirements: