Statement of Basis

Air Quality Construction Permit

Pete Lien and Sons

Rapid City, South Dakota

South Dakota Department of Environment and Natural Resources

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1.0 Background

Pete Lien and Sons, Inc. (Pete Lien) owns and operates a lime manufacturing plant in Rapid City, South Dakota. In addition, Pete Lien also owns and operates Cheyenne River Spec Mix, Dakota Block Company, and Birdsall Sand and Gravel, all of which fall under the same two digit Standard Industrial Classification Code and are in close proximity to each other. In the last renewal, DENR included all four facilities under one Title V air quality permit (Permit No. 28.1143-02). DENR has determined that for Prevention of Significant Deterioration (PSD) air quality permitting purposes all four of these facilities shall be treated as a single source.
In June 2015, Pete Lien sold Dakota Block and Cheyenne River Spec Mix. The pending renewal application will reflect these changes. For purposes of this review, those facilities will be included since two separate operating permits are pending with DENR.

On July 6, 2015, Pete Lien submitted an application to the South Dakota Department of Environment and Natural Resources (DENR) to construct and operate additional equipment at the lime plant to collect lime ash for re-sale. The application was considered complete on August 14, 2015. However, additional information was received on October 14, 2015.

1.1 Existing Equipment

Table 1-1 provides a list of the units presently permitted which was taken from the current Title V air quality operating permit issued as modified on November 28, 2012.

Table 1-1 – Description of Permitted Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Air Pollution Control Device
Quarry and Lime Plant Operations			
#1	ID #1 – 1972 Universal impact primary crusher, feeder hopper, and associated transfer points	500 tons per hour	2000 Mac Equipment pulse jet baghouse
#2	ID #2 – 1997 Cedar Rapids impact secondary crusher and associated transfer points	1,000 tons per hour	2000 Mac Equipment pulse jet baghouse
#3	ID #3 – 1993 Stedman tertiary crusher and associated transfer points	350 tons per hour	2000 Mac Equipment pulse jet baghouse
#4a	ID #4 – Rotary Kiln #1 (K121), pre heater, contact cooler, coal mill, and associated transfer points. The kiln is fired with subbituminous coal	90 million Btus per hour heat input and a process rate of 34.9 tons per hour [1]	1978 Joy Manufacturing Company reverse air baghouse with multiclone
#4b	Cooler pit elevator (ID #33 – MT-51), and associated transfer points (ID #33 – MT-52)	23 tons per hour	1978 Johnson March pulse jet baghouse
#5	1979 Stedman pebble lime crusher (ID #5), quick lime	ID #5 = 30 tons per hour	1999 Torit (Donaldson) pulse jet baghouse

Unit	Description	Maximum Operating Rate	Air Pollution Control Device
	screen (ID #20), and associated transfer points (ID #33 – MT-55, MT-56, and MT-57)	ID #20 = 70 tons per hour	
#7	1982 Gundlack pebble lime crusher (ID #7), hummer screen (ID #30), and associated transfer points	ID #7 = 20 tons per hour ID #30 = 100 tons per hour	1991 MAC pulse jet baghouse
#8	1965 large lime hydrator (ID #8) and hammer mill (ID #10)	25 tons per hour	1970 Ducon venturi wet scrubber
#9	1952 Harding small lime hydrator (ID #9) and hammer mill (ID #10)	12 tons per hour	1969 Ducon venturi wet scrubber
#11	1955 Saint Regis pebble lime bagging machine (ID #11) and 2004 Choice hydrated lime bagging machines (ID #12), hydrate feed hopper, and associated transfer points	ID #11 = 18 tons per hour ID#12 = 12 tons per hour	Norblo shaker baghouse
#12	ID #13 – Old front load out and truck tank pressurization during loading	45 tons per hour	1999 Torit (Donaldson) pulse jet baghouse
#13	ID #14 – New front pebble lime load and associated transfer points	160 tons per hour	1991 MAC pulse jet baghouse
#14	ID #15 – 1976 rear load out and truck tank pressurization during loading	75 tons per hour	1999 Torit (Donaldson) pulse jet baghouse
#15	ID #16 – New fines tank load out	62 tons per hour	1991 Midwest International baghouse
#16	ID #17 – 2010 Deister triple deck primary screen and associated transfer points	870 tons per hour	2000 Mac pulse jet baghouse
#17	ID #18 – 2009 Kolberg-Pioneer 3-deck secondary screen and associated transfer points	950 tons per hour	2000 Mac pulse jet baghouse
#18	ID #19 – 1982 Pioneer 3-deck tertiary screen and associated transfer points	750 tons per hour	2000 Mac pulse jet baghouse
#21	ID #22 – 1959 Allis Chalmers tipple screen and associated transfer points	300 tons per hour	1974 Johnson-March pulse jet baghouse
#22	ID #24 – Brock hydrated lime storage tank, North pebble lime storage tank, and associated	30 tons per hour	1991 MAC pulse jet baghouse

Unit	Description	Maximum Operating Rate	Air Pollution Control Device
	transfer points		
Cheyenne River Spec Mix Plant			
#25	Custom Welding rotary kiln dryer and transfer to elevated storage bin. The dryer is fired with natural gas.	25 million Btus per hour heat input and a process rate of 40 tons per hour	Jet Aire pulse jet baghouse
#26	Con-E-Co cement silo, Model # PI-300	40 tons per hour	Baghouse
#27	Con-E-Co fly ash silo, Model #PI-300	40 tons per hour	Baghouse
#28	Con-E-Co lime silo, Model #PI-300	40 tons per hour	Baghouse
#29	Five Con-E-Co aggregate silos, Model #PI-300	8 tons per hour (each silo)	Baghouse
Dakota Block Company			
#30	1924 Allis Chalmers rotary kiln fired with natural gas	20 million Btus per hour heat input and a process rate of 15 tons per hour	1988 Ducon cyclone wet scrubber
#31	Two – 1972 Dakota Steel and Supply cement silos	32 tons per hour	Dusty Dustless baghouse
Birdsall Sand and Gravel			
#32	1975 Rexnord concrete plant, model #1018-80DPR339 - sand and aggregate transfer system, weigh hopper and mixer loading	220 cubic yards per hour	Not Applicable
#33	Cement silo 1	30 tons per hour	1974 Mikro Pulsair baghouse
#34	Cement silo 2	30 tons per hour	1974 Mikro Pulsair baghouse
#35	Cement silo 3	30 tons per hour	1974 Mikro Pulsair baghouse
#36	Fly ash silo	30 tons per hour	1974 Mikro Pulsair baghouse
#37	2000 Kemco Systems, natural gas fired water heater	9 million Btus per hour	Not Applicable
#38	Cement silo 4	30 tons per hour	2003 Con-E-Co pulse jet baghouse
Operations Associated with Kiln #2.			
#39	D-231 C-231 feed, E-231 boot, N-222 cooler discharge, R-251, T-234 core bin, C-232 feed, and E-232 boot, U-234 load spout	75 tons per hour	Baghouse with a maximum fan flow rate of 1,346 dscfm [3]
#41	D-241: S-241 screen, T-241	75 tons per hour	Baghouse with a

Unit	Description	Maximum Operating Rate	Air Pollution Control Device
	silo, T-242 silo, T-243 silo, C-242 feed, blow line, E-232 head		maximum fan flow rate of 5,290 dscfm [3]
#42	D-261: U-261 load spout	200 tons per hour	Baghouse with a maximum fan flow rate of 1,346 dscfm [3]
#43	D-262: U-262 load spout	200 tons per hour	Baghouse with a maximum fan flow rate of 1,346 dscfm [3]
#44	D-263: U-263 load spout	200 tons per hour	Baghouse with a maximum fan flow rate of 1,346 dscfm [3]
#45	Kiln #2 (K221) – preheater, contact cooler and rotary kiln fired with natural gas and subbituminous coal and/or petroleum coke	50 tons stone feed per hour and 25 tons of produced lime per hour	Baghouse with a maximum fan flow rate of 44,592 dscfm [3]
#46	D-288: T-288 – dust silo	3.5 tons per hour	Baghouse with a maximum fan flow rate of 2,035 dscfm [3]
#47	D-289: U-289 – load spout	200 tons per hour	Baghouse with a maximum fan flow rate of 1,346 dscfm [3]
#48	D-291: T-291 coal silo and T-292 coke silo	20 tons per hour	Baghouse with a maximum fan flow rate of 897 dscfm [3]
Fugitive Sources			
ID #21	2001 Oldenburg-Stampler mobile feeder breaker crusher	1,200 tons per hour	Two spray bars – Capable of 30 to 75 gallons of water per hour
ID #25	1997 Extec rock screen	500 tons per hour	Spray bars
C-051	Belt conveyor transfer points	870 tons per hour	Not applicable
C-052	Belt conveyor transfer points	870 tons per hour	Not applicable
C-053	Belt conveyor transfer points	870 tons per hour	Not applicable
S-052	Belt conveyor transfer points	870 tons per hour	Not applicable
T-291	Coal silo	240 tons per day	Not applicable

[1] – The maximum operating rate is actually 40 tons per hour. The process rate of 34.9 tons per hour is based on a 1998 stack performance test that was not performed within 90 percent of the maximum operating rate for the unit;

[2] – "dscfm" means dry standard cubic feet per minute.

1.2 Proposed Construction

Pete Lien proposes to add a lime kiln dust circuit to the existing lime kiln operations. The production design capacity would be 24 tons per hour. The proposed circuit will consist of a hopper, two straight section screw conveyors, a natural gas air dryer/heater, a Raymond 66" roller mill controlled by a baghouse, two blowers, an elevator, and a final product silo for loadout. Pete Lien indicated that the equipment will be within the existing lime plant footprint and will begin at Unit #46. The facility also stated the mill and cyclone will be under negative pressure. The lime kiln dust circuit will crush the lime kiln dust generated from lime kilns #1 and #2 (Units #4 and #45).

The lime kiln dust will be sent to the roll mill and processed from 60% passing a 200 mesh sieve to approximately 90% passing a 325 mesh sieve. The final crushed product will then be mechanically conveyed to a storage silo to be loaded into a truck for final sale. The circuit will reduce the lime kiln dust waste and reduce fugitive emission from transportation, handling, storage, and disposal since the lime kiln dust is currently loaded into a truck and transported to Pete Lien's rubble site. The facility estimates to process 210,240 tons of lime kiln dust per year. Pete Lien included potential emissions estimates in the application. Table 1-2 summarizes the proposed equipment.

Table 1-2 – Proposed Equipment

Description	Operating Rate	Control Device
Hopper material transfer	210,240 tons per year	Not applicable
Screw conveyor material transfer with 3 transfer points	210,240 tons per year	Not applicable
Natural gas dryer/heater	1.3 million Btus per hour	Not Applicable
Raymond 66" roll mill	210,240 tons per year	Baghouse
Cyclone material transfers with 2 transfer points	210,240 tons per year	Not applicable
Screw conveyor material transfer with 2 transfer points	210,240 tons per year	Not applicable
Elevator material transfer	210,240 tons per year	Not applicable
Final product silo	210,240 tons per year	Baghouse
Final product silo transfer to truck	210,240 tons per year	Not applicable

2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards (NSPS) listed in the Code of Federal Regulation to determine applicability to each unit. The following may be applicable to Pete Lien:

2.1 Standards for Lime Manufacturing Plants – Subpart HH

The provisions of 40 CFR Part 60, Subpart HH, Standards of Performance for Lime Manufacturing Plants, are applicable to each rotary lime kiln used in the manufacturing of lime and was constructed or modified after May 3, 1977.

Currently, Units #4a and #45 are applicable to Subpart HH. Since the lime kiln dust circuit will not be part of the lime manufacturing process, the proposed equipment will not be subject to this subpart.

2.2 Standards for Nonmetallic Mineral Processing Plants – Subpart OOO

The provisions of 40 CFR Part 60, Subpart OOO, Standard of Performance for Nonmetallic Mineral Processing Plants, are applicable to each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, and enclosed truck or railcar loading station manufactured after August 31, 1983. Nonmetallic mineral means any of the following minerals or any mixture of which the majority is crushed and broken stone, including limestone, slate, and shale. The equipment associated with the proposed construction project is applicable to Subpart OOO.

Table 2-1 lists all applicable units and requirements.

Table 2-1 – Subpart OOO Affected Units and Limits

Description	Control Device	Opacity limit	Particulate limit
Hopper material transfer	Not applicable	7 percent	Not applicable
Screw conveyor material transfer with 3 transfer points	Not applicable	7 percent	Not applicable
Raymond 66” roll mill	Baghouse	Not applicable	0.014 gr/dscf [1]
Cyclone material transfers with 2 transfer points	Not applicable	7 percent	Not applicable
Screw conveyor material transfer with 2 transfer points	Not applicable	7 percent	Not applicable
Elevator material transfer	Not applicable	7 percent	Not applicable
Final product silo	Baghouse	7 percent	Not applicable
Final product silo transfer to truck	Not applicable	7 percent	Not applicable

[1] – Unit means “Grains per dry standard cubic foot.”

2.3 Standards Applicable to Boilers -Subparts D/Db/Dc

There are three New Source Performance Standards for fossil fuel-fired steam generators. The three standards are applicable to the following steam generators:

1. 40 CFR Part 60, Subpart D: applicable to a steam generator with a maximum operating rate of 250 million Btus per hour or more and commenced construction after August 17, 1971;

2. 40 CFR Part 60, Subpart Db: applicable to a steam generator with a maximum operating rate of 100 million Btus per hour or more and commenced construction after June 19, 1984; and
3. 40 CFR Part 60, Subpart Dc: applicable to a steam generator with a minimum design heat input capacity equal to or greater than 10 million Btus per hour but less than or equal to 100 million Btus per hour and commenced construction after June 9, 1989.

Pete Lien proposes to install a 1.3 million Btu per hour natural gas fired dryer/heater. The proposed unit is not a steam generator and its maximum operating rate is less than 10 million Btus per hour; therefore, the unit is not applicable to any of these subparts.

2.4 Other Applicable New Source Performance Standards

DENR reviewed the other New Source Performance Standards and determined there are no other standards applicable to Pete Lien's operations.

3.0 New Source Review

ARSD 74:36:10:01 notes that new source review regulations in this chapter apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. The facility is located near Rapid City in Pennington County, South Dakota, which is in attainment for all the pollutants regulated under the Clean Air Act. Therefore, the project is not subject to the new source review requirements in this chapter.

4.0 Prevention of Significant Deterioration

Any stationary source which emits or has the potential to emit 250 tons per year or more of any air pollutant is considered a major source and is subject to prevention of significant deterioration (PSD) requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). Any stationary source which emits or has the potential to emit 100 tons per year or more of any air pollutant and is one of the 28 named PSD source categories is subject to PSD requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). The following is a list of regulated pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate matter with a diameter less than or equal to 10 microns (PM_{10});
3. Particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$);
4. Sulfur dioxide (SO_2);
5. Nitrogen oxides (NO_x);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOC);
8. Lead;
9. Greenhouse gases (carbon dioxide, nitrous oxide, methane, etc.)
10. Fluorides;
11. Sulfuric acid mist;

12. Hydrogen sulfide;
13. Reduced sulfur compounds; and
14. Total reduced sulfur.

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the Federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases.

On June 24, 2014, the US Supreme Court decided greenhouse gases may not be regulated under the PSD program unless the facility requires a PSD permit for the other regulated air pollutants. Therefore, the greenhouse gas emissions from the proposed change will not be reviewed unless the proposed change is subject to a PSD review.

Pete Lien and Sons is an existing major source of PM, PM_{10}, SO_2, NOx, and CO under the PSD program; but was not initially subject to PSD review because the operations were constructed prior to the promulgation of the PSD rules. Once a source is considered major for any pollutant all the other regulated pollutants are compared to the significant rate threshold to determine if the other regulated pollutants are subject to a PSD review.

4.1 PSD Pollutant Applicability

The primary criterion to determine PSD applicability is whether the proposed project is considered a major modification is based on its potential emissions. Potential to emit is the capability at maximum design capacity to emit a pollutant, except as constrained by federally enforceable permit conditions.
For an existing major stationary source, if both the potential increase in emissions due to the modification itself, and the resulting net emissions change of any regulated or non-criteria pollutants are equal to or greater than the respective pollutant's significant emission rate, the modification is a major modification subject to PSD review.

The PSD regulations have established the following procedure for determining if a proposed project is subject to a PSD review:

1. Determine the potential increase from the proposed project and compare it to the significant emission rates in 40 CFR § 52.21(b)(23). If the potential increase is greater than the significant emission rate, proceed; if not, the source is not subject to a PSD review.
2. Determine the beginning and ending dates of the contemporaneous period as it relates to the proposed modification.
3. Determine which emissions units at the source experienced (or will experience, including any proposed decreases resulting from the proposed project) a creditable increase or decrease in emissions during the contemporaneous period.
4. Determine which emissions changes are creditable.
5. Determine, on a pollutant-by-pollutant basis, the amount of each contemporaneous and creditable emissions increase and decrease.

6. Sum all contemporaneous and creditable increases and decreases with the increase from the proposed modification to determine if a significant net emissions increase will occur.

The six-step procedure is discussed in detail in the following subsections.

4.2 Potential to Emit Criteria Pollutants

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

The only potential emission increase for the proposed equipment would be particulate matter. Pete Lien submitted estimated potential particulate matter emission increases.

Some of the equipment being installed is considered a fugitive source. In accordance with 40 CFR §51.165, if the facility is one of the 28 source categories, potential emissions from fugitive sources are included in the potential to emit to determine if a PSD is required. Pete Lien's operations are one of the 28 source categories and fugitive emissions from the proposed construction project will be used to determine if PSD is applicable. The emission factors in Tables 4-1 and 4-2 will be used to calculate uncontrolled and controlled particulate matter emissions, respectively and results are shown in Tables 4-5 and 4-7.

Table 4-1- Uncontrolled Emission Factors (pounds per ton)

Unit Description	PM	PM_{10}	$PM_{2.5}$	Source
Hopper Material Transfer	0.0154	0.0073	0.0011	AP-42, 13.2.4 (11/06)
Screw Conveyor Material Transfer	0.0154	0.0073	0.0011	AP-42, 13.2.4 (11/06)
Raymond 66" Roll Mill & Baghouse	0.0030	0.0011	0.0011[1]	AP-42, 11.19-2-2 (08/04)
Cyclone Material Transfer	2.2	2.2[2]	2.2[2]	AP-42, 11.17-4 (02/98)
Screw Conveyor Material Transfer	0.0154	0.0073	0.0011	AP-42 13.2.4 (11/06)
Elevator Material Transfer	0.0154	0.0073	0.0011	AP-42 13.2.4 (11/06)
Final Product Silo with Existing Baghouse	0.61	0.61[2]	0.61[2]	AP-42 11.17-4 (02/98)
Final Product Silo Transfer to Truck	1.5	1.5[2]	1.5[2]	AP-42 11.17-4 (02/98)

[1] – No PM2.5 data available; therefore, PM10 data was used; and
[2] – No PM10 data available; therefore, PM data was used.

Table 4-2 - Controlled Emission Factors (pounds per ton)

Unit Description	PM	PM_{10}	$PM_{2.5}$	Source
Hopper Material Transfer	0.0023	0.0011	0.0002	AP-42, 13.2.4 (11/06)
Screw Conveyor Material Transfer	0.0023	0.0011	0.0002	AP-42, 13.2.4 (11/06)
Raymond 66" Roll Mill & Baghouse	0.00014	0.00005	0.00001	AP-42, 11.19-2-2 (08/04)
Cyclone Material Transfer	2.2	2.2[1]	2.2[1]	AP-42, 11.17-4 (02/98)
Screw Conveyor Material Transfer	0.0023	0.0011	0.0002	AP-42 13.2.4 (11/06)
Elevator Material Transfer	0.0023	0.0011	0.0002	AP-42 13.2.4 (11/06)
Final Product Silo with Existing Baghouse	0.61	0.61[2]	0.61[2]	AP-42 11.17-4 (02/98)

Final Product Silo Transfer to Truck	1.5	1.5[1]	1.5[1]	AP-42 11.17-4 (02/98)

[1] – No PM10 data available; therefore, PM data was used.

Potential controlled and uncontrolled emissions for all units except the dryer/heater were calculated using Equation 4-1.

Equation 4-1 – Potential Emission Calculation

$$Potential\ Emissions \frac{tons}{year} = Emission\ Factor \frac{lbs}{ton} \times Annual\ Operating\ Rate \frac{tons}{year} \div 2{,}000 \frac{pounds}{ton}$$

4.2.1 Criteria Pollutant Emissions from the Dryer/Heater

The dryer/heater is fired with natural gas. In AP-42, Chapter 1.4, emission factors are determined by the unit's designed gross heat input rate. The proposed dryer/heater has a gross heat input rating of less than 100 million Btus per hour and the emission factors for firing this unit are listed in Table 4-3.

Table 4-3 – Dryer/heater Emission Factors (pounds per million cubic feet)

Unit Description	PM [1]	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO	Source
Dryer/heater – Natural Gas	7.6	7.6	7.6	0.6	100.0	5.5	84.0	AP-42, 1.4-1 and 1.4-2 (7/98)

[1] – All of the particulate emitted by a boiler fueled with natural gas is assumed to be less than 0.1 microns in diameter. Therefore, the emission factor for PM10 and PM2.5 are equivalent to PM.

In order to calculate potential emission for the dryer/heater DENR converted the AP-42 emission factors from units of pounds per volume of fuel burned to pounds per million Btu of heat input based on a natural gas heat capacity of 1,050 million Btus per million cubic feet. The resulting values are shown in Table 4-4.

Table 4-4 – Emission Factor Comparison (pounds per MMBtus)

Fuel	TSP	PM_{10}	$PM_{2.5}$	SO_2	NOx	VOC	CO
Natural Gas	0.0072	0.0072	0.0072	0.0006	0.0952	0.0052	0.0800

DENR used Equation 4-2, the unit's listed heat input capacity, and the appropriate emission factors in Table 4-4 to determine the greatest potential emissions from each dryer/heater. The results are displayed in Table 4-7.

Equation 4-2 – Calculating Potential Dryer/heater Emissions

$$\text{Potential} \frac{\text{tons}}{\text{yr}} = 8{,}760 \frac{hrs}{yr} \times heat\ input \frac{MMBtus}{hr} \times emission\ factor \frac{lbs}{MMBtus} \div 2{,}000 \frac{lbs}{ton}$$

Uncontrolled particulate matter potential emissions from the proposed equipment are shown in Table 4-5.

Table 4-5 - Uncontrolled Potential Emissions (tons per year)

Description	**PM**	**PM_{10}**	**$PM_{2.5}$**
Hopper Material Transfer	1.62	0.77	0.12
Screw Conveyor Material Transfer	4.85	2.30	0.35
Raymond 66” Roll Mill & Baghouse	2.05	0.79	0.79
Cyclone Material Transfer	231.26	231.26	231.26
Screw Conveyor Material Transfer	3.24	1.53	0.23
Elevator Material Transfer	1.62	0.77	0.12
Final Product Silo with Existing Baghouse	64.12	30.48	10.72
Final Product Silo Transfer to Truck	157.68	157.68	157.68
Total	**466**	**426**	**401**

Table 4-6 lists the control efficiencies for the proposed equipment as submitted in the application.

Table 4-6 - Percent of Controlled Potential Emissions (tons per year)

Description	**Percentage**
Hopper Material Transfer	85%
Screw Conveyor Material Transfer	85%
Raymond 66” Roll Mill & Baghouse	99%
Cyclone Material Transfer	99%
Screw Conveyor Material Transfer	85%
Elevator Material Transfer	95%
Final Product Silo with Existing Baghouse	99%
Final Product Silo Transfer to Truck	99%

Table 4-7 shows potential controlled emissions for all equipment proposed to operate the lime kiln circuit.

Table 4-7 - Controlled Potential Emissions (tons per year)

Description	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**NOx**	**VOC**	**CO**
Hopper Material Transfer	0.24	0.11	0.02	-	-	-	-
Screw Conveyor Material Transfer	0.73	0.34	0.05	-	-	-	-
Raymond 66” Roll Mill & Baghouse	0.16	0.06	0.06	-	-	-	-
Cyclone Material Transfer	2.31	2.31	2.31	-	-	-	-
Screw Conveyor Material Transfer	0.49	0.23	0.03	-	-	-	-
Elevator Material Transfer	0.08	0.04	0.01	-	-	-	-
Final Product Silo with Existing Baghouse	0.64	0.30	0.11	-	-	-	-
Final Product Silo Transfer to Truck	1.58	1.58	1.58	-	-	-	-
Dryer/heater – Natural Gas	0.04	0.04	0.04	0.00	0.54	0.03	0.46
Total	**6**	**5**	**4**	**0**	**1**	**0**	**0**

4.3 Proposed Potential Point Source Emission Increases

As outlined in 40 CFR § 52.21(a)(2), to determine if there is a potential increase in emissions from the proposed project, each increase of emissions from both existing and new emissions shall be summed together and compared to the PSD permitting thresholds. During step 1, decreases in emissions associated with the project are not considered.

The increase of emissions is the "positive" difference between the projected actual emissions and baseline actual emissions (projected – baseline). For new emission units the baseline actual emissions shall equal zero (40 CFR § 52.21(b)(48)(iii)). Since the project involves the addition of equipment, the project will have an increase from the existing operation.

To determine applicability and to determine its recommendations for enforceable conditions, DENR considered two operating scenarios, which are as follows:

Option #1 – Uncontrolled operations with 210, 240 tons of lime kiln dust produced per year; and
Option #2 – Controlled operations with 210, 240 tons of lime kiln dust produced per year.

The potential emissions for the two scenarios were calculated based on Equation 4-1 and summarized in Table 4-8. There will be no sulfur dioxide, nitrogen oxide, volatile organic compound, carbon monoxide, hydrogen sulfide, reduced sulfur compounds and total reduced sulfur and carbon dioxide equivalent emissions from the proposed sources.

Table 4-8 – Significant Emission Comparison (tons per year)

Pollutant	Uncontrolled Potential Emissions	Controlled Potential Emissions	Significant Rate	PSD Review
TSP	466	6	25	**Yes/No**
PM_{10}	426	5	15	**Yes/No**
$PM_{2.5}$ (direct)[1]	401	4	10	**Yes/No**
$PM_{2.5}$ (as SO_2)	0	0	40	**No**
$PM_{2.5}$ (as NOx)	0	0	40	**No**
Sulfur dioxide	0	0	40	**No**
Nitrogen oxides	1	1	40	**No**
Carbon monoxide	0	0	100	**No**
Ozone (as VOC)	0	0	40	**No**
Ozone (as NOx)	0	0	40	**No**
Lead	0	0	0.6	**No**
Greenhouse Gases	0	0	100,000 75, 000	**No**

1 – PM2.5 (direct) is expected to be less than PM10 emissions, for simplicity of calculations PM2.5 (direct) was assumed to be equivalent to PM10 emissions for the analysis.

A PSD review does not need to be conducted on the dryer/heater since potential particulate matter emissions are less than 0.5 tons per year and can be considered insignificant. The uncontrolled potential emissions at the maximum rated capacity for the proposed project are

greater than significant rate and would need other steps to determine PSD applicability. The controlled potential emissions at the maximum rated capacity for the proposed project are less than significant rate and do not need to consider the other steps in process to determine if PSD is applicable. In addition, DENR will include a grain loading limit for the baghouses of 0.014 grains per cubic foot to represent the controlled emission factors. Therefore, the permit will require control devices to be used for the proposed project limiting controlled emissions to less than the significant level so no further analysis is required and this project is not applicable to the PSD program.

5.0 National Emission Standards for Hazardous Air Pollutants (Part 61)

DENR reviewed 40 CFR Part 61 to determine its applicability. Currently, there are no finalized or promulgated National Emissions Standards for Hazardous Air Pollutants standards in 40 CFR Part 61 applicable to the proposed construction project.

6.0 Maximum Achievable Control Technology Standards (Part 63)

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

6.1 Potential HAP Emissions

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

The dryer/heater is fired with natural gas. The hazardous air pollutant emission factor for firing the dryer/heater burning natural gas is derived from AP-42, Table 1.4-3, 7/98 and is 1.88 pounds per million cubic foot.

DENR converted the AP-42 emission factors from units of pounds per volume of fuel burned to pounds per million Btu of heat input based on a natural gas heat capacity of 1,050 million Btus per million cubic feet. The resulting value is shown in Table 6-1.

Table 6-1 – HAP Emission Factor Comparison (pounds per MMBtus)

Fuel	Total HAPs	Hexane	Formaldehyde
Natural Gas	0.0018	0.0017	-

DENR used Equation 4-2, each unit's listed heat input capacity, and the appropriate emission factor in Table 6-1 to determine the greatest potential HAP emissions from the dryer/heater that resulting in 0.01 tons per year.

DENR reviewed the Maximum Achievable Control Technology Standards under 40 CFR Part 63 and determined the following may be applicable to the Pete Lien.

6.2 Industrial, Commercial, and Institutional Boilers and Process Heaters

40 CFR Part 63, Subpart DDDDD establishes national emission and operating limits for hazardous air pollutants emitted from industrial, commercial, and institutional boilers and process heaters located at a major source of hazardous air pollutant emissions. Currently, Pete Lien is considered a major source of hazardous air pollutants and the proposed dryer/heater is subject to this subpart.

6.3 Area Source for Industrial, Commercial and Institutional Boilers

On March 21, 2011, EPA finalized the MACT standard under 40 CFR Part 63, Subpart JJJJJJ. This rule applies to all new or existing industrial, commercial, and institutional boilers located at an area source of hazardous air pollutants. An existing boiler is defined as a boiler where construction or reconstruction occurred prior to June 4, 2010.

Pete Lien is considered a major source of hazardous air pollutants. Therefore, the dryer/heater is not subject to this subpart.

6.4 Standards for Lime Manufacturing Plants - Subpart AAAAA

The National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing Plants apply to any lime manufacturing plant that is a major source, or that is located at, or is part of, a major source of hazardous air pollutant emissions. Pete Lien is a major source of hazardous air pollutant emissions.

Currently, this subpart is applicable to Pete Lien. Pete Lien is considered an existing operation. The requirements are applicable to the rotary and vertical kiln, any associated cooler, and all equipment associated with processed stone handling operations. The processed stone handling operation begins at the processed stone storage bin(s) or open storage pile(s) and ends where the processed stone is fed into the kiln. It includes man-made processed stone storage bins (but not open processed stone storage piles), conveying system transfer points, bulk loading or unloading systems, screening operations, surge bins, bucket elevators, and belt conveyors. No other material processing operations are subject to this subpart. Therefore, this subpart is not applicable to the proposed construction project.

6.5 Other MACT Standards

DENR reviewed the other Maximum Achievable Control Technology Standards and determined there are no other standards applicable to Pete Lien's proposed construction project.

7.0 State Requirements

Any source operating in South Dakota that meets the requirements of Administrative Rules of South Dakota (ARSD) 74:36:05:03 is required to obtain a Title V air quality permit. Pete Lien and Sons is currently operating under a Title V air quality permit. In accordance with the ARSD 74:36:05:03.01, Pete Lien is required to submit an application to modify its Title V air quality permit within 12 months after commencing operation of this project.

7.1 Particulate Matter Emission Limits

Equation 7-1, derived from ARSD 74:36:06:03(1), is used to calculate the state's total suspended particulate emission limit for process industry units with a process rate less than 60,000 pounds per hour.

Equation 7-1 – State particulate emission limit

$$E_{TSP} = 4.10 \times P^{0.67}$$

Where E = rate of emission in pounds per hour; and
P = process weight in tons per hour.

In accordance with ARSD 74:36:06:02(1)(a), a fuel burning unit with heat input value less than 10 million Btus per hour may not exceed 0.6 pounds of particulate emissions per million Btu of heat input. Based on the heat input capacities of the permitted units, Unit #56 is applicable to the state total suspended particulate matter emission limit.

Table 7-1 compares the controlled potential emission rates of the process units to the state's particulate (TSP) emission limit.

***Table 7-1* – Potential Emission Rates versus State Emission Limits**

Unit	Process	TSP	
		Potential	State Limit
#53	Hopper Material Transfer	1.0[1]	34.5[1]
	Screw Conveyor Material Transfer	-	-
#54	Raymond 66" Roll Mill & Baghouse	3.0[1]	34.5[1]
	Cyclone Material Transfer	-	-
	Screw Conveyor Material Transfer	-	-
	Elevator Material Transfer	-	-
#55	Final Product Silo with Existing Baghouse	2.2[1]	34.5[1]
	Final Product Silo Transfer to Truck	-	-
#56	Dryer/Heater	0.0	0.6[2]

1 – Unit - "pounds per hour."

2 – Unit -"pounds per million Btu of heat input."

As shown in Table 7-1, all proposed units are capable of meeting the state's total suspended particulate matter emission limit.

7.2 Sulfur Dioxide Emission Limits

In accordance with ARSD 74:36:06:02(2), the permitted unit may not emit sulfur dioxide emissions to the ambient air in an amount greater than three pounds of sulfur dioxide per million Btus of heat input.

Table 7-2 – Sulfur Dioxide Emission Limit for Fuel Burning Unit

Unit	Unit Description	Potential Emissions	Emission Limit
#56	Dryer/Heater	0.0[1]	3.0[1]

1 – Unit -"pounds per million Btu of heat input."

Based on Table 4-7, the dryer/heater has negligible potential to emit sulfur dioxide and is capable of meeting the state emission limit.

7.3 Visible Emission Limit

In accordance with 74:36:12:01, the owner or operator may not discharge into the ambient air from a single unit of emissions an air pollutant of a density equal to or greater than that designated as 20 percent opacity.

7.4 Performance Testing

Pete Lien requested limits be placed on the facility's operation that would limit the potential to emit to allow the facility to forgo a PSD review and permit. The permit will contain a facility limit of 238 tons per year for particulate matter for the existing and new operations. Therefore, Pete Lien will be required to test for the following criteria air pollutant to ensure compliance with the limits:

1. Units #53, #54, and #55: particulate matter.

8.0 Recommendation

Pete Lien and Sons will be required to construct and operate within the requirements stipulated in the following regulations:

- ARSD 74:36:05 - Operating permits for Part 70 sources;
- ARSD 74:36:06 - Regulated air pollutant emissions;
- ARSD 74:36:07 – New Source Performance Standards;
- ARSD 74:36:08 – National Emission Standards for Hazardous Air Pollutants;
- ARSD 74:36:11 - Performance testing;
- ARSD 74:36:12 - Control of visible emissions; and
- ARSD 74:36:20 – Construction permits for new sources or modifications

Based on the information submitted in the air permit application, DENR recommends conditional approval of a construction permit. Any questions pertaining to this permit recommendation should be directed to Ashley Brakke, Engineer II.