Essroc
Italcementi Group

1826 South Queen Street
Martinsburg, WV 25402

Tel (304) 260 1800
Fax (304) 267 2617

February 10, 2016

Assistant Director for Permitting
WV Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

Re: Essroc Cement Corporation – Martinsburg Plant, Plant ID # 003-00006
Class II Administrative Update Application – Mobile Crushers

Dear Director,

Enclosed are three (3) copies of a Class II Administrative Update Application for the above referenced facility. The permit fee of $1,300 is included in this submittal. A legal notice has been sent to the local newspaper for publication and an affidavit will be sent under separate cover.

If you have any questions regarding this application, please contact Luis Rodriguez at 610-837-3336.

Sincerely,

Heinz Knopfel
Plant Director
Essroc Cement Corporation

Enclosures

cc: Mr. Joseph Kreger
WV Department of Environmental Protection
Eastern Panhandle Regional Office
HC 63, Box 2545
Romney, WV 26757

CLASS II ADMINISTRATIVE UPDATE APPLICATION FOR MOBILE CRUSHERS AT THE MARTINSBURG, WEST VIRGINIA PORTLAND CEMENT PLANT

Submitted by:
Essroc Cement Corporation
Martinsburg Plant
1826 S. Queen Street
Martinsburg, WV 25401

Submitted to:
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street
Charleston, WV 25304

Prepared by:

SPECTRUM
Environmental Sciences, Inc.
www.spectrumenv.com

February 2016

TABLE OF CONTENTS

1.0 INTRODUCTION AND APPLICATION CLASSIFICATION

1.1 Introduction

This Class II Administrative Update Application (Application) is being submitted to the West Virginia Department of Environmental Protection (WVDEP) Division of Air Quality (DAQ) by the Essroc Cement Corporation (Essroc) Martinsburg Portland cement Plant (Plant). This Application is being submitted in order to obtain permission to install and operate new mobile limestone crushers at the Plant.

The Application is organized in the following sections:

Section 2: Project Description

Section 3: NSR Applicability Analysis

Additionally, this Application contains the following Appendices:

Appendix A: NSR Permit and Title V Permit Revision Application Forms and Attachments

Appendix B: Engine Conformity Certification

Appendix C: Electronic Copy of the Application

1.2 Application Classification

This Application is proposed to be classified as a Class II Administrative Update Application. The modification being proposed as part of this Application results in a net increase in emissions as shown by Attachment N, Table N-1. Per 45 CSR 13 any proposed change that results in a net increase in emissions of criteria air pollutants that is greater than **both** 6 lbs/hr and 10 tons/year **or** 144 lbs/day is required to submit a Modification Permit Application. If the proposed changes result in a net increase of emissions that are less than these modification thresholds, then a Class II Administrative Update Application is only required to be submitted. As shown in Attachment N, Table N-1, the mobile crushers will have net emission increases for some criteria pollutants which are more than 10 tons/year, but less than 6 lbs/hr for each applicable pollutant; therefore, this Application qualifies to be classified as a Class II Administrative Update.

2.0 PROJECT DESCRIPTION

On January 5, 2016, major damage was sustained to the Plant's Primary Crusher (CD37.03) main rotor, causing all quarry limestone crushing operations to cease. On January 11, 2016, Essroc received permission from the WVDEP to operate two mobile crushers on a temporary basis not to exceed eight weeks while repairs to the Primary Crusher are completed. However, in the event that anticipated repairs to the Primary Crusher exceed the eight week timeframe, as well as to provide an alternative means to crush limestone if the Primary Crusher again becomes inoperable, the Plant is proposing to make the following permanent modifications.

Essroc is proposing to bring three mobile crushers on-site, which will provide an alternative limestone crushing system when the Primary Crusher is inoperable. The mobile crushers will be located next to the existing Primary Crusher feed hopper. Each mobile crusher will have its own feed hopper, crushing system, and conveyor belt. Limestone will be fed into the mobile crusher feed hoppers and then be processed through the crushing system. Crushed stone from the mobile crushers will be fed directly to the Primary Crusher feed hopper and then through the existing Primary Crusher conveying system. Each of the mobile crusher hoppers will be equipped with its own water spray system to reduce fugitive dust generated by the transfer of limestone to the feed hoppers and the subsequent crushing. The existing water sprays on the Primary Crusher feed hopper will continue to be utilized and the Primary Crusher baghouse will continue to operate to control any fugitive dust from the transfer of the limestone through the existing conveying system. A Plot Plan showing the proposed location of the mobile crushers is provided in Attachment E.

Although three mobile crushers are to be brought on-site, the Plant is only proposing to operate two of the mobile crushers at any one time. The third mobile crusher will serve as a backup in the event one of the mobile crushers becomes inoperable, to assure that the Plant can continue to have two mobile crushers providing crushed limestone to the kiln. As part of the permit language provided in Attachment S-1, the Plant is proposing to add a permit condition which will limit the Plant to only operating two mobile crushers at any one time

The current Primary Crusher system has the capability to process up to 1,322 short tons (1,200 metric tons) of limestone per hour and was permitted with a potential annual throughput of 4,125,933 short tons per year. Each of the mobile crushers will have an hourly throughput capacity to process up to 441 short tons (or 400 metric tons) of limestone per hour and will be permitted to operate twenty-four hours a day, seven days a week. The mobile crushers will also be permitted to have a combined potential annual throughput limit of 4,125,933 short tons per year, the same as the Primary Crusher.

The three mobile crushers are being provided by two vendors and each crusher will be powered by a diesel-fired engine. One mobile crusher will be a TESAB 1012TS mobile impact crusher that is rated at 440 HP and will be equipped with a CAT C13 diesel engine. The other two mobile crushers will both be Lokotrack LT1213S mobile impact crushers that are rated at 415 HP each and will also each be equipped with a CAT C13 diesel engine.

The proposed mobile crusher operations are expected to result in three types of new emissions. Fugitive dust emissions will be generated by both the limestone transfer to the mobile crusher hoppers and also from the crushing operation itself. In addition, combustion emissions will be generated by the operation of the mobile crusher diesel-fired engines. These new emissions will be accounted for by two new emission points.

EP37.14 – Limestone Dump to Mobile Crushers
EP37.15 – Mobile Limestone Crushers Operations

EP37.15 will account for both the fugitive dust generated from two mobile crushers processing limestone and the combustion emissions from the operation of the two mobile crushers' diesel-fired engines. Fugitive dust emissions from the transfer of limestone from the mobile crushers to the Primary Crusher feed hopper is already accounted for by emission point EP37.02.01. Also, because the crushed limestone will utilize the existing conveying system, there will be no additional transfer points downstream of the mobile crushers.

Emission calculations for the mobile crushers are provided in Attachment N. These calculations include tables that estimate the combustion emissions from each of the three mobile crushers. However, the emissions summary tables only includes the combustion emissions from the two worst-case (i.e., highest HP rated) engines being operational.

3.0 NSR APPLICABILITY ANALYSIS

The Plant is currently classified as a "major stationary source" with respect to New Source Review (NSR). A NSR Applicability Analysis was prepared to determine the net change in emissions associated with the proposed operation of two mobile crushers at the same time against all applicable contemporaneous changes within the last five-years to determine if the proposed changes would result in a significant "net emission increase" of any regulated NSR pollutant. The NSR Applicability Analysis results are presented in Table 3.1.

WV DEP 45 CSR 14-2.46.h addresses net emission increases and states that "*An increase that results from a physical change at a source occurs when the emissions unit on which construction occurred becomes operational and begins to emit a particular pollutant*." Therefore each contemporaneous change is evaluated based on when it began operation.

The Plant underwent a Major Modification (i.e., construction of new Preheater/Precalciner kiln and associated sources) that began operation on August 31, 2009. Therefore, the five-year contemporaneous period for all emission increases and decreases associated with this Major Modification ended on August 31, 2014.

The NSR Applicability Analysis shown in Table 3.1, defines and summarizes the Plant changes which have occurred during the five-year contemporaneous period. These Plant changes include the Reburn Hopper, which was permitted under PSD Permit R14-026G, the Rail Transloader (PSD Permit R-14-026H), the 2013 Baghouse Modifications (PSD Permit R14-026I), the 2014 Baghouse Modifications (Permit R14-026J), the Alternate Fuel Feeding System (Permit R14-026K), and the 2015 Material Handling and Storage Modifications (Permit TBD).

The Plant changes permitted under PSD Permit R14-026G through R14-026J were permitted during the contemporaneous period for the Major Modification. The Major Modification resulted in a large net decrease of emissions of PM, PM_{10}, $PM_{2.5}$, and SO_2. These four contemporaneous Plant changes were netted against the emission decrease for these pollutants associated with the Major Modification. Therefore, since the Major Modification is no longer reflected in the NSR Applicability Analysis, the emissions of PM, PM_{10}, $PM_{2.5}$, and SO_2 from these four contemporaneous Plant changes were reset to zero.

Table 3.1 also lists the potential emissions for the operation of two mobile crushers as discussed in Section 2.0 of this Application. The potential emissions for these sources are quantified in Attachment N of this Application.

Greenhouse Gas

As of January 2, 2011 per EPA regulations, Greenhouse Gases (GHGs) became subject to NSR Permitting and are required to be evaluated. The Rail Transloader was the first permitting project at the Plant that was required to evaluate GHG emissions, and was estimated to generate approximately 167 tons/year of carbon dioxide equivalent (CO_2e).

The addition of the mobile crushers will be the second permitting project at the Plant that will require a GHG emissions evaluation. As shown by Attachment N, the CO_2e emissions from the operation of the two worst case mobile crusher diesel engines (i.e., highest HP engines) are approximately 6,370 tons/year. The combined CO_2e emissions from both the Rail Transloader and the mobile crushers are still significantly below the 75,000 tons/year PSD CO_2e threshold for modifications to existing major sources.

TABLE 3.1
NSR APPLICABILITY ANALYSIS
SUMMARY OF PLANT CHANGES - ESSROC CEMENT CORPORATION - MARTINSBURG PLANT
(FEBRUARY 2016)

DESCRIPTION OF PLANT CHANGES[1]	APPLICABLE NSR REGULATED POLLUTANTS - NET EMISSION CHANGES (TONS/YR)								
	$PM_{2.5}$	PM_{10}	PM	SO_2	NO_X	CO	VOC	LEAD	FLUORIDES
1. REBURN HOPPER (R14-026G)[2]	0	0	0	0	0	0	0	0	0
2. RAIL TRANSLOADER (R14-026H)[3]	0	0	0	0	4.49	0.97	0.357	0	0
3. 2013 BAGHOUSE MODIFICATIONS (R14-026I)[4]	0	0	0	0	0	0	0	0	0
4. 2014 BAGHOUSE MODIFICATIONS (R14-026J)[5]	0	0	0	0	0	0	0	0	0
5. ALTERNATE FUEL FEEDING SYSTEM (R14-026K)[6]	0.01	0.03	0.16	0	0	0	0	0	0
6. 2015 MATERIAL HANDLING (TBD)	0.72	5.71	19.67	0	0	0	0	0	0
7. MOBILE LIMESTONE CRUSHING (TBD)	1.10	2.02	3.28	8	22	22	2.46	0	0
TOTAL NET EMISSION CHANGES (TONS/YR)	**1.83**	**7.76**	**23.11**	**7.60**	**26.65**	**22.52**	**2.82**	**0.00**	**0.00**
PSD SIGNIFICANCE THRESHOLDS (TONS/YR)	**10**	**15**	**25**	**40**	**40**	**100**	**40**	**0.6**	**3**
EXCEEDS PSD SIGNIFICANCE THRESHOLDS (YES OR NO)	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

NOTES:

1. PLANT CHANGES 1-4 WERE NETTED AGAINST THE PM, PM10, PM2.5, AND SO2 EMISSION DECREASE ASSOCIATED WITH THE PLANT MODIFICATION WHEN THEY WERE PERMITTED. THE PLANT MODIFICATION BEGAN OPERATION ON AUGUST 31, 2009, THEREFORE ITS CONTEMPORANEOUS PERIOD ENDS ON AUGUST 30, 2014 AND IS NO LONGER APPLICABLE. SINCE PLANT CHANGES 1-4 PM, PM10, PM2.5, AND SO2 EMISSIONS WERE PREVIOUSLY NETTED AGAINST AN EMISSION DECREASE THEIR PM, PM10, PM2.5, AND SO2 EMISSIONS HAVE BEEN SET TO ZERO FOR COMPARISON AGSINT FUTURE CHANGES IN THIS NSR APPLICABILITY ANALYSIS.

2. THE REBURN HOPPER BEGAN OPERATION ON 8/1/2011, THE CONTEMPORANEOUS PERIOD ENDS ON 7/31/2016.

3. THE RAIL TRANSLOADER BEGAN OPERATION ON 6/1/2013, THE CONTEMPORANEOUS PERIOD ENDS ON 5/31/2018.

4. THE 2013 BAGHOUSE MODIFICATIONS BEGAN OPERATION IN MAR. 2013, THE CONTEMPORANEOUS PERIOD ENDS MAR. 2018.

5. THE 2014 BAGHOUSE MODIFICATIONS BEGAN OPERATION ON 12/1/14, THE CONTEMPORANEOUS PERIOD ENDS 11/30/2019.

6. AS OF FEBRUARY 2016, THE ALTERNATE FUEL FEEDING SYSTEM HAS NOT YET BEGUN OPERATION SO THE CONTEMPORANEOUS PERIOD CANNOT BE DEFINED.

APPENDIX A – NSR PERMIT AND TITLE V REVISION APPLICATION FORMS AND ATTACHMENTS

Application for NSR Permit and Title V Revision
Attachment A – Business Certificate
Attachment B – Map
Attachment C – Installation and Start-Up Schedule
Attachment D – Regulatory Discussion
Attachment E –Plot Plan
Attachment F – Detailed Process Flow Diagrams
Attachment G – Process Description
Attachment H – Material Safety Data Sheets (MSDS)
Attachment I – Emission Units Table
Attachment J – Emission Points Data Summary Sheet
Attachment K – Fugitive Emissions Data Summary Sheet
Attachment L – Emission Unit Data Sheets
    Attachment L – General EUDS
Attachment M – Air Pollution Control Device Sheet - Baghouse
Attachment N – Supporting Emission Calculations
Attachment O – Monitoring/Recordkeeping/Reporting/Testing Plans
Attachment P – Public Notice
Attachment Q – Business Confidential Claims
Attachment R – Authority Forms
    Attachment R – Authority of Corporation
Attachment S – Title V Permit Revision Information

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☐ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☒ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☒ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
Essroc Cement Corporation

2. Federal Employer ID No. ***(FEIN):***
5 4 1 2 3 9 0 5 6

3. Name of facility *(if different from above):*
Martinsburg Plant

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
1826 South Queen Street
Martinsburg, WV 25401

5B. Facility's present physical address:
1826 South Queen Street
Martinsburg, WV 25401

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**

- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: **Riverton Investment Corporation**

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: **Own**
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): **Portland Cement Manufacturing**

10. North American Industry Classification System **(NAICS)** code for the facility:
3241

11A. DAQ Plant ID No. (for existing facilities only):
0 0 3 – 0 0 0 0 6

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R30-00300006-2012 (MM04)

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

Take Queen Street exit off Route 45 at Martinsburg; go south on Queen Street to plant.

A Map is included in Appendix A – Attachment B

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
N/A	**Martinsburg**	**Berkeley**
12.E. UTM Northing (KM): **4369.00**	12F. UTM Easting (KM): **243.50**	12G. UTM Zone: **18**

13. Briefly describe the proposed change(s) at the facility:
Install and operate new mobile limestone crushers

14A. Provide the date of anticipated installation or change: **See Attachment C of Appendix A** – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: January 2016

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day **24** Days Per Week **7** Weeks Per Year **52**

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17**. Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18**. Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) **.**
– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**
– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☒ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☐ Storage Tanks
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	
☒ General Emission Unit, specify		

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☐ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☐ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33**. Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's *"**Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☒ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☐ **Responsible Official** / ☒ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ *(Please use blue ink)* DATE: FEB 8/16 *(Please use blue ink)*

35B. Printed name of signee: **Heinz Knopfel**		35C. Title: **Plant Manager**
35D. E-mail: **Heinz.knopfel@essroc.com**	36E. Phone: **304-260-1887**	36F. FAX: **304-267-6571**
36A. Printed name of contact person (if different from above): **Luis Rodriguez**		36B. Title: **Corporate Environmental Engineer**
36C. E-mail: **luis.rodriguez@essroc.com**	36D. Phone: **610-837-3336**	36E. FAX: **610-837-9614**

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- ☒ **Attachment A: Business Certificate**
- ☒ **Attachment B: Map(s)**
- ☒ **Attachment C: Installation and Start Up Schedule**
- ☒ **Attachment D: Regulatory Discussion**
- ☒ **Attachment E: Plot Plan**
- ☒ **Attachment F: Detailed Process Flow Diagram(s)**
- ☒ **Attachment G: Process Description**
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- ☒ **Attachment K: Fugitive Emissions Data Summary Sheet**
- ☒ **Attachment L: Emissions Unit Data Sheet(s)**
- ☐ **Attachment M: Air Pollution Control Device Sheet(s)**
- ☒ **Attachment N: Supporting Emissions Calculations**
- ☒ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
- ☒ **Attachment P: Public Notice**
- ☒ **Attachment Q: Business Confidential Claims**
- ☒ **Attachment R: Authority Forms**
- ☒ **Attachment S: Title V Permit Revision Information**
- ☒ **Application Fee**

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
- ☐ ***For Title V Administrative Amendments:***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
- ☐ ***For Title V Minor Modifications:***
  - ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt.***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
- ☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  - ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  - ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  - ☐ ***EPA has 45 day review period of a draft permit.***

RECEIVED
FEB 11 2016
WV DEP / DIV OF AIR QUALITY

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

ATTACHMENT A
BUSINESS CERTIFICATE

Provided in this section is a copy of Essroc Cement Corporation's (previously Capitol Cement Corporation) West Virginia Business Registration.

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
CAPITOL CEMENT CORPORATION
1826 S QUEEN ST
MARTINSBURG, WV 25401-9596

BUSINESS REGISTRATION ACCOUNT NUMBER: **1032-7447**

This certificate is issued on: **07/13/2011**

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

etL006 v.4
L1119845504

ATTACHMENT B
MAP

Provided in this section is a map depicting the approximate location of the Plant.

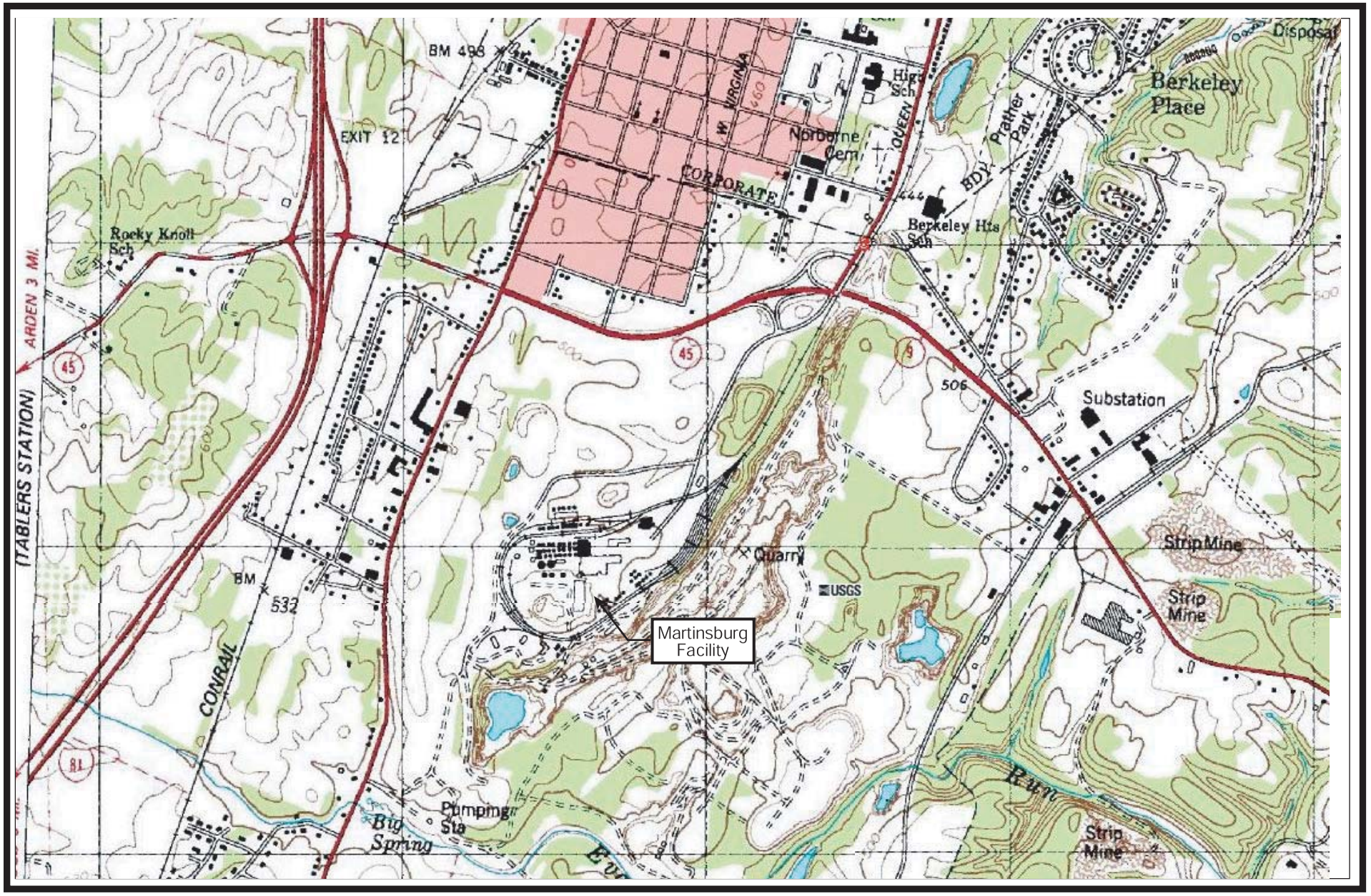


Figure B-1
Essroc Cement Corporation -
Martinsburg Plant Area Map

ATTACHMENT C
INSTALLATION AND STARTUP SCHEDULE

The mobile limestone crushers began operation in January 2016 based upon WV DEP's approval of their temporary operation on January 11, 2016.

This section discusses the applicable Federal and WV DEP emission standards and regulations applicable to the Plant.

D.1 APPLICABLE FEDERAL EMISSIONS STANDARDS

New Source Performance Standards (NSPS) codified in 40 CFR 60 will apply to the operations being permitted as part of this Application update. Emissions standards codified within 40 CFR 89 will apply to the non-road diesel engines being permitted as part of the mobile crushers.

D.1.1 NSPS SUBPART OOO

New non-metallic mineral processing facilities (i.e., raw material handling and storage) are subject to PM and opacity standards established under NSPS Subpart OOO – Nonmetallic Mineral Processing Facilities on August 1, 1985. Proposed changes to NSPS Subpart OOO were published in the Federal Register on April 22, 2008 and became final on April 28, 2009.

Per 40 CFR 60.670(b), portable crushers with a capacity of more than 150 short tons per hour are subject to the requirements of NSPS Subpart OOO. NSPS Subpart OOO requires that fugitive opacity emissions from sources constructed after April 22, 2008 be maintained at 12 percent or less from crushers and 7 percent or less from other affected facilities such as transfer points.

For this update the affected NSPS Subpart OOO air emission sources are those associated with the mobile crushers and their associated feed hoppers.

D.1.2 40 CFR 89

The diesel-fired CAT C13 engines that are part of each of the mobile crushers meet the applicability requirements of 40 CFR 89 are subject to the emission standards specified in Subpart B for all new non-road compression-ignition engines. Appendix B of this Application provides copies of the performance data and regulatory information for both engines indicating that they will be compliant with all applicable Tier III emission standards per Table 1 of 40 CFR 89.112.

D.2 WEST VIRGINIA STATE REGULATIONS

The air quality regulations for the state of West Virginia are codified in Title 45 of the Code of State Rules (45 CSR). Title 45 is divided into series, each covering a specific aspect of the state's air pollution regulatory program. Series that contain requirements specific to the source included in this Application are discussed in the following paragraphs. West Virginia regulations that are applicable to the entire Plant are not discussed in this Application.

D.2.1 SERIES 7

45 CSR 7, *To Prevent & Control Particulate Matter Air Pollution from Manufacturing Processes & Associated Operations,* defines PM emissions standards for manufacturing processes and associated operations. The regulation requires the Plant to comply with PM emissions as defined in the regulation from point and fugitive sources, as well as to implement use of good operating practices to prevent/reduce fugitive emissions. NSPS Subpart OOO requirements, for applicable sources, are more stringent; therefore, compliance with the Federal requirements ensures compliance with the state standards.

D.2.2 SERIES 8

45 CSR 8, *Ambient Air Quality Standards for Sulfur Oxides and Particulate Matter,* establishes ambient air quality standards for SO_2 and PM, equivalent to the primary and secondary National Ambient Air Quality Standards (NAAQS) established by the U.S. EPA.

D.2.3 SERIES 9

45 CSR 9, *Rules Pertaining to Ambient Air Quality Standards for Carbon Monoxide and Ozone,* establishes ambient air quality standards for CO and ozone, equivalent to the primary and secondary NAAQS established by the U.S. EPA.

D.2.4 SERIES 10

45 CSR 10, *To Prevent and Control Air Pollution from the Emission of Sulfur Oxides,* defines sulfur limits for manufacturing processes. This regulation is only applicable to fuel burning units which produce heat or power by indirect heat transfer, therefore the diesel engines are not applicable.

D.2.5 SERIES 12

45 CSR 12, *Ambient Air Quality Standard for Nitrogen Dioxide,* establishes the ambient air quality standard for nitrogen dioxide, which is equivalent to the primary and secondary NAAQS established by the U.S. EPA.

D.2.6 SERIES 13

45 CSR 13, *Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation,* regulates the procedures for stationary source reporting, and the criteria for obtaining a permit to construct and operate a new stationary source which is not a major stationary source, to modify a non-major stationary source, to make modifications which are not major modifications to an existing major stationary source, to relocate non-major stationary sources within the state of West Virginia, and to set forth procedures to allow facilities to commence construction in advance of permit issuance. Such construction, modification, relocation, and

operation without a required permit is a violation of this rule. This rule also establishes the requirements for obtaining an administrative update to an existing permit, a temporary permit, or a general permit registration, and for filing notifications and maintaining records of changes not otherwise subject to the permit requirements of this rule. Since the Application is considered a Class II Administrative Update, it is subject to this regulation. Essroc Cement Corporation is meeting the requirements of this regulation by submitting this Application.

D.2.7 SERIES 14

45 CSR 14, *Permits For Construction & Major Modification of Major Stationary Sources for the Prevention of Significant Deterioration of Air Quality,* regulates the construction or relocation of any major stationary source or major modification in any area classified as attaining National or West Virginia Ambient Air Quality Standards or unclassifiable. Since the Application is a Class II Administrative Update to a 45 CSR 14 Permit, it is subject to this regulation. Essroc Cement Corporation is meeting the requirements of this regulation by submitting this Application.

D.2.8 SERIES 16

45 CSR 16, *Standards of Performance for New Stationary Sources,* adopts standards of performance for new stationary sources (NSPS) promulgated by U.S. EPA pursuant to section 111(b) of the Federal Clean Air Act, as amended. This Application will be subject to NSPS requirements, as discussed above.

D.2.9 SERIES 17

45 CSR 17, *To Prevent & Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage & Other Sources of Fugitive Particulate Matter,* requires the prevention and control of PM from materials handling, preparation, storage, and other fugitive particulate sources beyond the property boundary through the appropriate use of preventative measures, which include but are not limited to water or chemicals, enclosure/covering of sources, and installation of hoods/fans/fabric filters. As part of this Application, Essroc Cement Corporation will take preventative measures to reduce/prevent emissions from fugitive sources.

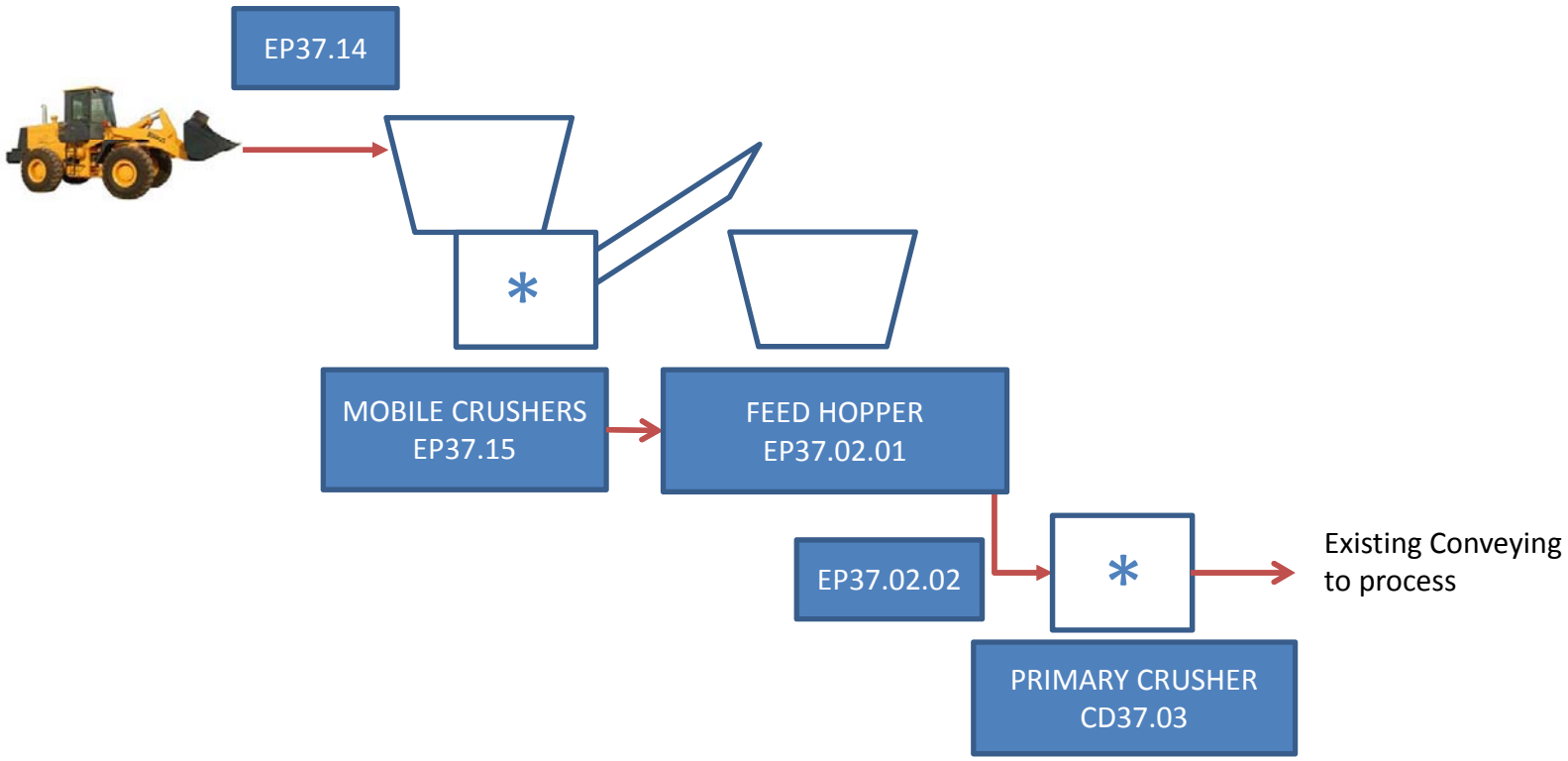
ATTACHMENT E
PLOT PLAN

Provided in this section is a Plot Plan depicting the location of the proposed mobile limestone crushers.


Portable Crushers
location

ATTACHMENT F
DETAILED PROCESS FLOW DIAGRAMS

A detailed process flow diagram depicting the flow of material through the proposed mobile limestone crushers is provided in this section.



Supplementary Portable Crushing System Flow Diagram

Essroc
Italcementi Group

A process description for the proposed new equipment requested as part of this Class II Administrative Update is provided in Section 2 of the Application.

ATTACHMENT H
MATERIAL SAFETY DATA SHEETS (MSDS)

A Material Safety Data Sheet (MSDS) for the limestone handled by the mobile crushers is provided in this section.

Essroc
Italcementi Group

3251 Bath Pike
Nazareth, PA 18064

MATERIAL SAFETY DATA SHEET

Section 1 - IDENTIFICATION

Product Name: Limestone

CAS Reg. No.: 1317-65-3

Trade Names: Limestone

MSDS Information: This MSDS supersedes prior MSDS's for the products noted above.

Informational Phone Numbers: (800) 437-7762 Customer Service - Nazareth, PA
(800) 336-0366 Customer Service - Speed, IN
(800) 624-8986 Customer Service - Martinsburg, WV
(800) 386-2111 Customer Service - Mississauga, ONT

Emergency Contact Information: (800)-424-9300 Chemtrec

MSDS Prepared by: Essroc MSDS Development Committee - (610) 837-6725 – May 26, 2010

Section 2 - COMPONENTS

Hazardous Ingredients:

Component	CAS No.	OSHA PEL (8-hour TWA)	ACGIH TLV	Other Information
Limestone	1317-65-3	15 mg total dust/m^3 5 mg respirable dust/m^3	10 mg/m^3	IDLH: Not Determined LD_{50}: No Data
Crystalline Silica (1 - 10%)	14808-60-7	For mineral dusts containing crystalline silica: (10 mg respirable dust/m^3)/(%SiO_2 +2) (30 mg total dust/m^3) /(%SiO_2 + 2)	0.025 mg/m^3 respirable	IDLH: 50 mg/m^3 (twa) LD_{50}: ipr rat LD Lo 400 mg/kg
Notes:				

Section 3 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Limestone is an odorless, grey, white, and tan rock that can be present in particles ranging in size from powder to boulders. A single short-term exposure to limestone presents little or no hazard.

POTENTIAL HEALTH EFFECTS

Relevant Routes of Exposure: Eye contact, skin contact, inhalation and ingestion.

Effects resulting from eye contact: Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.

Effects resulting from skin contact: Exposure to limestone dust may cause dry skin, abrasions, discomfort, and irritation.

Effects resulting from inhalation: Inhalation of dust may cause nose, throat, or lung irritation depending on the extent of the exposure. Limestone contains free crystalline silica. Prolonged exposure to airborne free crystalline silica may cause delayed lung injury including silicosis, a disabling and potentially fatal lung disease, and/or other diseases. (also see "Carcinogenic potential" below.)

Effects resulting from ingestion: Although ingestion of small quantities of limestone is not known to be harmful, ill effects are possible especially if larger quantities are consumed. Limestone should not be eaten.

Carcinogenic potential: Limestone is not listed as a carcinogen by the National Toxicology Program (NTP), International Agency for Research (IARC) or the Occupational Safety and Health Administration (OSHA). However, Limestone contains crystalline silica which is classified by IARC and NTP as a known human carcinogen.

Medical conditions which may be aggravated by exposure: Pre-existing upper respiratory and lung diseases may be aggravated by inhalation of limestone dust.

Section 4 - FIRST AID

Eyes: Immediate flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes including under lids, to remove all particles. Seek medical attention for abrasions.

Skin: Wash skin with cool water and pH-neutral soap or a mild detergent intended for use on skin. Seek medical treatment for rash or irritation.

Inhalation of Airborne Dust: Remove to fresh air. Seek medical help if coughing and other symptoms do not subside. ("Inhalation" of gross amounts of Limestone requires immediate medical attention.)

Ingestion: Do not induce vomiting. If conscious, have the victim drink plenty of water and seek medical attention immediately.

Section 5 - FIRE AND EXPLOSION DATA

Limestone is not combustible.

Flash Point:	Not applicable	Upper Explosive Limit:	Not applicable
Auto ignition temperature:	Not applicable	Lower Explosive Limit:	Not applicable
Auto ignition temperature:	Not applicable	Extinguishing media:	Not applicable
Hazardous combustion products:	Not applicable	Unusual fire and explosion hazards:	None
Special fire fighting procedures:	Contact with powerful oxidizing agents may cause fire and/or explosions.		

Section 6 - ACCIDENTAL RELEASE MEASURES

Place spilled material into a container. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section 8.

Dispose of waste material according to local, state, and federal regulations.

Section 7 - HANDLING AND STORAGE

Dust containing respirable crystalline silica may be generated during processing, handling, and storage. The exposure controls and personal protective equipment indentified in Section 8 should be used as appropriate.

Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Skin protection: Wash dust exposed skin with soap and water before eating, drinking, smoking, and using toilet facilities. Launder clothing that has become dusty before reuse.

Respiratory protection: Avoid actions that cause dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits.

Use NIOSH/MSHA-approved (under 30 CFR 11) or NIOSH-approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation.

Ventilation: Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye protection: When engaged in activities where limestone dust could contact the eye, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working in dusty conditions.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Angular grey, white, or tan particles ranging in size from powder to boulders.	Odor:	No distinct odor
Physical state:	Solid	pH (in water):	Neutral
Solubility in water:	Not soluble	Vapor pressure:	Not applicable
Vapor density:	Not applicable	Boiling point:	Not applicable
Melting point:	Not applicable	Specific gravity (H_2O=1.0):	2.6 – 2.8
Evaporation Rate:	Not applicable	Coefficient of oil to water distribution:	Not applicable

Section 10 - STABILITY AND REACTIVITY

Stability: Stable

Conditions to avoid: Avoid contact with incompatible materials.

Incompatibility: Contact with powerful oxidizing agents such as fluorine, boron trifluoride, chlorine trifluoride, manganese trifluoride, and oxygen difluoride may cause fire and/or explosions. Silica dissolves readily in hydrofluoric acid producing a corrosive gas – silicon tetrafluoride.

Hazardous decomposition: Will not spontaneously occur. Limestone decomposes at 825^{o}C producing calcium oxide.

Hazardous polymerization: Will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

Route of Entry.....Section 3
Effects of acute exposure to product.....Section 3
Effects of chronic exposure to product.....Section 3
Exposure Limits.....Section 2
Irritancy of product.....Section 3
Sensitization to product .....Section 3
Carcinogenicity.....Section 3
Reproductive Toxicity.....Not Applicable
Teratogenicity.....Not Applicable
Mutagenicity.....Not Applicable
Toxicologically synergistic products.....Section 3, Section 16

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity: No recognized unusual toxicity to plants or animals.

Relevant physical and chemical properties: See sections 9 and 10.

Section 13 - DISPOSAL

Dispose of waste material according to local, state, and federal regulations.

Section 14 - TRANSPORTATION DATA

Hazardous materials description/proper shipping name: Limestone is not hazardous under U.S. Department of Transportation (DOT) regulations.

Hazard class: Not applicable.

Identification number: Not applicable

Required label text: Not applicable.

Hazardous substances/reportable quantities (RQ): Not applicable

Section 15 - OTHER REGULATORY INFORMATION

Status under USDOL-OSHA & MSHA Hazard Communication Standards (29CFR 1910.1200 & 30CFR Part 47): Limestone is considered a "hazardous chemical" under these regulations, and should be part of any hazard communication program.

Status under CERCLA/Superfund, 40 CFR 117 and 302: Not Listed

Hazard Category under SARA TITLE III, Sections 311- 312: Limestone qualifies as a "hazardous substance" with delayed health effects.

Status under SARA Title III, Section 313: Not subject to the reporting requirements under Section 313.

Toxic Substance Control Act (TSCA): Exempt.

Status under Canadian Environmental Protection Act: Not listed.

Status under WHMIS: Limestone containing crystalline silica is considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations (Class D2A – Materials causing other toxic effects) and, depending on use, is subject to the labeling and MSDS requirements of the Workplace Hazardous Materials Information System (WHMIS).

SECTION 16 - OTHER INFORMATION

Abbreviations:

ACGIH	American Conference of Government Industrial Hygienists
ASTM	American Society of Testing Materials
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
DOT	Department of Transportation
IARC	International Agency for Research
IDLH	Immediately dangerous to life and health (NIOSH).
m^3	cubic meter
mg	Milligram
mm	millimeter
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RQ	Reportable Quantities
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TWA	Time Weighted Average
URT	Upper Respiratory Tract
WHMIS	Workplace Hazardous Material Information System

Other important information:

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Attachment I

Emission Units Table

(includes all emission units and air pollution control devices That will be part of this permit application review, regardless of permitting status)

Emission Point ID[2]	Emission Unit ID[1]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
EP37.14	EP37.14	Limestone Dump to Mobile Crushers	2016	4,125,933 stons/year	New	N/A
EP37.15	EP37.15	Mobile Limestone Crushers Operations	2016	4,125,933 stons/year	New	N/A

[1] For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,… or other appropriate designation.
[2] For Emission Points use the following numbering system: 1E, 2E, 3E,… or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,… or other appropriate designation.

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Concentr-ation [7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
EP37.14	Fugitive	EP37.14	Limestone Dump to Mobile Crushers	N/A	N/A	N/A		PM PM10 PM2.5	0.40 0.19 0.03	1.73 0.82 0.12	0.40 0.19 0.03	1.73 0.82 0.12	Solid	O – AP-42	N/A
EP37.15	Engine Vent	EP37.15	Mobile Limestone Crushers Operations	N/A	N/A	N/A		PM PM10 PM2.5	0.35 0.27 0.22	1.54 1.20 0.98	0.35 0.27 0.22	1.54 1.20 0.98	Solid	O- 40 CFR 98 Tier III	37.2 mg/m^3 29.0 mg/m^3 23.5 mg/m^3
				N/A	N/A	N/A		NOx	5.06	22.16	5.06	22.16	Gas	O- 40 CFR 98 Tier III	534.2 mg/m^3
				N/A	N/A	N/A		CO	4.92	21.55	4.92	21.55	Gas	O- 40 CFR 98 Tier III	519.4 mg/m^3
				N/A	N/A	N/A		VOC	0.56	2.46	0.56	2.46	Gas	O- 40 CFR 98 Tier III	59.4 mg/m^3
				N/A	N/A	N/A		SO2	1.74	7.60	1.74	7.60	Gas	O – AP-42	183.2 mg/m^3

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (^oF)	Volumetric Flow [1] (dscfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
EP37.14	N/A	N/A	N/A	N/A	N/A	N/A	4368.953	243.942
EP37.15	0.417	Ambient	2,529 cfm	309	Below Grade (Within Quarry)	13.5	4368.953	243.942

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

ATTACHMENT K
FUGITIVE EMISSIONS DATA SUMMARY SHEET

Provided in this section is the Fugitive Emission Data Summary Sheet Form.

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☐ Yes ☒ No ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☐ Yes ☒ No ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☐ Yes ☒ No ☐ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☒ Yes ☐ No ☒ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	PM PM_{10} $PM_{2.5}$	N/A	N/A	N/A	N/A	N/A
Unpaved Haul Roads	PM PM_{10} $PM_{2.5}$	N/A	N/A	N/A	N/A	N/A
Storage Pile Emissions	PM PM_{10} $PM_{2.5}$	N/A	N/A	N/A	N/A	N/A
Loading/Unloading Operations	N/A	N/A	N/A	N/A	N/A	N/A
Wastewater Treatment Evaporation & Operations	N/A	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	Does not apply	N/A	Does not apply	N/A	N/A
General Clean-up VOC Emissions	N/A	N/A	N/A	N/A	N/A	N/A
Other	PM PM_{10} $PM_{2.5}$	0.75 0.46 0.25	3.28 2.02 1.10	0.75 0.46 0.25	3.28 2.02 1.10	O

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Provided in this section is the applicable Attachment L – General Emission Unit Data Sheet (EUDS) Form for the mobile crushers.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): See Item 1

1. Name or type and model of proposed affected source:

   New: EP37.14, EP37.15

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   Not Applicable

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   Limestone - 441 stons/hour from each mobile crusher (maximum of 882 stons/hour from two mobile crushers)

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   Not Applicable

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

No. 2 Diesel Fuel

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

Not Applicable

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

CAT C13 engines on all three mobile crushers
1 engine at 3.08 MMBtu/hr (TESAB 440 HP)
2 engines at 2.91 MMBtu/hr (Lokotrack (415 HP)

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: See item e × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ See Attachment N °F and psia

a.	NO_X	See Attachment N	lb/hr	grains/ACF
b.	SO_2	See Attachment N	lb/hr	grains/ACF
c.	CO	See Attachment N	lb/hr	grains/ACF
d.	PM_{10}	See Attachment N	lb/hr	grains/ACF
e.	Hydrocarbons	N/A	lb/hr	grains/ACF
f.	VOCs	See Attachment N	lb/hr	grains/ACF
g.	Pb	N/A	lb/hr	grains/ACF
h.	Specify other(s)			
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
Sources will comply with all applicable 40 CFR 60 Subpart OOO Monitoring Requirements.	Sources will comply with all applicable 40 CFR 60 Subpart OOO Recordkeeping Requirements.
REPORTING	TESTING
Sources will comply with all applicable 40 CFR 60 Subpart OOO Reporting Requirements.	Sources will comply with all applicable 40 CFR 60 Subpart OOO Testing Requirements.

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Per Manufacturer provided manual.

Attachment L
Emission Unit Data Sheet
(NONMETALLIC MINERALS PROCESSING)

Control Device ID No. (must match List Form): None

Equipment Information

1. Plant Type:
   - ☐ Hot-mix asphalt facility that reduces the size of nonmetallic minerals embedded in recycled asphalt pavement
   - ☐ Plant without crushers or grinding mills and containing a stand-alone screening operation
   - ☐ Sand and gravel plant ☐ Common clay plant
   - ☐ Crushed stone plant ☐ Pumice plant
   - ☒ Other, specify Portland Cement Plant

2. Plant Style: ☐ Fixed Plant ☒ Portable Plant

3. Plant Capacity: See Table 1 tons/hr

4. Underground mine: ☐ Yes ☒ No

5. Storage: ☐ Open ☐ Enclosed

6.

Emission Facility Type	Equipment Type Used	ID Number of Emission Unit	Manufacturer	Model Number/ Serial Number	Date of Manufacture
Conveyors		See Table 1			
Crusher					
Secondary Crushers					
Tertiary Crushers					
Grinder					
Hoppers					
Rock Drills					
Screens					
Enclosed Storage					
Other					
Other					
Other					

Emission Facility Type	Operation Rate Design Ton/hr	Operation Rate Design Ton/hr	Annual Production Tons/year	Number of Units	Air Pollution Control Device Used
Conveyors	See Table 1				
Crusher					
Secondary Crushers					
Tertiary Crushers					
Grinder					
Hoppers					
Rock Drills					
Screens					
Enclosed Storage					
Other					
Other					
Other					

7. Provide a diagram and/or schematic that shows the proposed process of the operation or plant. The diagram and/or schematic is to show all sources, components and facets of the operation or plant in an understandable line sequence of the operation. The diagram should include all the equipment involved in the operation; such as conveyors, transfer points, stockpiles, crushers, facilities, vents, screens, truck dump bins, truck, barge and railcar loading and unloading, etc. Appropriate sizing and specifications of equipment should be included in the diagram. The diagram shall logical follow the entire process load-in to load-out.

8. Roads

	Paved Miles of Road	**Unpaved Miles of Road**	**Watered**		**Other Control (Specify)**
			Miles	**Frequency**	
Plant Yard	Not Applicable				
Access Roads					

9. Vehicle Type

Vehicle Type	**Mean Vehicle Speed in mph**	**Mean Vehicle Weight in Tons**		**Number of Wheels**	**Distance Traveled per Round Trip**	
		Empty	**Full**		**Paved** Feet or Miles	**Unpaved** Feet or Miles
Raw Aggregate	Not Applicable					
Loaders						
Product Trucks						
Other						
Other						
Other						
Other						

10. Describe all proposed materials storage facilities associated with the **Emission Units** listed.

Not Applicable

Storage Activity

ID of Emission Unit	Not Applicable				
Type Storage					
Material Stored					
Typical Moisture Content (%)					
Avg % of material passing through 200 mesh sieve					
Maximum Total Yearly Throughput in storage (tons)					
Maximum Stockpile Base Area (ft^2)					
Maximum Stockpile height (ft)					
Dust control method applied to storage					
Method of material load-in to bin or stockpile					
Dust control method applied during load-in					
Method of material load-out to bin or stockpile					
Dust control method applied during load-out					

Storagepiles	**Estimated Annual Tons**	**Turnover Rate (Ton/Month)**	**Wetted as Piled**	**Number of Sides Enclosed**	**Other Dust Control**	**Loading Method** (Loader, Conveyor) **IN/OUT**
Coarse: over 1”						
Fine: 1” to ¼“						
¼” and less						
MFG. Sand						
Other, specify						

Conveying and Transfer

Describe the conveying system including transfer points associated with proposed Emission Units (crushers, etc…).

See Section 2.0 of the Application.

Describe any methods of emission control to be used with these proposed conveying systems:

Controls include, but are not limited to, the following:

- Inherent moisture
- Partial Enclosures
- Process Controls
- Water Sprays

ID of Emission Unit	Type Conveyor or Transfer Point	Material Handled [Note nominal size of material transferred (e.g. ¾” × 0)]	Material Conveying or Transfer Rate		Dust Control Measures Applied	Approximate Material Moisture Content (%)
			Max. TPH	Maximum TPY		
See Table 2						

Crushing and Screening

ID of Emission Unit	EP37.15					
Type Crusher or Screen	Mobile Crusher					
Material Sized	Limestone					
Material Sized Throughput:						
Tons/hr	882 stph					
Tons/yr	4,125,933 stpy					
Material sized from/to	From >1" to ¼"-1"					
Typical moisture content as crushed or screened (%)	2%					
Dust control methods applied	Water Spray and Partial Enclosure					
Stack Parameters:						
Height (ft)	13.5					
Diameter (ft)	0.417					
Volume (ACFM)	2,529 cfm					
Temp (°F)	Ambient					
Maximum operating schedule:						
Hour/day	24					
Day/year	7					
Hour/year	8760					
Approximate Percentage of Operation from:						
Jan – Mar	25%					
April – June	25%					
July – Sept	25%					
Oct – Dec	25%					
Maximum Particulate Emissions:						
LB/HR	See Att. N					
Ton/Year	See Att. N					

List emission sources with request information:

ID of Emission Unit	Type of Emission Unit and Use	Operating Schedule		Max. Amount of Stone Input to Emission (lb/hr)	Crushed or Screened From/To (size)	Date of Emission Unit was Manufacture
		Actual (hrs/yr)	Design (hrs/yr)			
See Attachment N and I						

List emission sources with request information:

ID of Emission Unit	Maximum expected emissions from Emission Unit without Air Pollution Control Equipment				
	PM_{10} (lbs/hr)	**SO_2** (lbs/hr)	**CO** (lbs/hr)	**NO_x** (lbs/hr)	**VOC** (lbs/hr)
See Attachment N					

ID of Emission Unit	Maximum expected emissions from Emission Unit without Air Pollution Control Equipment				
	PM_{10} (tons/yr)	**SO_2** (tons/yr)	**CO** (tons/yr)	**NO_x** (tons/yr)	**VOC** (tons/yr)
See Attachment N					

Please fill out a separate Air Pollution Control Device Sheet for each Emission Unit equipped with an air pollution control system.

What type of stone will be quarried at this site?

Limestone

How will it be quarried?

- ☐ Sawing
- ☒ Blasting
- ☐ Other, Specify:

If blasting is checked, complete the following:

- ☒ Frequency of blasting: As needed (approximately once per week)
- ☒ What method of air pollution control will be employed during drilling and blasting?

Emissions are below grade and controlled as needed with dust control.

TABLE 1

Emission Point ID	Emission Unit ID	Equipment Type	Manufacturer/ Model	Date of Manufacturer	Hourly Operation Rate	Annual Production	Number of Units
EP37.14	EP37.14	Crusher Hoppers	(1) TESAB 1012TS (2) Lokotrack LT1213S	2010 2008	882 stons per hour	4,125,933 short tons per year	One per mobile crusher
EP37.15	EP37.15	Mobile Crushers	(1) TESAB 1012TS (2) Lokotrack LT1213S	2010 2008	882 stons per hour	4,125,933 short tons per year	Three mobile crushers but only two in operation at any one time

TABLE 2

Emission Point ID	Emission Unit ID	Equipment Type	Material Handled (Note nominal size)	Maximum Hourly Rate (TPH)	Maximum Annual Rate (TPY)	Dust Control Measures Applied	Approximate Material Moisture Content (%)
EP37.14	EP37.14	Crusher Hoppers	Limestone (> 1”)	882 stph	4,125,933 stpy	Water Spray, Partial Enclosure	2%
EP37.15	EP37.15	Mobile Crushers	Limestone (1” to ¼”)	882 stph	4,125,933 stpy	Partial Enclosure	2%

No control device is proposed for the mobile crushers, so no Attachment M – Air Pollution Control Device Sheet is provided.

Potential Emissions Inventory

Enclosed in this section are the supporting emission calculations required for the Application in the form of the Potential Emission Inventory for the mobile crushers. As previously stated in Section 2, Table N-3 and N-4 provide estimates of the combustion emissions from each of the three mobile crushers. However, the emissions summary in Table N-1 only includes the combustion emissions from the two worst-case (i.e., highest HP rated) engines being operational.

The following tables are included:

Table N-1 - Emissions Summary for the Mobile Crushers

Emission Point	Annual Potential Emissions (tons/year)						
	NOx	CO	VOC	SO_2	PM	PM10	PM2.5
EP37.14 - Limestone Dump to Mobile Crushers					1.73	0.82	0.12
EP37.15 - Mobile Limestone Crushers Operations[1]	22.16	21.55	2.46	7.60	1.54	1.20	0.98
Total Emission Increase	**22.16**	**21.55**	**2.46**	**7.60**	**3.28**	**2.02**	**1.10**

Note 1 - Emissions account for operation of two worst case (i.e., largest HP) mobile crushers.

Emission Point	Hourly Potential Emissions (lbs/hour)						
	NOx	CO	VOC	SO_2	PM	PM10	PM2.5
EP37.14 - Limestone Dump to Mobile Crushers					0.40	0.19	0.03
EP37.15 - Mobile Limestone Crushers Operations[1]	5.06	4.92	0.56	1.74	0.35	0.27	0.22
Total Emission Increase	**5.06**	**4.92**	**0.56**	**1.74**	**0.75**	**0.46**	**0.25**

Note 1 - Emissions account for operation of two worst case (i.e., largest HP) mobile crushers.

Emission Point	Greenhouse Gas Emission Summary (tons/year)			
	CO2	CH4	N2O	CO2e
EP37.15 - Mobile Limestone Crushers Operations[1]	6,350.11	0.26	0.05	6,371.90

Note 1 - Emissions account for operation of two worst case (i.e., largest HP) mobile crushers.

Table N-2
Emissions Calculations for Fugitive Particulate Emissions

Emission Point ID	Emission Unit ID	EU Description	Potential Throughput (stons/yr)	Emission Factors				Control Efficiency (%)	PM Emissions (lb/hr)	PM10 Emissions (lb/hr)	PM2.5 Emissions (lb/hr)	PM Emissions (tpy)	PM10 Emissions (tpy)	PM2.5 Emissions (tpy)	EF Basis	Notes
				TSP	PM10	PM2.5	Units									
GROUP 1 - QUARRYING AND CRUSHING																
EP37.14	EP37.14	Limestone Dump to Mobile Crushers	4,125,933	0.003364	0.001591	0.000241	lb/ton	75%	0.396	0.187	0.028	1.735	0.821	0.124	AP-42 Section 13.2.4.3	Control Efficiency accounts for being within quarry and water spray application
EP37.15	EP37.15	Mobile Limestone Crushers Operations	4,125,933	0.0012	0.00054	0.0001	lb/ton	75%	0.141	0.064	0.012	0.619	0.279	0.052	AP-42 Section 11.19.2	Emissions from crushing operations. Control Efficiency accounts for being within quarry and partial enclosure of the crushing system
			See Tables N-3 and N-4					25%	0.211	0.211	0.211	0.923	0.923	0.923	40 CFR 98 Tier III	Emissions from diesel combustion of 2 engines. 25% control efficiency applied for being within the quarry.
							TOTAL EMISSIONS		**0.75**	**0.46**	**0.25**	**3.28**	**2.02**	**1.10**		

NOTE: Particulate emissions from the mobile crushers crushing operations are calculated using TSP, PM10, and PM2.5 emission factors for controlled tertiary crushing from AP-42 Table 11.19.2-2. Tertiary crushing emission factors were conservatively used since Section 11.19.2 contains no data on emission factors for primary or secondary crushing. The controlled emission factors account for wet suppression resulting in material moisture contents of 0.55 to 2.88 percent, which is considered representative for the Martinsburg Plant limestone after the application of water sprays.

Table N-3
TESAB Mobile Crusher Emission Calculations from Diesel Combustion

Heating Value of Diesel Fuel (Btu/gal):	140,000
Crusher Manufacturer and Model	TESAB 1012TS
Engine Manufacturer and Model	CAT C13
# of mobile crushers	1
Rated Output (hp):	440
Rated Output (kw):	328
Heat Input (MMBtu/hr):	3.08
Operation (hrs/yr):	8760

Assumes a BFSC of 7,000 Btu/hp-hr per AP-42 Table 3.3-1

Criteria Pollutants

Pollutant	Emission Factor	EF Units	Emissions (lb/hr)	Emissions (tpy)	Notes
NOx	3.6	g/kwh	2.60	11.41	40 CFR 98 Tier III (Note 1)
CO	3.5	g/kwh	2.53	11.09	40 CFR 98 Tier III
VOC	0.4	g/kwh	0.29	1.27	40 CFR 98 Tier III (Note 1)
SO_2	0.2900	lb/MMBtu	0.89	3.91	AP-42 Table 3.3-1
PM	0.2000	g/kwh	0.11	0.48	40 CFR 98 Tier III (Note 2)
PM10	0.2000	g/kwh	0.11	0.48	40 CFR 98 Tier III (Note 2)
PM2.5	0.2000	g/kwh	0.11	0.48	40 CFR 98 Tier III (Note 2)

[1] Emission factors from 40 CFR 98 for Tier III engines. NOx and VOC emission factors based on a 4.0 g/kwh NOx and non-methane hydrocarbon combined limit. NOx is conservatively assumed to be 90% of the limit based on AP-42 Section 3.3.

[2] All particulate is assumed to be less than 1 micron, so PM Emission Factor used as representative for PM10 and PM2.5. In addition, particulate emission calculations include a 25% control efficiency for being within the quarry.

Hazardous Air Pollutants

Pollutant	Emission Factor	EF Units	Emissions (lb/hr)	Emissions (tpy)	Notes
1,3-Butadiene	3.91E-05	lb/MMBtu	1.20E-04	5.27E-04	AP-42 Table 3.3-2
Acrolein	9.25E-05	lb/MMBtu	2.85E-04	1.25E-03	AP-42 Table 3.3-2
Acetaldehyde	7.67E-04	lb/MMBtu	2.36E-03	1.03E-02	AP-42 Table 3.3-2
Benzene	9.33E-04	lb/MMBtu	2.87E-03	1.26E-02	AP-42 Table 3.3-2
Formaldehyde	1.18E-03	lb/MMBtu	3.63E-03	1.59E-02	AP-42 Table 3.3-2
Naphthalene	8.48E-05	lb/MMBtu	2.61E-04	1.14E-03	AP-42 Table 3.3-2
POM[1]	1.68E-04	lb/MMBtu	5.17E-04	2.27E-03	AP-42 Table 3.3-2
Toluene	4.09E-04	lb/MMBtu	1.26E-03	5.52E-03	AP-42 Table 3.3-2
Xylenes	2.85E-04	lb/MMBtu	8.78E-04	3.84E-03	AP-42 Table 3.3-2
TOTAL				5.34E-02	

[1] Polycyclic Organic Matter (listed as "Total PAH" in AP-42)

GHG

Pollutant[1]	Emission Factor	EF Units	Emissions (lb/hr)	Emissions (tpy)	Notes
CO_2	163.1	lb/MMBtu	502.3	2200.0	40 CFR Part 98, Table C1
CH_4	0.007	lb/MMBtu	0.0	0.089	40 CFR Part 98, Table C2
N_2O	0.001	lb/MMBtu	0.0	0.018	40 CFR Part 98, Table C2
CO_2e			504	2207.6	

[1] CO_2e calculated using Global Warming Potentials of 1 for CO_2, 25 for CH_4, and 298 for N_2O per 40 CFR 98.

Table N-4
Lokotrack Mobile Crushers Emission Calculations from Diesel Combustion

Heating Value of Diesel Fuel (Btu/gal):	140,000
Crusher Manufacturer and Model	Lokotrack LT1213S
Engine Manufacturer and Model	CAT C13
# of mobile crushers	2
Rated Output (hp):	415
Rated Output (kw):	309
Heat Input (MMBtu/hr):	2.905
Operation (hrs/yr):	8760

Assumes a BFSC of 7,000 Btu/hp-hr per AP-42 Table 3.3-1

Criteria Pollutants

Pollutant	Emission Factor	EF Units	Emissions (lb/hr)	Emissions (tpy) (1 engine)	Emissions (tpy) (2 engines)	Notes
NOx	3.6	g/kwh	2.46	10.76	21.52	40 CFR 98 Tier III (Note 1)
CO	3.5	g/kwh	2.39	10.46	20.92	40 CFR 98 Tier III
VOC	0.4	g/kwh	0.27	1.20	2.39	40 CFR 98 Tier III (Note 1)
SO_2	0.2900	lb/MMBtu	0.84	3.69	7.38	AP-42 Table 3.3-1
PM	0.2000	g/kwh	0.10	0.45	0.90	40 CFR 98 Tier III (Note 2)
PM10	0.2000	g/kwh	0.10	0.45	0.90	40 CFR 98 Tier III (Note 2)
PM2.5	0.2000	g/kwh	0.10	0.45	0.90	40 CFR 98 Tier III (Note 2)

[1] Emission factors from 40 CFR 98 for Tier III engines. NOx and VOC emission factors based on a 4.0 g/kwh NOx and non-methane hydrocarbon combined limit. NOx is convservatively assumed to be 90% of the limit based on AP-42 Section 3.3.

[2] All particulate is assumed to be less than 1 micron, so PM Emission Factor used as representative for PM10 and PM2.5. In addition, particulate emission calculations include a 25% control efficiency for being within the quarry.

Hazardous Air Pollutants

Pollutant	Emission Factor	EF Units	Emissions (lb/hr)	Emissions (tpy) (1 engine)	Emissions (tpy) (2 engines)	Notes
1,3-Butadiene	3.91E-05	lb/MMBtu	1.14E-04	4.98E-04	9.95E-04	AP-42 Table 3.3-2
Acrolein	9.25E-05	lb/MMBtu	2.69E-04	1.18E-03	2.35E-03	AP-42 Table 3.3-2
Acetaldehyde	7.67E-04	lb/MMBtu	2.23E-03	9.76E-03	1.95E-02	AP-42 Table 3.3-2
Benzene	9.33E-04	lb/MMBtu	2.71E-03	1.19E-02	2.37E-02	AP-42 Table 3.3-2
Formaldehyde	1.18E-03	lb/MMBtu	3.43E-03	1.50E-02	3.00E-02	AP-42 Table 3.3-2
Naphthalene	8.48E-05	lb/MMBtu	2.46E-04	1.08E-03	2.16E-03	AP-42 Table 3.3-2
POM[1]	1.68E-04	lb/MMBtu	4.88E-04	2.14E-03	4.28E-03	AP-42 Table 3.3-2
Toluene	4.09E-04	lb/MMBtu	1.19E-03	5.20E-03	1.04E-02	AP-42 Table 3.3-2
Xylenes	2.85E-04	lb/MMBtu	8.28E-04	3.63E-03	7.25E-03	AP-42 Table 3.3-2
TOTAL				5.04E-02	1.01E-01	

[1] Polycyclic Organic Matter (listed as "Total PAH" in AP-42)

GHG

Pollutant[1]	Emission Factor	EF Units	Emissions (lb/hr)	Emissions (tpy) (1 engine)	Emissions (tpy) (2 engines)	Notes
CO_2	163.1	lb/MMBtu	473.8	2075.0	4150.1	40 CFR Part 98, Table C1
CH_4	0.007	lb/MMBtu	0.0	0.084	0.168	40 CFR Part 98, Table C2
N_2O	0.001	lb/MMBtu	0.0	0.017	0.034	40 CFR Part 98, Table C2
CO_2e			475	2082.2	4164.3	

[1] CO_2e calculated using Global Warming Potentials of 1 for CO_2, 25 for CH_4, and 298 for N_2O per 40 CFR 98.

Table N-5
Fugitive Material Transfer Emission Calculations

FUGITIVE MATERIAL TRANSFERS

Source: Vol. 1, 5th Ed., AP-42, Section 13.2.4.3

$$E = k \cdot (0.0032) \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

WHERE:

k =	0.74	PM - (AP42, Section 13.2.4, for Particle Size < 30 mm)
	0.35	PM10 - (AP42, Section 13.2.4, for Particle Size < 10 mm)
	0.053	PM2.5 - (AP42, Section 13.2.4, for Particle Size < 2.5 mm)
Wind Speed (mph): U =	6.55	Average wind speed (mph) for Martinsburg, WV (1991-1995).
M =		Material Moisture Content (found below)

Type of Material	Moisture (%)*	TSP Emission Factor (lb/ton)	PM10 Emission Factor (lb/ton)	PM2.5 Emission Factor (lb/ton)
Limestone	2	0.00336	0.00159	0.00024

*As provided by Essroc Cement Corporation - Martinsburg Plant

Table N-6

Changes to Title V Permit Potential Group Emission Limits

Permit/Project		Facility-Wide Total Potential Emission Limits								
		PM2.5	**PM10**	**PM**	**SO2**	**NOx**	**CO**	**VOC**	**Fluorides**	**Lead**
PSD Permit R14-026K		227.59	599.14	936.26	4,507.90	4,009.59	4,436.95	156.32	1.02	0.08
2015 Material Handling and Storage Modifications	Tarped Outdoor Clinker Storage	0.47	0.99	2.05						
	Finish Mill Limestone	0.81	6.45	20.92						
	Additives Storage Building	0.09	0.15	0.30						
	Alternate Fuel Feeding System	0.01	0.02	0.12						
	Decommissioned Sources	-7.77	-24.12	-35.25						
Mobile Crushers		1.10	2.02	3.28	7.60	22.16	21.55	2.46		
Updated Emission Limits		222.30	584.65	927.68	4515.50	4031.75	4458.50	158.78	1.02	0.08

Permit/Project		Combined Group Source (Point and Fugitive) TSP and PM10 Emission Limits															
		Group 1		**Group 2**		**Group 3**		**Group 4**		**Group 5**		**Group 6**		**Group 7**		**Group 8**	
		PM	**PM10**	**PM**	**PM10**	**PM**	**PM10**	**PM**	**PM10**	**PM**	**PM10**	**PM**	**PM10**	**PM**	**PM10**	**PM**	**PM10**
PSD Permit R14-026K		53.51	36.63	51.91	35.00	279.29	234.59	14.25	12.10	0.39	0.18	154.82	127.31	68.41	58.18	313.68	95.14
2015 Material Handling and Storage Modifications	Tarped Outdoor Clinker Storage											2.05	0.99				
	Finish Mill Limestone	1.84	0.88													19.08	5.58
	Additives Storage Building			0.30	0.15												
	Alternate Fuel Feeding System															0.12	0.02
	Decommissioned Sources	-21.28	-17.10	-4.15	-3.42	-0.32433	-0.1534	-0.99657	-0.847084							-8.49	-2.61
Mobile Crushers		3.28	2.02														
Updated Emission Limits		37.35	22.43	48.06	31.73	278.97	234.44	13.25	11.25	0.39	0.18	156.87	128.30	68.41	58.18	324.39	98.13

ATTACHMENT O
MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

The Martinsburg Plant will comply with all applicable Federal monitoring, recordkeeping, reporting, and testing requirements per 40 CFR 60 Subpart OOO.

A copy of the Class II legal advertisement, as well as the publication date, both required as part of the Application process, will be submitted under a separate cover.

ATTACHMENT Q
BUSINESS CONFIDENTIAL CLAIMS

Essroc Cement Corporation is not requesting that this revised Application be confidential.

Provided in this section is an Attachment R – Authority of Corporation Form for the Martinsburg Plant.

Attachment R
AUTHORITY OF CORPORATION
OR OTHER BUSINESS ENTITY (DOMESTIC OR FOREIGN)

TO: The West Virginia Department of Environmental Protection, Division of Air Quality

DATE: October 29, 2015

ATTN.: Director

Corporation's / other business entity's Federal Employer I.D. Number 541239056

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which is used in the conduct of an incorporated business or other business entity.

Further, the corporation or the business entity certifies as follows:

(1) Heinz Knopfel (is/are) the authorized representative(s) and in that capacity may represent the interest of the corporation or the business entity and may obligate and legally bind the corporation or the business entity.

(2) The corporation or the business entity is authorized to do business in the State of West Virginia.

(3) If the corporation or the business entity changes its authorized representative(s), the corporation or the business entity shall notify the Director of the West Virginia Department of Environmental Protection, Division of Air Quality, immediately upon such change.

[signature] / Munza Ghosh VP Mfg

President or Other Authorized Officer
(Vice President, Secretary, Treasurer or other official in charge of a principal business function of the corporation or the business entity)

(If not the President, then the corporation or the business entity must submit certified minutes or bylaws stating legal authority of other authorized officer to bind the corporation or the business entity).

Secretary

Essroc Cement Corporation
Name of Corporation or business entity

ATTACHMENT S
TITLE V PERMIT REVISION INFORMATION

Provided in this section is an Attachment S – Title V Permit Revision Information Form for the Martinsburg Plant.

Attachment S

Title V Permit Revision Information

1. New Applicable Requirements Summary

Mark all applicable requirements associated with the changes involved with this permit revision:

☐ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☐ NESHAP (45CSR15)	☐ Nonattainment NSR (45CSR19)
☒ Section 111 NSPS (Subpart(s) OOO)	☐ Section 112(d) MACT standards (Subpart(s)_____)
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ Compliance Assurance Monitoring (40CFR64) (1)
☐ NO_x Budget Trading Program Non-EGUs (45CSR1)	☐ NO_x Budget Trading Program EGUs (45CSR26)

(1) If this box is checked, please include **Compliance Assurance Monitoring (CAM) Form(s)** for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why **Compliance Assurance Monitoring** is not applicable:

2. Non Applicability Determinations

List all requirements, which the source has determined not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and a rationale for the determination.

☐ **Permit Shield Requested** *(not applicable to Minor Modifications)*

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

3. Suggested Title V Draft Permit Language

Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision? ☐ Yes ☒ No If Yes, describe the changes below.

Also, please provide **Suggested Title V Draft Permit language** for the proposed Title V Permit revision (including all applicable requirements associated with the permit revision and any associated monitoring /recordkeeping/ reporting requirements), OR attach a marked up pages of current Title V Permit. Please include appropriate citations (Permit or Consent Order number, condition number and/or rule citation (e.g. 45CSR§7-4.1)) for those requirements being added / revised.

See Attachment S-1 – PSD R14-026 Draft Permit Language

4. Active NSR Permits/Permit Determinations/Consent Orders Associated With This Permit Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
R30-00300006-2012 (MM04)	01/19/2012 (Modified 3/27/15)	
R14-026K	12/19/14	
	/ /	

5. Inactive NSR Permits/Obsolete Permit or Consent Orders Conditions Associated With This Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
	MM/DD/YYYY	
	/ /	
	/ /	

6. Change in Potential Emissions

Pollutant	Change in Potential Emissions (+ or -), TPY
See Attachment N	

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

7. Certification For Use Of Minor Modification Procedures *(Required Only for Minor Modification Requests)*

Note:	*This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:*

i. Proposed changes do not violate any applicable requirement;

ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;

iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis;

iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act;

v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19;

vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification;

Notwithstanding subparagraph 45CSR§30-6.5.a.1.A. (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under 45CSR30.

Pursuant to 45CSR§30-6.5.a.2.C., the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 45CSR§30-6.5.a.1.A. The use of Minor permit modification procedures are hereby requested for processing of this application.

(Signed): _____ Date: FEB / 8 / 16
(Please use blue ink) *(Please use blue ink)*

Named (typed): *Heinz Knopfel* Title: *Plant Manager*

Note: Please check if the following included (if applicable):

☐	Compliance Assurance Monitoring Form(s)
☒	Suggested Title V Draft Permit Language

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

ATTACHMENT S-1 – PSD R14-026 DRAFT PERMIT LANGUAGE

To facilitate WVDEP's review of this Application and incorporation of the Application changes into the PSD Construction Permit issued for this Application, Essroc is providing the following list of proposed changes. All changes to emissions tables are based on the calculations in Table N-6 of Attachment N. These changes should also be incorporated into the next update to the Title V Operating Permit.

Condition A.2 – Revise the first three rows of the table to reflect the following changes:

Pollutant	Allowable Emissions (tpy)
$PM_{2.5}$	222.30
PM_{10}	584.65
TSP	927.68
SO_2	4,515.50
NO_x (as NO_2)	4,031.75
CO	4,458.50
VOC	158.78

Condition A.5 – Add the follow new Group 1 fugitive emission sources:

EP ID	EP Description	TSP (tpy)	PM_{10} (tpy)
EP37.14	Limestone Dump to Mobile Crushers	1.73	0.82
EP37.15	Mobile Limestone Crushers Operations	1.54	1.20

Condition A.5 - Revise the Group 1 emission limits "emissions from the combined above sources (both point and fugitive) shall not exceed 37.35 tons per year of TSP nor 22.43 tons per year of PM_{10} based on a 12 month rolling total."

New Condition A.5a – The permittee shall be limited to operating only two mobile limestone crushers at any one time. The emissions from these two mobile limestone crushers shall not exceed the following:

Pollutant	lb/hr	tpy
$PM_{2.5}$	0.22	0.98
PM_{10}	0.27	1.20
TSP	0.35	1.54
SO_2	1.74	7.60
NO_x (as NO_2)	5.06	22.16
CO	4.92	21.55
VOC	0.56	2.46

APPENDIX B – ENGINE PERFORMANCE DATA AND REGULATORY INFORMATION

Provided in this appendix is a copy of the Performance Data and Regulatory Information for each of the diesel engines being used in the mobile crushers documenting that they will be compliant with EPA non-road Tier III emission limits.

PERFORMANCE DATA[DM7687]

January 21, 2016

Performance Number: DM7687 **Change Level: 08**

SALES MODEL:	C13	**COMBUSTION:**	DI
ENGINE POWER (BHP):	440	**ENGINE SPEED (RPM):**	2,100
PEAK TORQUE (FT-LB):	1,482.5	**PEAK TORQUE SPEED (RPM):**	1,400
COMPRESSION RATIO:	17.3	**TORQUE RISE (%):**	35
RATING LEVEL:	INDUSTRIAL C - INTERMITTENT	**ASPIRATION:**	TA
PUMP QUANTITY:	1	**AFTERCOOLER TYPE:**	ATAAC
FUEL TYPE:	DIESEL	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
MANIFOLD TYPE:	DRY	**INLET MANIFOLD AIR TEMP (F):**	120
GOVERNOR TYPE:	ELEC	**JACKET WATER TEMP (F):**	192.2
INJECTOR TYPE:	EUI	**TURBO CONFIGURATION:**	SINGLE
REF EXH STACK DIAMETER (IN):	5	**TURBO QUANTITY:**	1
MAX OPERATING ALTITUDE (FT):	2,349	**TURBOCHARGER MODEL:**	GTA4502BS 1.33 A/R
		CERTIFICATION YEAR:	2005
		PISTON SPD @ RATED ENG SPD (FT/MIN):	2,163.4

INDUSTRY	SUBINDUSTRY	APPLICATION
INDUSTRIAL	GENERAL INDUSTRIAL	INDUSTRIAL
INDUSTRIAL	MATERIAL HANDLING	INDUSTRIAL
OIL AND GAS	LAND PRODUCTION	INDUSTRIAL
INDUSTRIAL	FORESTRY	INDUSTRIAL
INDUSTRIAL	CONSTRUCTION	INDUSTRIAL
INDUSTRIAL	MINING	INDUSTRIAL
INDUSTRIAL	AGRICULTURE	INDUSTRIAL
OIL AND GAS	WELL SERVICING	INDUSTRIAL

General Performance Data

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
RPM	BHP	LB-FT	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
2,100	440	1,101	218	0.358	22.7	47.9	120.8	1,170.3	43.4	925.2
2,000	440	1,156	228	0.355	22.4	47.8	112.0	1,137.2	41.3	833.9
1,900	440	1,217	240	0.350	22.1	48.9	114.2	1,159.8	39.5	896.8
1,800	440	1,284	254	0.346	21.9	50.1	114.7	1,180.9	38.2	944.2
1,700	435	1,345	266	0.347	21.7	51.0	114.8	1,197.5	36.4	972.4
1,600	426	1,399	276	0.342	20.9	50.7	112.8	1,201.2	34.2	977.9
1,500	413	1,446	286	0.338	20.1	51.1	109.2	1,192.1	32.6	961.2
1,400	395	1,484	293	0.336	19.2	50.7	107.1	1,196.9	30.3	974.3
1,300	362	1,464	289	0.335	17.5	49.3	103.6	1,174.3	27.8	959.7
1,200	327	1,431	283	0.330	15.6	42.4	100.3	1,188.8	22.5	973.8
1,100	277	1,321	261	0.333	13.4	33.4	93.2	1,227.3	16.6	1,026.9
1,000	231	1,211	239	0.322	10.7	21.0	86.2	1,174.5	10.1	1,015.9
900	183	1,068	211	0.339	8.8	13.9	85.2	1,160.0	6.8	1,009.4
700	117	880	174	0.365	6.2	6.2	83.7	1,164.1	3.7	1,011.1

ENGINE SPEED	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
RPM	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
2,100	440	52	323.5	1,028.9	2,723.2	4,434.4	4,593.3	966.8	886.2
2,000	440	51	309.2	1,004.0	2,481.1	4,323.1	4,480.2	943.0	863.1
1,900	440	52	316.1	970.4	2,514.2	4,175.0	4,329.4	911.3	833.0
1,800	440	53	322.0	942.7	2,528.9	4,054.8	4,207.8	885.7	808.8
1,700	435	54	323.5	911.3	2,490.8	3,910.7	4,062.6	855.1	779.1
1,600	426	53	322.5	858.5	2,353.2	3,676.9	3,823.8	804.8	731.9
1,500	413	53	323.3	814.1	2,205.4	3,484.6	3,625.7	763.2	693.1
1,400	395	53	325.1	763.5	2,084.5	3,261.4	3,395.5	714.7	648.3
1,300	362	51	322.0	705.2	1,900.6	3,005.6	3,128.0	658.4	597.7
1,200	327	44	305.3	600.3	1,632.3	2,550.9	2,659.9	559.9	506.2
1,100	277	34	271.1	484.5	1,366.8	2,054.0	2,147.5	452.0	406.4
1,000	231	22	212.8	349.4	981.5	1,478.5	1,553.8	327.0	291.0
900	183	14	186.1	272.6	763.1	1,152.1	1,213.4	255.4	226.2
700	117	7	151.2	167.9	473.9	709.1	752.6	158.4	138.1

PERFORMANCE DATA[DM7687]

January 21, 2016

Heat Rejection Data

ENGINE SPEED	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
RPM	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
2,100	440	7,091	2,411	19,708	11,214	2,574	3,599	18,664	48,321	51,474
2,000	440	6,933	4,553	17,449	9,150	2,551	3,414	18,664	47,888	51,012
1,900	440	6,806	3,342	18,141	10,041	2,516	3,375	18,664	47,245	50,328
1,800	440	6,713	2,396	18,580	10,647	2,486	3,366	18,664	46,674	49,720
1,700	435	6,884	2,121	18,561	10,801	2,465	3,268	18,465	46,279	49,299
1,600	426	6,566	2,149	17,648	10,270	2,376	3,089	18,067	44,608	47,519
1,500	413	6,312	2,264	16,492	9,474	2,279	2,988	17,516	42,781	45,572
1,400	395	5,989	2,052	15,699	9,077	2,168	2,846	16,771	40,700	43,356
1,300	362	5,517	1,869	14,229	8,154	1,981	2,629	15,372	37,189	39,615
1,200	327	5,120	1,749	12,383	7,116	1,760	2,094	13,865	33,053	35,210
1,100	277	4,781	1,451	10,639	6,274	1,503	1,463	11,732	28,225	30,066

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 2100 RPM

ENGINE POWER		BHP	440	330	220	110	44.0
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	1,346	816	436	209	145
TOTAL CO		G/HR	1,103	913	284	208	424
TOTAL HC		G/HR	37	44	92	96	77
PART MATTER		G/HR	85.9	63.7	48.4	61.3	82.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,365.7	1,028.3	750.5	699.4	776.8
TOTAL CO	(CORR 5% O2)	MG/NM3	1,135.0	1,149.6	496.0	1,195.3	2,255.9
TOTAL HC	(CORR 5% O2)	MG/NM3	32.3	48.3	136.8	264.8	360.5
PART MATTER	(CORR 5% O2)	MG/NM3	73.7	69.3	74.3	234.5	404.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	665	501	366	341	378
TOTAL CO	(CORR 5% O2)	PPM	908	920	397	956	1,805
TOTAL HC	(CORR 5% O2)	PPM	60	90	255	494	673
TOTAL NOX (AS NO2)		G/HP-HR	3.08	2.49	2.00	1.91	3.32
TOTAL CO		G/HP-HR	2.53	2.79	1.30	1.90	9.67
TOTAL HC		G/HP-HR	0.08	0.13	0.42	0.87	1.76
PART MATTER		G/HP-HR	0.20	0.19	0.22	0.56	1.89
TOTAL NOX (AS NO2)		LB/HR	2.97	1.80	0.96	0.46	0.32
TOTAL CO		LB/HR	2.43	2.01	0.63	0.46	0.93
TOTAL HC		LB/HR	0.08	0.10	0.20	0.21	0.17
PART MATTER		LB/HR	0.19	0.14	0.11	0.14	0.18

RATED SPEED NOMINAL DATA: 2100 RPM

ENGINE POWER		BHP	440	330	220	110	44.0
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	1,246	756	404	193	135
TOTAL CO		G/HR	590	488	152	111	227
TOTAL HC		G/HR	20	23	48	51	41
TOTAL CO2		KG/HR	233	186	136	80	42
PART MATTER		G/HR	44.0	32.7	24.8	31.5	42.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,264.5	952.2	694.9	647.6	719.2
TOTAL CO	(CORR 5% O2)	MG/NM3	606.9	614.8	265.2	639.2	1,206.3
TOTAL HC	(CORR 5% O2)	MG/NM3	17.1	25.6	72.4	140.1	190.7
PART MATTER	(CORR 5% O2)	MG/NM3	37.8	35.5	38.1	120.3	207.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	616	464	338	315	350
TOTAL CO	(CORR 5% O2)	PPM	486	492	212	511	965
TOTAL HC	(CORR 5% O2)	PPM	32	48	135	262	356
TOTAL NOX (AS NO2)		G/HP-HR	2.86	2.31	1.85	1.77	3.07
TOTAL CO		G/HP-HR	1.35	1.49	0.70	1.02	5.17
TOTAL HC		G/HP-HR	0.04	0.07	0.22	0.46	0.93
PART MATTER		G/HP-HR	0.10	0.10	0.11	0.29	0.97
TOTAL NOX (AS NO2)		LB/HR	2.75	1.67	0.89	0.43	0.30
TOTAL CO		LB/HR	1.30	1.08	0.33	0.25	0.50

PERFORMANCE DATA[DM7687]

January 21, 2016

TOTAL HC	LB/HR	0.04	0.05	0.11	0.11	0.09
TOTAL CO2	LB/HR	513	411	300	175	93
PART MATTER	LB/HR	0.10	0.07	0.05	0.07	0.09
OXYGEN IN EXH	%	10.5	12.2	14.2	16.0	17.0
DRY SMOKE OPACITY	%	0.9	0.8	0.6	1.3	2.6
BOSCH SMOKE NUMBER		0.62	0.50	0.29	0.87	1.58

PERFORMANCE DATA[DM7687]

January 21, 2016

Regulatory Information

EPA TIER 3		2005 - 2010		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 3	CO: 3.5 NOx + HC: 4.0 PM: 0.20

EU STAGE IIIA		2006 - 2010		
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EU 97/68/EC, ECE REGULATION NO. 96 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSION VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
EUROPE	EU	NON-ROAD	STAGE IIIA	CO: 3.5 NOx + HC: 4.0 PM: 0.20

IMO II	2011 - ----
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN REGULATION 13 OF REVISED ANNEX VI OF MARPOL 73/78 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THIS ENGINE CONFORMS TO INTERNATIONAL MARINE ORGANIZATION'S (IMO) MARINE COMPRESSION-IGNITION EMISSION REGULATIONS.

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	50	60	70	80	90	100	110	120	130	NORMAL
ALTITUDE (FT)										
0	440	440	440	440	440	440	440	440	438	440
1,000	440	440	440	440	440	440	436	429	422	440
2,000	440	440	440	440	435	428	420	413	406	440
3,000	440	440	435	427	419	412	404	397	391	437
4,000	435	426	418	411	403	396	389	382	376	423
5,000	418	410	402	395	388	381	374	368	361	409
6,000	402	394	387	380	373	366	360	353	347	396
7,000	386	379	372	365	358	352	346	340	334	384
8,000	371	364	357	351	344	338	332	326	321	371
9,000	356	350	343	337	331	325	319	313	308	359
10,000	342	336	329	323	317	312	306	301	296	347
11,000	328	322	316	310	304	299	294	289	284	335
12,000	315	309	303	297	292	287	282	277	272	324
13,000	302	296	291	285	280	275	270	266	261	313
14,000	289	284	279	273	268	264	259	255	250	302
15,000	277	272	267	262	257	253	248	244	240	292

Cross Reference

Engine Arrangement			
Arrangement Number	**Effective Serial Number**	**Engineering Model**	**Engineering Model Version**
2413804	LGK21070	E707	-

Test Specification Data						
Test Spec	**Setting**	**Effective Serial Number**	**Engine Arrangement**	**Governor Type**	**Default Low Idle Speed**	**Default High Idle Speed**
0K5712	PP5378	LGK21070	2413804			

PERFORMANCE DATA[DM7686]

August 5, 2010

Performance Number: DM7686 **Change Level: 06**

SALES MODEL:	C13	**COMBUSTION:**	DI
ENGINE POWER (BHP):	415	**ENGINE SPEED (RPM):**	2,100
PEAK TORQUE (FT-LB):	1,398.4	**PEAK TORQUE SPEED (RPM):**	1,400
COMPRESSION RATIO:	17.3	**TORQUE RISE (%):**	35
APPLICATION:	INDUSTRIAL	**ASPIRATION:**	TA
RATING LEVEL:	INDUSTRIAL B	**AFTERCOOLER TYPE:**	ATAAC
PUMP QUANTITY:	1	**AFTERCOOLER CIRCUIT TYPE:**	JW+OC, ATAAC
FUEL TYPE:	DIESEL	**INLET MANIFOLD AIR TEMP (F):**	120
MANIFOLD TYPE:	DRY	**JACKET WATER TEMP (F):**	192.2
GOVERNOR TYPE:	ELEC	**TURBO CONFIGURATION:**	SINGLE
INJECTOR TYPE:	EUI	**TURBO QUANTITY:**	1
REF EXH STACK DIAMETER (IN):	5	**TURBOCHARGER MODEL:**	GTA4502BS-48T-1.33
MAX OPERATING ALTITUDE (FT):	1,201	**CERTIFICATION YEAR:**	2006
		PISTON SPD @ RATED ENG SPD (FT/MIN):	2,163.4

General Performance Data

ENGINE SPEED	ENGINE POWER	ENGINE TORQUE	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	EXH STACK TEMP
RPM	BHP	LB-FT	PSI	LB/BHP-HR	GAL/HR	IN-HG	DEG F	DEG F	IN-HG	DEG F
2,100	415	1,038	205	0.347	20.7	45.8	125.2	1,117.2	38.8	894.7
2,000	415	1,090	215	0.342	20.5	46.5	123.4	1,121.0	37.4	904.1
1,900	415	1,147	227	0.343	20.4	47.3	123.1	1,135.1	36.0	921.8
1,800	415	1,211	239	0.339	20.2	48.0	121.2	1,149.8	34.3	942.4
1,700	410	1,268	251	0.336	19.8	48.1	118.7	1,161.0	32.3	956.0
1,600	402	1,318	261	0.333	19.2	48.2	116.9	1,161.1	30.4	956.8
1,500	389	1,364	269	0.336	18.8	48.4	115.2	1,180.3	28.7	980.4
1,400	373	1,399	276	0.331	17.8	47.3	111.2	1,186.0	26.4	986.3
1,300	342	1,380	273	0.340	16.7	47.0	110.0	1,188.8	24.4	991.4
1,200	308	1,349	267	0.331	14.7	38.3	100.9	1,202.6	18.6	1,040.6
1,100	261	1,245	246	0.337	12.6	31.1	95.2	1,211.3	13.8	1,064.3

ENGINE SPEED	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
RPM	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
2,100	415	47	312.1	964.1	2,520.1	4,201.4	4,346.6	914.9	841.8
2,000	415	47	311.0	941.4	2,473.4	4,093.2	4,236.4	891.7	819.5
1,900	415	48	310.6	913.3	2,427.4	3,961.5	4,104.3	863.9	792.5
1,800	415	48	311.4	884.5	2,385.2	3,832.3	3,973.8	836.4	765.8
1,700	410	49	310.3	844.0	2,296.2	3,649.7	3,788.7	797.5	728.4
1,600	402	48	308.2	807.2	2,189.8	3,476.7	3,611.1	760.1	694.5
1,500	389	48	310.3	765.7	2,113.7	3,297.0	3,428.3	721.6	657.1
1,400	373	47	309.4	710.6	1,968.2	3,054.6	3,179.5	669.2	608.1
1,300	342	47	310.5	664.7	1,840.9	2,846.3	2,963.4	623.8	566.5
1,200	308	38	279.3	552.0	1,577.2	2,352.7	2,455.8	516.9	467.0
1,100	261	30	250.7	456.5	1,322.9	1,939.3	2,027.8	426.8	384.2

Heat Rejection Data

ENGINE SPEED	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
RPM	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
2,100	415	6,445	1,974	17,923	10,014	2,354	3,144	17,601	44,203	47,087
2,000	415	6,340	1,696	17,681	9,941	2,320	3,076	17,601	43,551	46,393
1,900	415	6,312	1,993	17,564	9,961	2,322	2,975	17,601	43,600	46,445
1,800	415	6,226	1,757	17,440	10,015	2,297	2,920	17,601	43,129	45,943
1,700	410	6,104	1,795	16,948	9,788	2,253	2,800	17,408	42,295	45,055
1,600	402	6,103	1,654	16,229	9,347	2,184	2,663	17,032	41,006	43,682
1,500	389	5,980	1,802	15,849	9,246	2,136	2,576	16,515	40,104	42,721
1,400	373	5,583	1,698	14,842	8,667	2,018	2,424	15,810	37,884	40,356
1,300	342	5,309	1,904	13,922	8,148	1,896	2,286	14,490	35,589	37,911
1,200	308	4,925	1,450	12,229	7,314	1,668	1,681	13,074	31,316	33,360
1,100	261	4,650	1,407	10,401	6,268	1,436	1,208	11,061	26,967	28,727

PERFORMANCE DATA[DM7686]

August 5, 2010

Emissions Data

RATED SPEED NOT TO EXCEED DATA: 2100 RPM

ENGINE POWER		BHP	415	311	208	104	41.5
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	1,437	794	417	220	140
TOTAL CO		G/HR	1,000	1,253	313	540	474
TOTAL HC		G/HR	55	75	114	137	169
PART MATTER		G/HR	83.0	82.1	48.0	75.6	72.4
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,613.1	1,076.6	780.1	723.6	785.1
TOTAL CO	(CORR 5% O2)	MG/NM3	1,120.7	1,705.6	597.9	1,773.9	2,665.4
TOTAL HC	(CORR 5% O2)	MG/NM3	53.0	88.8	184.8	389.8	819.8
PART MATTER	(CORR 5% O2)	MG/NM3	78.4	96.3	79.1	223.1	372.8
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	786	524	380	352	382
TOTAL CO	(CORR 5% O2)	PPM	897	1,364	478	1,419	2,132
TOTAL HC	(CORR 5% O2)	PPM	99	166	345	728	1,530
TOTAL NOX (AS NO2)		G/HP-HR	3.49	2.57	2.02	2.13	3.38
TOTAL CO		G/HP-HR	2.43	4.06	1.52	5.23	11.48
TOTAL HC		G/HP-HR	0.13	0.24	0.55	1.32	4.08
PART MATTER		G/HP-HR	0.20	0.27	0.23	0.73	1.75
TOTAL NOX (AS NO2)		LB/HR	3.17	1.75	0.92	0.49	0.31
TOTAL CO		LB/HR	2.20	2.76	0.69	1.19	1.05
TOTAL HC		LB/HR	0.12	0.17	0.25	0.30	0.37
PART MATTER		LB/HR	0.18	0.18	0.11	0.17	0.16

RATED SPEED NOMINAL DATA: 2100 RPM

ENGINE POWER		BHP	415	311	208	104	41.5
PERCENT LOAD		%	100	75	50	25	10
TOTAL NOX (AS NO2)		G/HR	1,331	735	386	204	129
TOTAL CO		G/HR	535	670	167	289	254
TOTAL HC		G/HR	29	40	60	72	89
TOTAL CO2		KG/HR	213	172	126	71	42
PART MATTER		G/HR	42.6	42.1	24.6	38.7	37.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,493.6	996.8	722.3	670.0	727.0
TOTAL CO	(CORR 5% O2)	MG/NM3	599.3	912.1	319.7	948.6	1,425.3
TOTAL HC	(CORR 5% O2)	MG/NM3	28.0	47.0	97.8	206.2	433.8
PART MATTER	(CORR 5% O2)	MG/NM3	40.2	49.4	40.6	114.4	191.2
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	728	486	352	326	354
TOTAL CO	(CORR 5% O2)	PPM	479	730	256	759	1,140
TOTAL HC	(CORR 5% O2)	PPM	52	88	182	385	810
TOTAL NOX (AS NO2)		G/HP-HR	3.23	2.38	1.87	1.97	3.13
TOTAL CO		G/HP-HR	1.30	2.17	0.81	2.80	6.14
TOTAL HC		G/HP-HR	0.07	0.13	0.29	0.70	2.16
PART MATTER		G/HP-HR	0.10	0.14	0.12	0.38	0.90
TOTAL NOX (AS NO2)		LB/HR	2.93	1.62	0.85	0.45	0.29
TOTAL CO		LB/HR	1.18	1.48	0.37	0.64	0.56
TOTAL HC		LB/HR	0.06	0.09	0.13	0.16	0.20
TOTAL CO2		LB/HR	469	378	278	157	92
PART MATTER		LB/HR	0.09	0.09	0.05	0.09	0.08
OXYGEN IN EXH		%	10.7	12.5	14.1	15.5	17.1
DRY SMOKE OPACITY		%	1.4	1.5	0.9	2.0	2.0
BOSCH SMOKE NUMBER			0.97	1.04	0.54	1.27	1.29

Regulation Information

EPA TIER 3		2005 - 2010		
GASEOUS EMISSIONS DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN 40 CFR, EU 97/68/EC, ECE REGULATION NO. 96 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSIONS VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 3	CO: 3.5 NOx + HC: 4.0 PM: 0.20

EU STAGE IIIA		2006 - ----		
GASEOUS EMISSION DATA MEASUREMENTS ARE CONSISTENT WITH THOSE DESCRIBED IN EU 97/68/EC, ECE REGULATION NO. 96 AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. GASEOUS EMISSION VALUES ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
EUROPE	EU	NON-ROAD	STAGE IIIA	CO: 3.5 NOx + HC: 4.0 PM: 0.20

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	50	60	70	80	90	100	110	120	130	NORMAL
ALTITUDE (FT)										
0	415	415	415	415	415	415	386	339	293	415
1,000	415	415	415	415	408	397	368	333	297	415
2,000	415	415	409	404	397	380	350	314	278	406
3,000	413	411	405	395	383	363	332	299	262	402
4,000	412	407	398	384	368	346	315	286	255	398
5,000	410	402	392	373	352	329	298	274	249	394
6,000	407	397	383	361	338	314	285	262	242	391
7,000	402	390	370	348	326	302	275	251	233	389
8,000	393	378	356	334	312	289	266	241	220	383
9,000	380	362	339	317	296	277	257	231	208	375
10,000	366	345	323	300	281	264	247	221	208	367
11,000	351	327	305	284	268	252	235	215	208	362
12,000	335	310	287	268	256	241	223	208	208	358
13,000	321	293	269	254	243	229	212	208	208	355
14,000	308	277	251	241	232	216	208	208	208	353
15,000	298	265	237	232	223	208	208	208	208	352

Cross Reference

Engine Arrangement			
Arrangement Number	**Effective Serial Number**	**Engineering Model**	**Engineering Model Version**
2413804	LGK11446	E707	-

Test Specification Data						
Test Spec	**Setting**	**Effective Serial Number**	**Engine Arrangement**	**Governor Type**	**Default Low Idle Speed**	**Default High Idle Speed**
0K6067		LGK11446	2413804	ELEC		

APPENDIX C – ELECTRONIC COPY OF APPLICATION