Duffield Associates, Inc.
5400 Limestone Road
Wilmington, DE 19808
Phone: 302.239.6634
Fax: 302.239.8485
duffnet.com

October 18, 2018

Mr. David Fees, Acting Director
State of Delaware
Department of Natural Resources
and Environmental Control
Division of Air Quality
Dover, DE 19901

Re: Project No. 8850.ED (Duffield Associates)
Walan Specialty Construction Products, LLC
501 Christiana Avenue
Wilmington, New Castle County, Delaware

Dear Mr. Fees:

On the behalf of Walan Specialty Construction Products, LLC (Walan), Duffield Associates, Inc. (Duffield) respectfully submits the enclosed Air Quality Construction Permit Application package for a new, natural minor facility that will be located at 501 Christiana Avenue, in Wilmington, Delaware. The new facility will receive granulated blast furnace slag (GBFS) by way of the Port of Wilmington, grind the GBFS to particle sizes appropriate for addition to portland cement concrete, store the ground GBFS in silos, and then transferred to dry bulk trucks and rail cars for delivery to client-owned, off-site concrete batch plants. The application package includes air emission controls associated with truck unloading and loading of raw and finished product, respectively. If rail car transportation is pursued, information regarding emission control equipment for such operations will be submitted to the Department of Natural Resources and Environmental Control (DNREC) in a future separate package.

The application package includes:

AQM-1	Administrative Information
AQM-2	Process flow Diagram
AQM-3.1	Generic Process Equipment Application
AQM-3.7	Silo Application and supporting information
AQM-4.6	Baghouse Application for load-out chute cartridge filters and supporting information
AQM-4.6	Baghouse Application for grinding mill and supporting information
AQM-4.6	Baghouse Application for silo bin vents and supporting information
AQM-5	Emissions Information Application and support information and calculations

Transportation Routes (included with AQM-1)
Minor New Source Review for Particulate Matter (included with AQM-4.6)
Fugitive Dust Plan
Environmental Permit Application Background Statement
Explanation of Application Differences
Application fee - $215.00 check
Legal notice fee - $165.00 check

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In addition to the enclosed application package, the applicant is in the process of reaching-out to State of Delaware and local elected officials, Prosperity Partnership, and civic organizations to discuss the project. The applicant intends to meet with local civic organizations to present the project and answer questions they may have. The applicant anticipates that these meetings will occur during the month of October 2018.

As discussed during our meeting on September 7, 2018, the applicant is hoping that the permitting process can be completed by the end of December 2018 to support the construction schedule for the facility and the anticipated delivery date. The applicant requests that the DNREC schedule a public hearing for the application for the first week of November 2018.

Should DNREC have any questions regarding this Natural Minor Construction Permit Application, please contact M. Richard Beringer, P.E. of Duffield Associates at (302) 239-6634 or via electronic mail at rberinger@duffnet.com.

Thank you in advance for the Department's timely administrative completeness and technical reviews of this application.

Very truly yours,

DUFFIELD ASSOCIATES, INC.

M. Richard Beringer

M. Richard Beringer, P.E., LEED AP
Senior Environmental Consultant

MRB:acj
8850ED.1018-7.Application Package LOT

Enclosure: Air Permit Application for a Granulated Blast Furnace Slag (GBFS) Grinding Facility

cc: Ms. Lisa B. Dharwadkar – Walan Specialty Construction Products, LLC
Ms. Angela Marconi, P.E. – DNREC DAQ (electronic)
Ms. Karen A. Matteo, P.E. – DNREC DAQ (electronic)
Mr. Bradley A. Klotz – DNREC DAQ (electronic)

AIR PERMIT APPLICATION FOR A GRANULATED BLAST FURNACE SLAG (GBFS) GRINDING FACILITY

WALAN Specialty Construction Products, LLC
501 Christina Avenue
Wilmington, DE 19801

October 2018

Prepared by:

Duffield Associates, Inc.
5400 Limestone Road
Wilmington, Delaware 19808

Project No. 8850.ED

TABLE OF CONTENTS

AQM-1
Administrative Information

DNREC – Division of Air Quality
Application to Construct, Operate, or Modify Stationary Sources

Administrative Information

One original and one copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 West Water Street, Suite 6A
Dover, DE 19904

All Checks Should Be Made Payable To:
State of Delaware

Company and Site Information

1.	Company Name: **WALAN Specialty Construction Products, LLC**
2.	Company Mailing Address: **719 Tarrtown Road** City: **Adrian** State: **PA** Zip Code: **16210**
3.	Site Name: **Walan Specialty Construction Products, LLC.**
4.	Site Mailing Address: **501 Christina Avenue** *(if different from above)* City: **Wilmington** State: **DE** Zip Code: **19801**
5.	Physical Location of Site: **501 Christina Avenue** *(if different from above)* City: **Wilmington** State: **DE** Zip Code: **19801**
6.	Site Billing Address: **719 Tarrtown Road** *(if different from above)* City: **Adrian** State: **PA** Zip Code: **16210**
7.	Air Quality Management Facility ID Number:
8.	Site NAICS Code): **327992** *(list all that apply*
9.	Site SIC Code: **3295** *(list all that apply)*
10.	Site Location Coordinates: Latitude: 39 ° 43' 37" Longitude: 75 ° 32' 08"
11.	Is the Facility New or Existing? ☒ NEW ☐ EXISTING
	If the Facility is an Existing Facility, Complete the Rest of Question 11. If Not, Proceed to Question 12.
11.1.	Does the Facility Have Active Air Permits? ☐ YES ☒ NO
12.	Is this Application For New Equipment or a Modification to Existing Equipment? ☒ New Equipment ☐ Modification of Existing Equipment ☐ Other (Specify):
	If the application is for the modification of existing equipment, complete the rest of Question 12. If not, proceed to Question 13.

Company and Site Information

12.1.	Does the Equipment Have an Active Air Permit? ☐ YES ☐ NO
If the equipment has an active air permit, complete the rest of Question 12. If not, proceed to Question 13.	
12.2.	Permit Number of Existing Equipment:
13.	Status of Equipment Being Applied For: ☒ Natural Minor Source ☐ Synthetic Minor Source ☐ Major Source ☐ Federally Enforceable Restrictions
14.	Facility Status: ☒ Natural Minor Facility ☐ Synthetic Minor Facility ☐ Major Facility
If the facility is a Major Source, complete the rest of Question 14. If not, proceed to Question 15.	
14.1.	Responsible Official Name:
14.2.	Responsible Official Title:

Contact Information

15.	Name of Owner or Facility Manager: **Anil Bhadsavle**
16.	Title of Owner or Facility Manager: **President**
17.	Permit Contact Name: **M. Richard Beringer**
18.	Permit Contact Title: **Senior Project Manager**
19.	Permit Contact Telephone Number: **302-239-6634**
20.	Permit Contact Fax Number: **302-239-8485**
21.	Permit Contact E-Mail Address: **rberinger@duffnet.com**
22.	Billing Contact Name: **Lisa Dharwadkar**
23.	Billing Contact Title: **Vice President**
24.	Billing Contact Telephone Number: **724-545-2300**
25.	Billing Contact Fax Number:
26.	Billing Contact E-Mail Address: **lisa.walanscp@gmail.com**

Proposed Construction and Operating Schedule

27.	When Will the Proposed Construction/Installation/Modification Occur: 06/01/2019
28.	Proposed Operating Schedule: **24** hours/day **7** days/week **52** weeks/year
28.1.	Is There Any Additional Information Regarding the Operating Schedule? ☒ YES ☐ NO
If YES, complete the rest of Question 28. If NO, proceed to Question 29.	

Proposed Construction and Operating Schedule

28.2. Describe the Additional Information: **The proposed operating schedule assumes the maximum continuous operation of the facility. However, the actual operating schedule will vary throughout the year depending on when GBFS is shipped to the Port of Wilmington and transported to the facility. Assuming the plant operates at maximum capacity with a projected throughput rate of 30 tons/hour, the maximum throughput is approximately 262,800 tons/year. Due to the seasonal nature of the business, the number of trucks delivering material to the facility will range from approximately 8-24 per day, when a ship is being unloaded. A figure of the local route that trucks will take from the Port of Wilmington to the facility and to Interstate 495 is provided in AQM-1 Supporting Information. A figure of the truck route that will be taken from the facility to the principal customer as well as a figure identifying locations of potential customers in Pennsylvania, Delaware, New Jersey, and Maryland is provided in AQM-1 Supporting Information. Initially, one ship per year is anticipated. Up to three ships per year is anticipated in the future. A maximum range of 60,000 to 65,000 tons of GBFS will be stored at the facility at any given time and will accumulate as GBFS is transported to and stockpiled at the facility.**

Coastal Zone Information

29. Is the Facility Located in the Coastal Zone? ☐ YES ☒ NO

If the facility is located in the Coastal Zone complete the rest of Question 29. If not, proceed to Question 30.

29.1. Is a Coastal Zone Permit Required for Construction or Operation of the Source Being Applied for? ☐ YES ☒ NO

Attach a copy of the Coastal Zone Determination if it has not been previously submitted

If a Coastal Zone Permit is required complete the rest of Question 29. If not, proceed to Question 30.

29.2. Has a Coastal Zone Permit Been Issued? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Permit if it has not been previously submitted

Local Zoning Information

30. Parcel Zoning: **W1, Waterfront Manufacturing (See Zoning Information)**

Attach Proof of Local Zoning if it has not been previously submitted

Application Information

31. Is the Appropriate Application Fee Attached? ☒ YES ☐ NO

32. Is the Advertising Fee Attached? ☒ YES ☐ NO

For help determining your application and advertising fees see:
http://www.dnrec.state.de.us/DNREC2000/Library/Fees/DE%20Permit%20Fees.htm

Attach the appropriate fees. Note that your Application will not be considered complete if the appropriate fees are not included.

33. Is a Cover Letter Describing the Process Attached? ☒ YES ☐ NO

Attach a brief cover letter describing your Application.

Application Information

If the Facility is a New Facility complete Question 34. If not, proceed to Question35.

34. Is a Copy of the Applicant Background Information Questionnaire on Record at the Department? ☐ YES ☒ NO

If NO, complete the rest of Question 34. If YES, process to Question 35.

34.1 Is a Copy of the Applicant Background Information Questionnaire Attached? ☒ YES ☐ NO

For a copy of the Applicant Background Information Questionnaire see
http://www.dnrec.delaware.gov/services/Documents/Chapter79Form.pdf

Attach a copy of the Applicant Background Information Questionnaire if applicable.

35. Check Which Application Forms are Attached:

☒ AQM-1	☐ AQM-3.4	☐ AQM-3.9	☐ AQM-3.14	☐ AQM-4.4	☐ AQM-4.9	☐ AQM-6
☒ AQM-2	☐ AQM-3.5	☐ AQM-3.10	☐ AQM-3.15	☐ AQM-4.5	☐ AQM-4.10	
☒ AQM-3.1	☐ AQM-3.6	☐ AQM-3.11	☐ AQM-4.1	☒ AQM-4.6	☐ AQM-4.11	
☐ AQM-3.2	☒ AQM-3.7	☐ AQM-3.12	☐ AQM-4.2	☐ AQM-4.7	☐ AQM-4.12	
☐ AQM-3.3	☐ AQM-3.8	☐ AQM-3.13	☐ AQM-4.3	☐ AQM-4.8	☒ AQM-5	

36. Check Which Documents are Attached:

☐ Coastal Zone Determination
☐ Coastal Zone Permit
☒ Proof of Local Zoning
☒ Application Fee
☒ Advertising Fee
☒ Applicant Background Information Questionnaire

☐ Claim of Confidentiality
☒ Manufacturer Specification(s)
☒ Material Safety Data Sheets (MSDSs)
☒ Supporting Calculations
☒ Descriptive Cover Letter
☒ Other (Specify): **Area map, aerial photo, site drawing, and equipment site drawing**

Confidentiality Information

37. Do You Consider Any of the Information Submitted With this Application Confidential? ☐ YES ☒ NO

For help on how to submit a confidentiality claim see
http://regulations.delaware.gov/register/december2011/final/15%20DE%20Reg%20864%2012-01-11.htm

If a Claim of Confidentiality is made it MUST meet the requirements of Section 6 of DNREC's Freedom of Information ("FOIA") Regulation at the time the Application is submitted.

Signature Block

Signature Block

I, the undersigned, hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all of its attachments as to the truth, accuracy, and completeness of this information. I certify based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete. By signing this form, I certify that I have not changed, altered, or deleted any portions of this application. I acknowledge that I cannot commence construction, alteration, modification or initiate operation until I receive written approval (i.e. permit, registration, or exemption letter) from the Department. I acknowledge that I may be required to perform testing of the equipment to receive construction or operation approval, and that if I do not receive approval to construct or operate that I may appeal the decision.

Anil Bhadsavle, President
Owner or Operator

10/15/18
Date

Signature of Owner or Operator

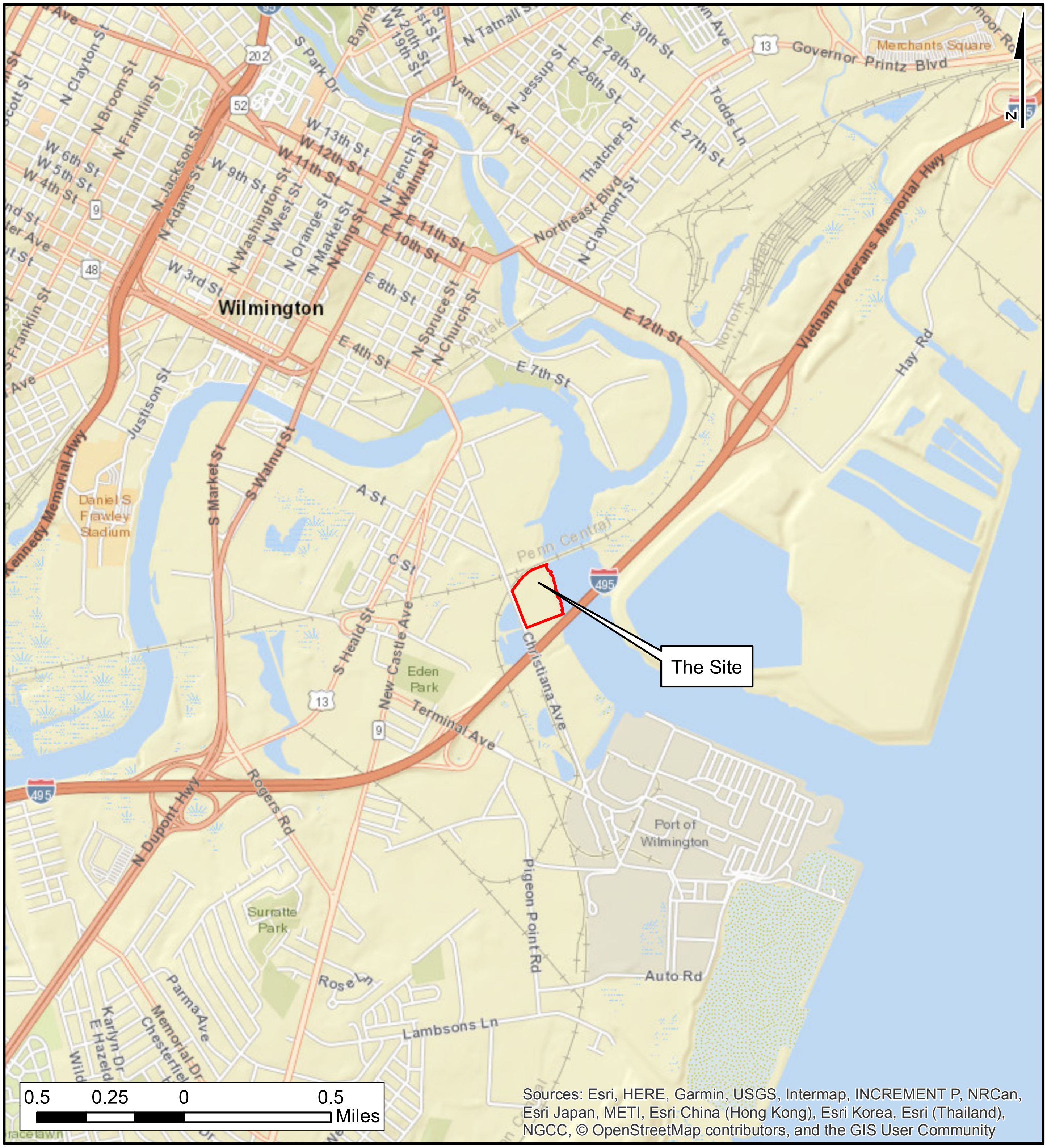
One Original and One Copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 W. Water Street, Suite 6A
Dover, Delaware 19904

All Checks Should Be Made Payable To:
State of Delaware

DUFFIELD ASSOCIATES
Soil, Water & the Environment

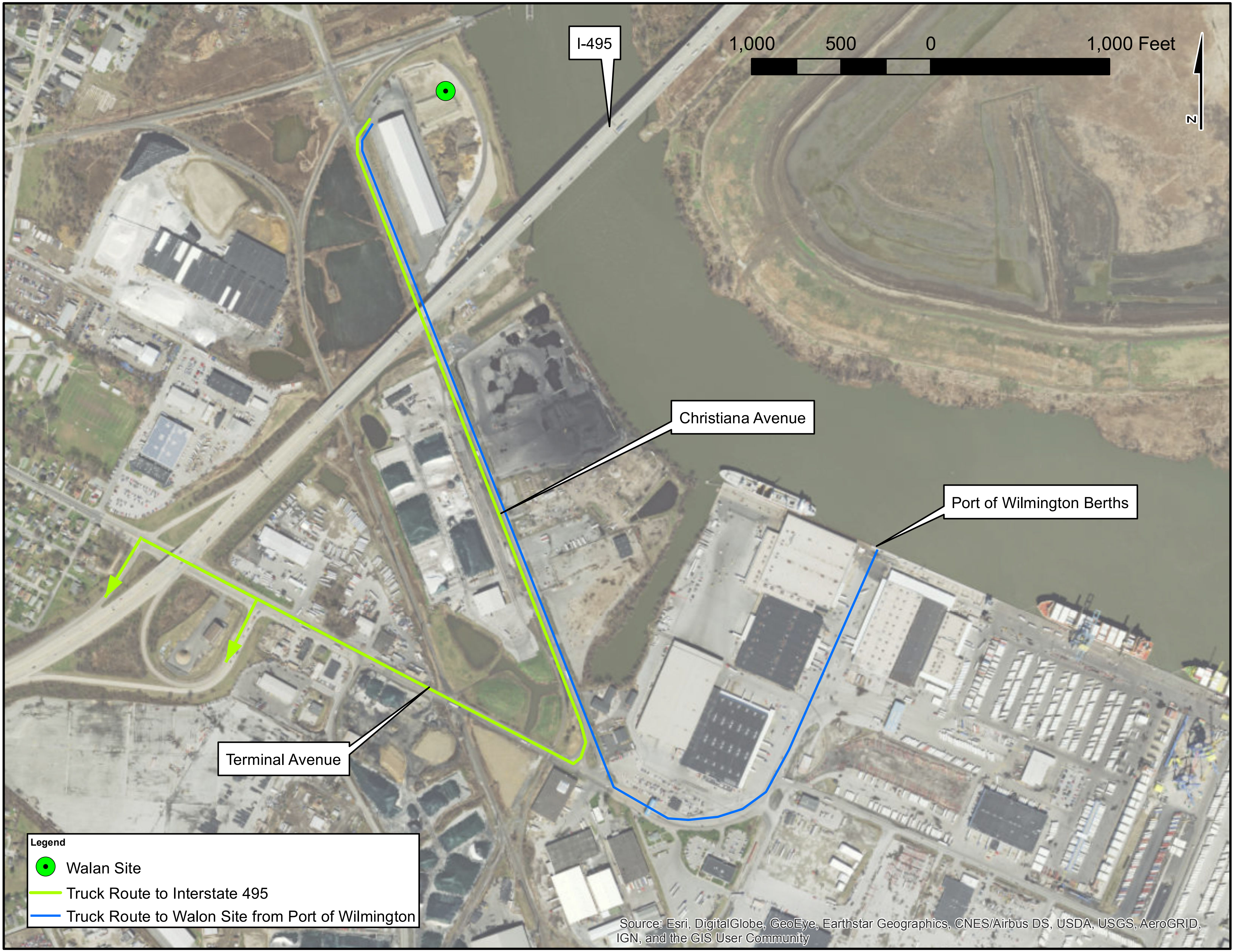
AQM-1
Supporting Information

Site Location Map



Date: 10/2018	**Site Location Map**	DESIGNED BY: BNM	DUFFIELD ASSOCIATES Soil, Water & the Environment
SCALE: AS SHOWN		DRAWN BY: CSP	5400 LIMESTONE ROAD WILMINGTON, DE 19808-1232 TEL. (302)239-6634 FAX (302)239-8485
PROJECT NO. 8850.ED		CHECKED BY: MRB	OFFICES IN PENNSYLVANIA, SOUTHERN DELAWARE, MARYLAND AND NEW JERSEY
FIGURE 1		FILE: 8850.ED.mxd	EMAIL: DUFFIELD@DUFFNET.COM

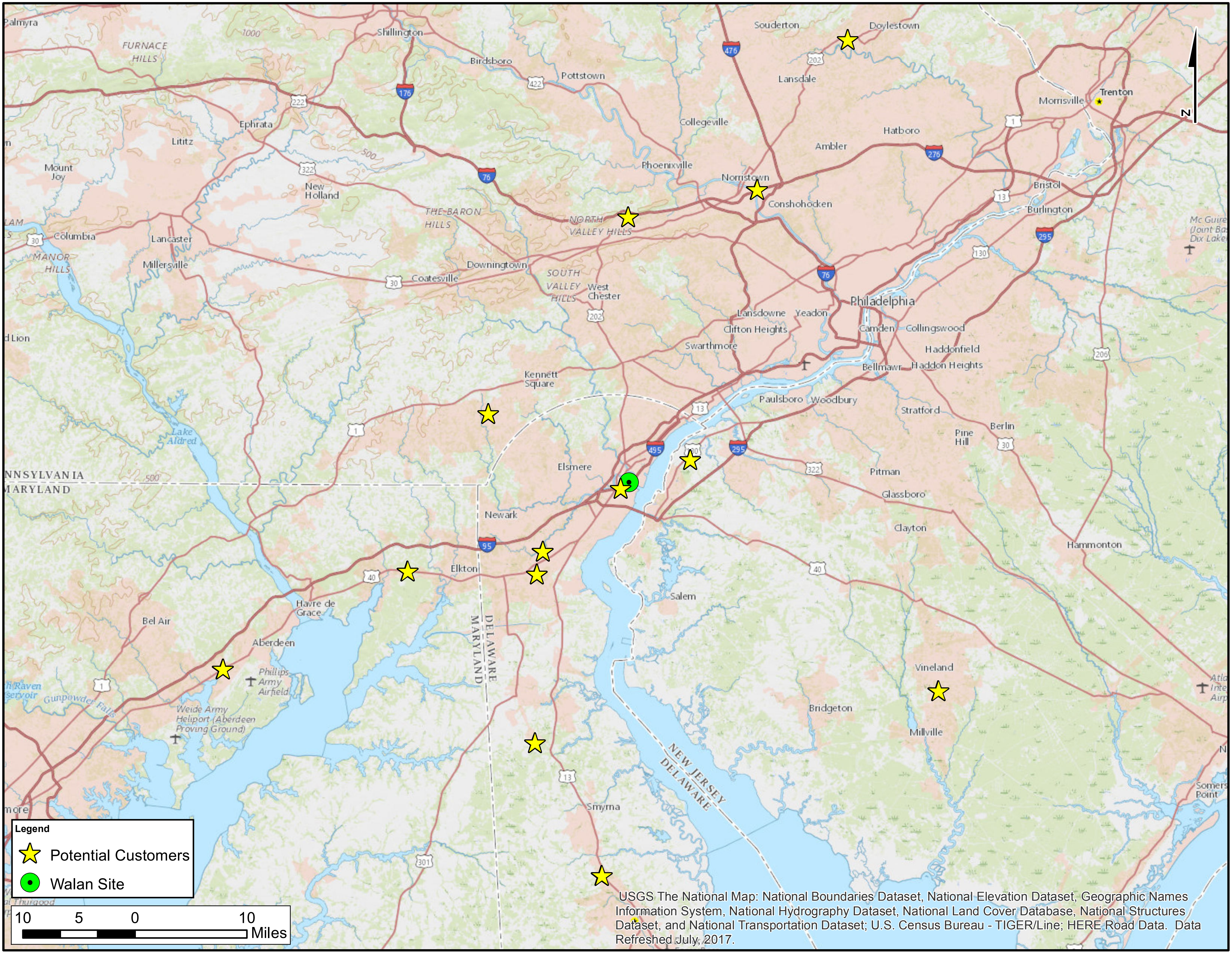
Local Truck Routes


I-495
1,000 500 0 1,000 Feet
N
Christiana Avenue
Port of Wilmington Berths
Terminal Avenue
Legend
Walan Site
Truck Route to Interstate 495
Truck Route to Walon Site from Port of Wilmington
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Truck Route to Principal Client


I-495
I-95
DE-1
Walther Road
US-40
Legend
Walan Site
Truck Route
1 0.5 0 1
Miles
N
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Locations of Potential Future Customers



USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data. Data Refreshed July, 2017.

DUFFIELD ASSOCIATES
Soil, Water & the Environment

Zoning Information

City of Wilmington

MICHAEL S. PURZYCKI
Mayor

March 6, 2018

Mr. Ali Mirzakhalili, P.E.
DNREC Division of Air Quality
State Street Commons
100 West Water Street- Suite 6A
Dover, DE 19904

Re: 501 Christiana Avenue

Dear Mr. Mirzakhalili:

Please be advised that the subject property is located in an area zoned W-1 and that the proposed use of the premises for a granulated blast furnace slag grinding operation is permitted as a matter of right per Wilmington City Code section 48-336(b)(1).

If I can be of further assistance with this matter, please don't hesitate to call or write.

Respectfully,

James G. DiPinto
Zoning Manager
Department of Licenses & Inspection
(302)-576-3040
jdipinto@wilmingtonde.gov

cc: Craig R. Holdefer

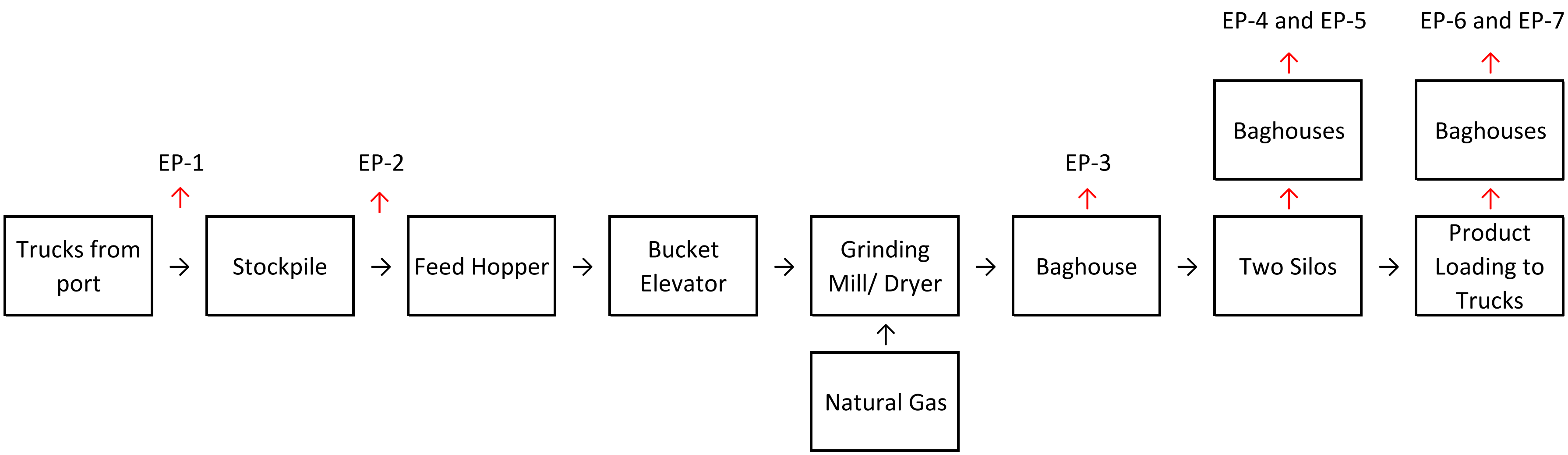
DUFFIELD ASSOCIATES
Soil, Water & the Environment

AQM-2
Process Flow Diagram

Process Flow Diagram

Sketch the Process Flow Diagram for the equipment or process being applied for. Include each emission unit and control device (even existing emission units that will not be modified by this application). You may identify each emission unit with a simple shape. Label each emission unit and control device with a unique identifier. Show the relationship between each emission unit and/or control device by drawing arrows between them to indicate the flow of air pollutants. List which application forms are included for each emission unit or control device below the shape representing each emission unit or control device . See http://www.delaware.gov/reg2/default.htm for example Process Flow Diagrams for common processes. If you already have a Process Flow Diagram for the equipment or process being applied for, you may attach it to the application instead of using this form.

See Process Flow Diagram attached



DATE: 10/2018	**Process Flow Diagram**	DRAWN BY: BNM	DUFFIELD ASSOCIATES Soil, Water & the Environment
PROJECT NO: 8850.ED	WALAN Specialty Construction Products, LLC	CHECKED BY: MRB	5400 LIMESTONE ROAD WILMINGTON, DE 19808-1232 TEL. (302)239-6634 FAX (302)239-8485
SHEET: FIGURE 2	Wilmington~Delaware	FILE: 8850.ED.Process_Flow_Diagram.xlxs	OFFICES IN PENNSYLVANIA, SOUTHERN DELAWARE, MARYLAND AND NEW JERSEY *EMAIL: DUFFIELD@DUFFNET.COM*

DUFFIELD ASSOCIATES
Soil, Water & the Environment

AQM-3.1
Generic Process Equipment
Application

INTRODUCTION TO AQM-3.1: GENERIC PROCESS EQUIPMENT APPLICATION

Form AQM-3.1 provides general technical information and descriptions of the facility's processes. The form identifies the raw material inputs and products which are granulated blast furnace slag (GBFS) and ground granulated blast furnace slag (GGBFS), respectively. A material safety data sheet (MSDS) is provided for the GBFS which is representative of the product GGBFS given that the composition of the material is not altered during the grinding process. The stack information is included which summarizes the height and width of the baghouse and bin vent exhaust stacks, stack exit gas temperature and gas flow rate, and other parameters. All technical parameters can be found in the equipment information documents provided as supporting information in AQM-3.1, AQM-3.7, and AQM- 4.6. A glossary of technical terms used in this section is provided below.

Baghouse – an air pollution control device that separates particulates from exhaust gas and collects the separated particulates to keep them from being discharged to the atmosphere.

Actual Cubic Feet per Minute – (ACFM) a unit of volumetric flow that is provided by manufacturers of fans and compressors. The actual volumetric flow is determined with reference to inlet conditions of the gas.

Generic Process Equipment Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **WALAN Specialty Construction Products, LLC**
2. Equipment ID Number: **GBFS Handling, Grinding and Storage**
3. Provide a brief description of Equipment or Process: **GBFS is received from the Port of Wilmington by truck, stockpiled, and fed by front-end loader, via a hopper, to the "Ready2Grind" grinding/drying equipment. The ground GBFS is fed by bucket elevator to two - 1,100 ton storage silos equipped with bin vents that remove particulates from the air. The fine dust particles are captured by a baghouse during grinding and drying. Finally, the ground GBFS is loaded into enclosed trucks through dustless loadout chutes controlled by cartridge filters.**
4. Manufacturer: **See supporting equipment information attached in AQM-4.6**
5. Model:
6. Serial Number:

Raw Material Information

7. Raw Materials Used in Process

If there are more than four Raw Materials used, attach additional copies of this page as needed.

	Raw Material Used	CAS Number	Usage Rate (include units)	MSDS Attached?
7.1.	**Granulated blast furnace slag (GBFS)**	**N/A**	**30 tons/hour**	☒ YES ☐ NO
7.2.				☐ YES ☐ NO
7.3.				☐ YES ☐ NO
7.4.				☐ YES ☐ NO

Attach a copy of all calculations made to support the data in the table above.
Attach a Material Safety Data Sheet (MSDS) for each Raw Material used.

Products Produced Information

8. Products Produced

If there are more than four Products Produced, attach additional copies of this page as needed.

	Product Produced	CAS Number	Production Rate (include units)	MSDS Attached?
8.1.	**Ground GBFS (GGBFS)**	**N/A**	**30 tons/hour**	☒ YES ☐ NO
8.2.				☐ YES ☐ NO
8.3.				☐ YES ☐ NO

Products Produced Information

8.4.			☐ YES ☐ NO

Attach a copy of all calculations made to support the data in the table above.
Attach a Material Safety Data Sheet (MSDS) for each Product Produced.

Byproducts Generated Information

9. Byproducts Generated

If there are more than four Byproducts Generated, attach additional copies of this page as needed.

	Byproduct Generated	CAS Number	Generation Rate (include units)	MSDS Attached?
9.1.				☐ YES ☐ NO
9.2.				☐ YES ☐ NO
9.3.				☐ YES ☐ NO
9.4.				☐ YES ☐ NO

Attach a copy of all calculations made to support the data in the table above.
Attach a Material Safety Data Sheet (MSDS) for each Byproduct Generated.

General Information

10. Manufacturer's Rated Capacity or Maximum Throughput of Equipment or Process: **30 tons/hour**

11. Describe Important Manufacturer Specifications and/or Operating Parameters for Equipment or Process: **The "Ready2Grind" system consists of one (1) feed hopper, two (2) bucket elevators, one (1) mill used to dry and grind the GBFS, and one (1) baghouse used for air pollution control and product recovery. The natural gas-fueled heater on the mill has a gas firing rate of 7,240 cubic ft/hour. The ground GBFS from the system is conveyed via a bucket elevator to two product silos controlled by bin vents where it is then loaded into enclosed trucks for shipment through dustless loadout chutes controlled by cartridge filters.**

Attach the Manufacturer's Specification Sheet(s) for the equipment or process.

Control Device Information

12. Is an Air Pollution Control Device Used? ☒ YES ☐ NO

If an Air Pollution Control Device is used, complete the rest of Question 12. If not, proceed to Question 13.

12.1. Is Knockout Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.11 and attach it to this application.

12.2. Is a Settling Chamber Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.10 and attach it to this application.

12.3. Is an Inertial or Cyclone Collector Used? ☐ YES ☒ NO

If YES, complete Form AQM-4.5 and attach it to this application.

Control Device Information

12.4. Is a Fabric Collector or Baghouse Used?	☒ YES ☐ NO
If YES, complete Form AQM-4.6 and attach it to this application.	
12.5. Is a Venturi Scrubber Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.8 and attach it to this application.	
12.6. Is an Electrostatic Precipitator Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.7 and attach it to this application.	
12.7. Is Adsorption Equipment Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.2 and attach it to this application.	
12.8. Is a Scrubber Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.4 and attach it to this application.	
12.9. Is a Thermal Oxidizer or Afterburner Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.1 and attach it to this application.	
12.10. Is a Flare Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.3 and attach it to this application.	
12.11. Is Any Other Control Device Used?	☐ YES ☒ NO
If YES, attach a copy of the control device Manufacturer's Specification Sheet(s).	
If any other control device is used, complete the rest of Question 12. If not, proceed to Question 13.	
12.12. Describe Control Device:	
12.13. Pollutants Controlled: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_X ☐ SO_X ☐ Metals ☐ Other (Specify):	
12.14. Control Device Manufacturer:	
12.15. Control Device Model:	
12.16. Control Device Serial Number:	
12.17. Control Device Design Capacity:	
12.18. Control Device Removal or Destruction Efficiency:	

Stack Information

13. How Does the Process Equipment Vent:
(check all that apply)
☐ Directly to the Atmosphere
☒ Through a Control Device Covered by Forms AQM-4.1 through 4.12
☐ Through Another Control Device Described on This Form

If any of the process equipment vents directly to the atmosphere or through another control device described on this form, proceed to Question 14. If the process equipment vents through a control device, provide the stack parameters on the control device form and proceed to Question 18.

14. Number of Air Contaminant Emission Points: **Seven**

If there are more than three Emission Points, attach additional copies of this page as needed.

Stack Information

For the first Emission Point
15. Emission Point Name: **EP-3 "Ready2Grind" Baghouse**
15.1. Stack Height Above Grade: **83 feet**
15.2. Stack Exit Diameter: **3 feet** *(Provide Stack Dimensions If Rectangular Stack)*
15.3. Is a Stack Cap Present? ☐ YES ☒ NO
15.4. Stack Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting *(check all that apply)* ☐ Other (Specify):
15.5. Stack Exit Gas Temperature: **204.8 °F**
15.6. Stack Exit Gas Flow Rate: **10,463 ACFM**
15.7. Distance to Nearest Property Line: **to the railroad tracks - about 125 feet**
15.8. Describe Nearest Obstruction: **Large 150' x 675' building to the west**
15.9. Height of Nearest Obstruction: **about 50 feet**
15.10. Distance to Nearest Obstruction: **about 235 feet**
15.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO
For the second Emission Point. If there is no second Emission Point, proceed to Question 18.
16. Emission Point Name: **EP-4 and EP-5 Silo Bin Vents with cartridge filters**
16.1. Stack Height Above Grade: **85 feet**
16.2. Stack Exit Diameter: **1.02 feet** *(Provide Stack Dimensions If Rectangular Stack)*
16.3. Is a Stack Cap Present? ☐ YES ☒ NO
16.4. Stack Configuration: ☐ Vertical ☒ Horizontal ☐ Downward-Venting *(check all that apply)* ☐ Other (Specify):
16.5. Stack Exit Gas Temperature: **Ambient °F**
16.6. Stack Exit Gas Flow Rate: **4000 ACFM**
16.7. Distance to Nearest Property Line: **about 50 feet**
16.8. Describe Nearest Obstruction: **Large 150' x 675' building to the west**
16.9. Height of Nearest Obstruction: **about 50 feet**
16.10. Distance to Nearest Obstruction: **about 325 feet**
16.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO
For the third Emission Point. If there is no third Emission Point, proceed to Question 18.
17. Emission Point Name: **EP-6 and EP-7 GGBFS Loadout Chutes - dustless loadout with cartridge filters**
17.1. Stack Height Above Grade: **about 22 feet**
17.2. Stack Exit Diameter: **0.667 feet** *(Provide Stack Dimensions If Rectangular Stack)*
17.3. Is a Stack Cap Present? ☐ YES ☒ NO
17.4. Stack Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting

Stack Information

(check all that apply)	☐ Other (Specify):
17.5.	Stack Exit Gas Temperature: **ambient °F**
17.6.	Stack Exit Gas Flow Rate: **1400 ACFM**
17.7.	Distance to Nearest Property Line: **about 50 feet**
17.8.	Describe Nearest Obstruction: **Large 150' x 675' building to the west**
17.9.	Height of Nearest Obstruction: **about 50 feet**
17.10.	Distance to Nearest Obstruction: **about 325 feet**
17.11.	Are Stack Sampling Ports Provided? ☐ YES ☒ NO

Monitoring Information

18.	Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO
If Yes, attach a copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets	
If YES, complete the rest of Question 18. If NO, proceed to Question 19.	
18.1.	Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_X ☐ SO_X ☐ Metals ☐ Other (Specify):
18.2.	Describe the Continuous Emission Monitoring System:
18.3.	Manufacturer:
18.4.	Model:
18.5.	Serial Number:
18.6.	Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☐ NO
If YES, complete the rest of Question 18. If NO, proceed to Question 19.	
18.7.	Emission Units Monitored:
18.8.	Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? ☐ YES ☐ NO
If YES, complete the rest of Question 18. If NO, proceed to Question 19.	
18.9.	Emission Units Emitting Simultaneously:

Voluntary Emission Limitation Request Information

19.	Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO
If YES, complete the rest of Question 19. If NO, proceed to Question 20.	
19.1.	Describe Any Requested Emission Limitations:

Voluntary Operating Limitation Request Information

20.	Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.?	☐ YES ☒ NO
If YES, complete the rest of Question 20. If NO, proceed to Question 21.		
20.1.	Describe Any Requested Operating Limitations:	

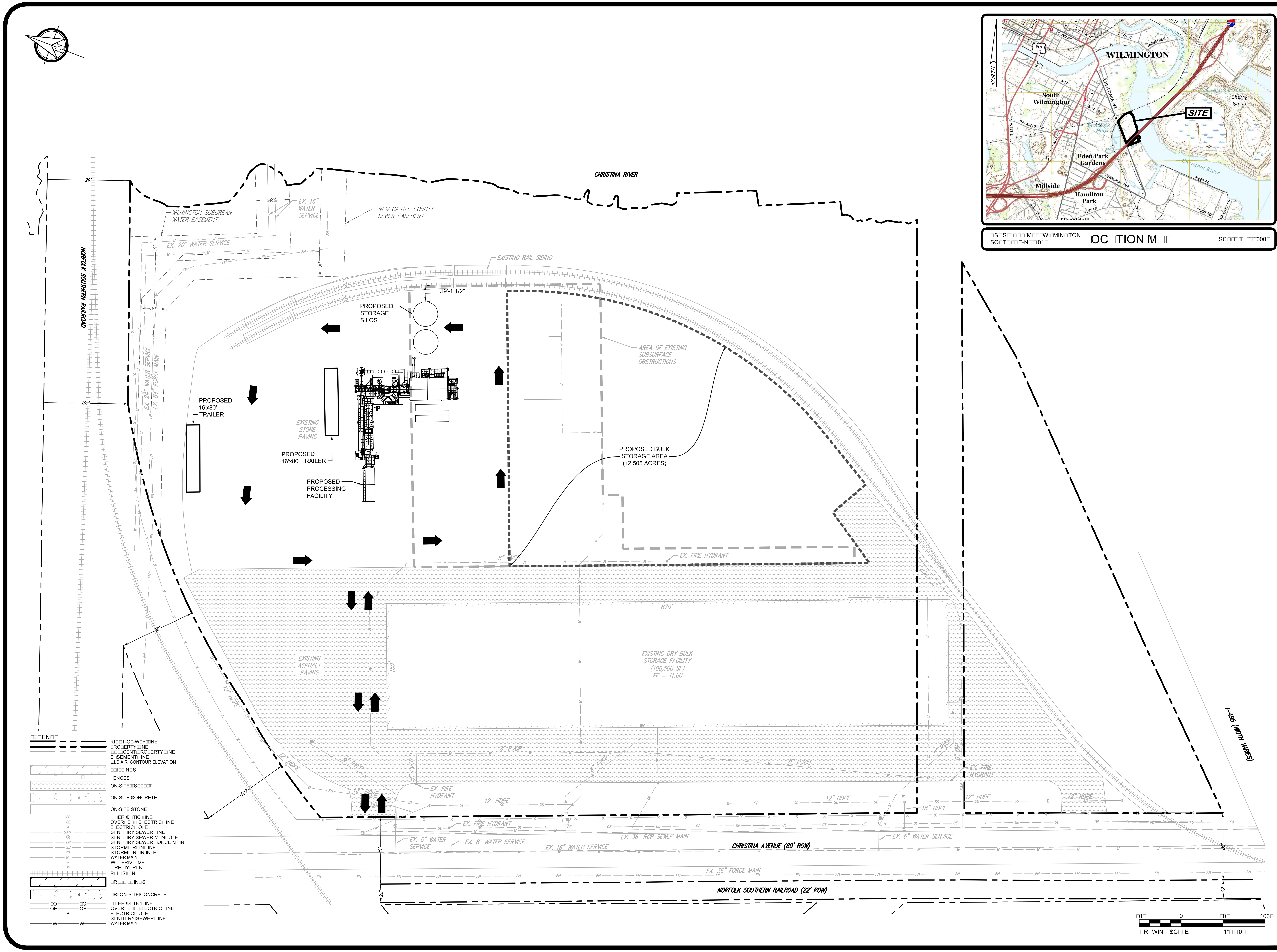
Additional Information

21.	Is There Any Additional Information Pertinent to this Application?	☒ YES ☐ NO
If YES, complete the rest of Question 21.		
21.1.	Describe: **About 80 - 85% of the exhaust gases passing through the grinder/dryer are recirculated.**	

AQM-3.1
Supporting Information

DUFFIELD ASSOCIATES
Soil, Water & the Environment

Proposed Site Plan



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CMC

CMC

REVISION

PRELIMINARY NOT FOR CONSTRUCTION

APPLICANT:

SITE PLAN

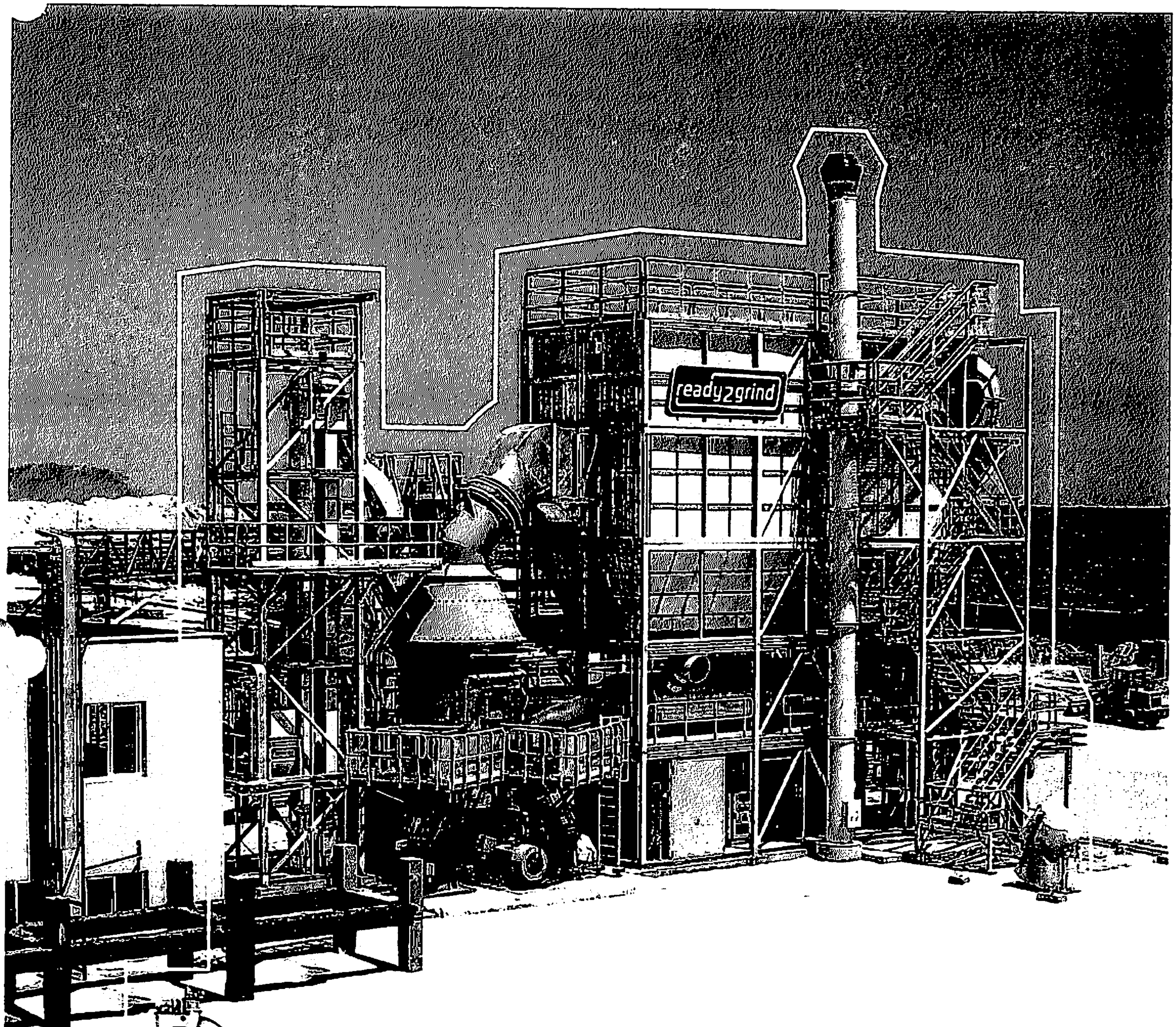
PROPOSED PROCESS UNIT
PORT CONTRACTORS FACILITY

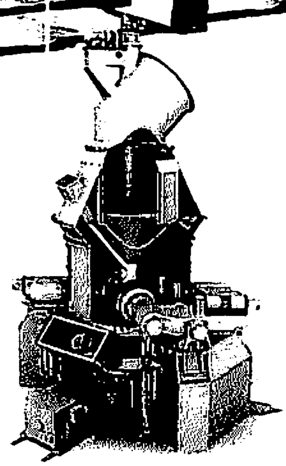
CITY OF WILMIINGTON ~ NEW CASTLE COUNTY ~ DELAWARE

DUFFIELD ASSOCIATES
Soil, Water & the Environment

Ready2Grind Modular System for Grinding/Drying of GBFS Information

GEBR. PFEIFFER





ready2grind MODULAR SYSTEM

Pfeiffer's modular mill solution enables flexible use in any place, bringing cement producers closer to their customers. This compact system is suited to producing all types of cement - perfect for local cement producers and market entrants as well as for large construction companies aiming to expand their position by manufacturing cement on the spot.

The ingenious design allows the ready2grind plant to be transported and mounted fast and efficiently with manageable costs - making it the perfect concept to respond rapidly to the changing needs of the local cement markets.

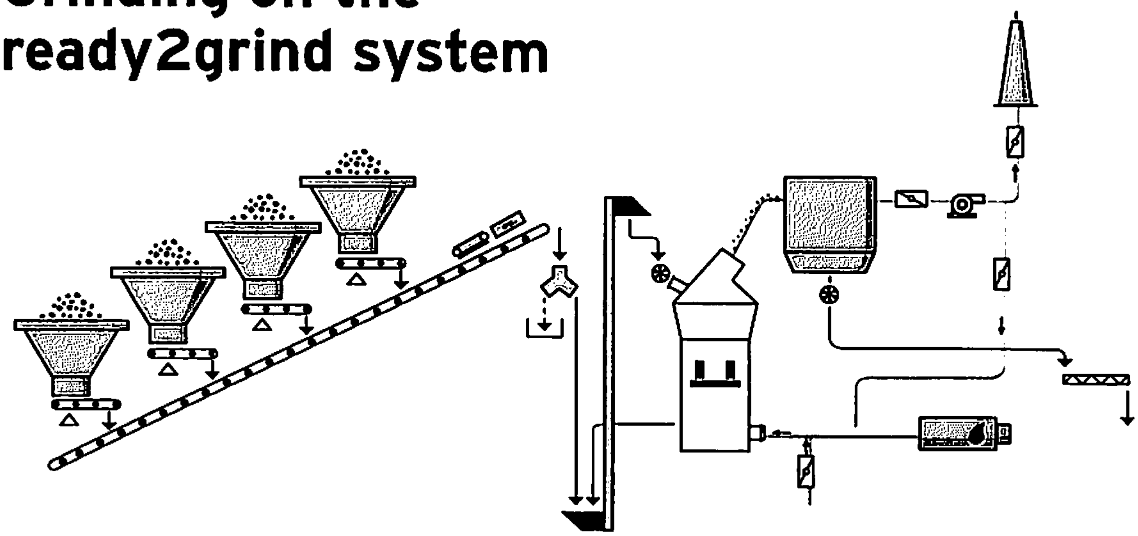
The advantages at one view:

» highest reliability, proven concept
» cost-efficient transportation in standard container dimensions
» rapid delivery, installation and commissioning
» highest operational availability with moderate investment
» immediate market entry, short amortization, reduced investment risk
» maximum flexibility, to react to changing market requirements at short notice

Features:

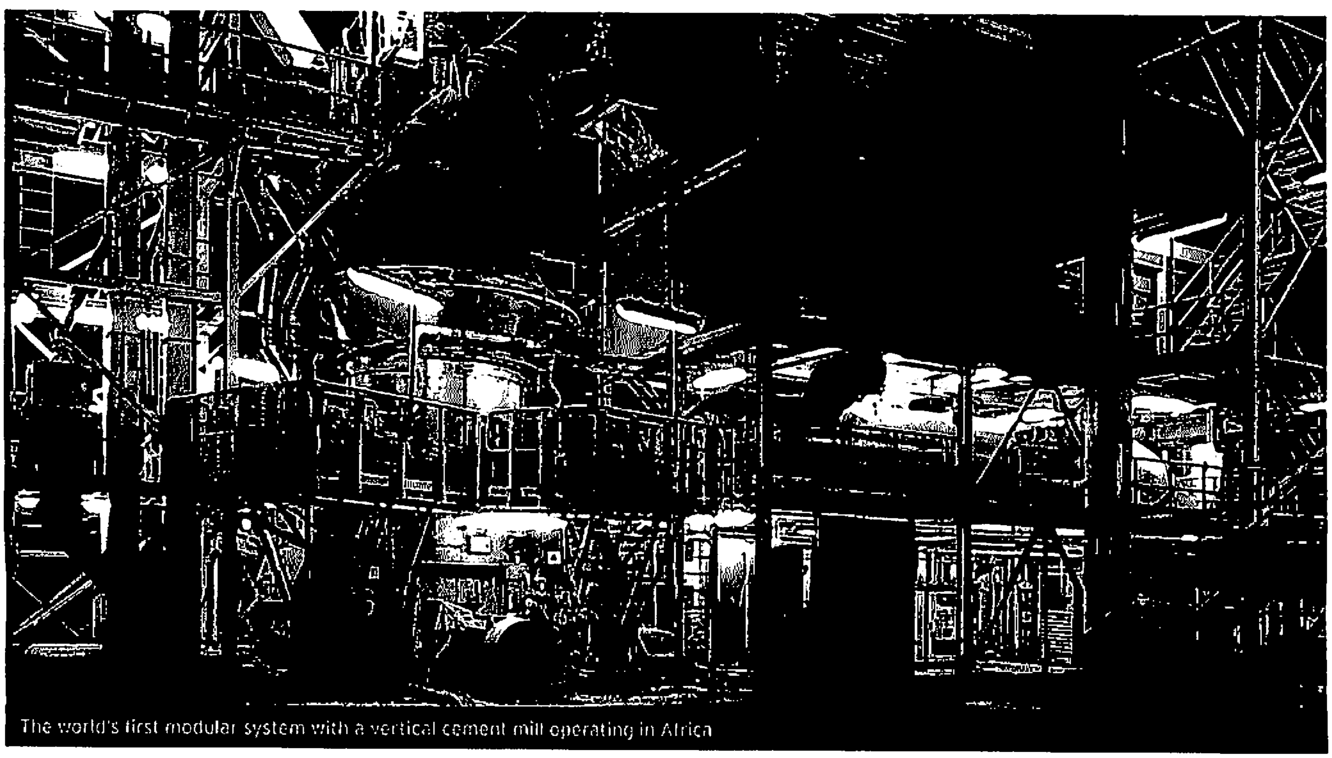
» cement of any desired type
» efficient VRM operation
» different plant sizes available
» compact modular design
» flexible feed system
» pre-assembled in standardized container dimensions
» perfect for small-scale production
» also available for other material such as limestone, gypsum, coal or similar

Grinding on the ready2grind system



With its extraordinarily compact and modular design, the ready2grind system is preassembled for transportation in standard container dimensions. The grinding process is the same as that of bigger Pfeiffer grinding plants. The above flow sheet shows the process of cement grinding as an example.

Clinker and additives are ground, dried, and classified in the Pfeiffer vertical mill. Product quality and fineness can be set within wide limits (up to 6,000 cm²/g Blaine). The ground and dried product is separated from the process gas in a filter for entire dust collection which is followed by a fan. Downstream of the fan, the volume flow is divided: part of it is returned to the mill while the remainder is evacuated through the exhaust gas chimney.



The world's first modular system with a vertical cement mill operating in Africa

Proven mill technology for ambitious tasks

The design of the ready2grind system is based on the Pfeiffer vertical roller mill technology approved across the globe and on the decade-long experience in developing innovative mill technologies. The Pfeiffer vertical roller mill at the core of the ready2grind solution guarantees the highest level of operational reliability.

Benefits of Pfeiffer vertical roller mills:

» lower electrical power consumption: up to 40 % compared to ball mills
» few ancillaries required, little to no building volume compared to other systems
» maximum availability: minimum maintenance downtime
» very quick product change-over
» low vibration level
» grinding, drying and classifying, all in one machine

Standardized ready2grind systems for different throughput rates

GEBR. PFEIFFER ready2grind - performance table

■ R2G 1800 C-4 / ■ R2G 2500 C-4

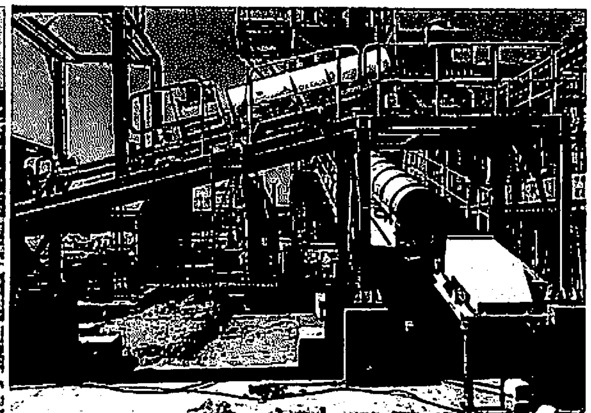
Product		Portland Cement CEM I		Limestone Cement CEM II / B - L		Ground granulated blast-furnace slag (GGBFS)	
Fineness acc. to Blaine		3300	4000	4000	5000	3800	4500
Grindability	kWh/t	18	22	15	19	23	27
Production rate	t/h	25 / 60	20 / 50	30 / 72	23 / 57	21 / 47	18 / 44
Max feed grain size	mm	35 / 50					
Approx. yearly production rate	t/a	up to 200,000 / up to 450,000					
Installed mill motor power	kW	560 / 1260					
Total installed power	kW	about 1200 / about 2300					

GEBR. PFEIFFER

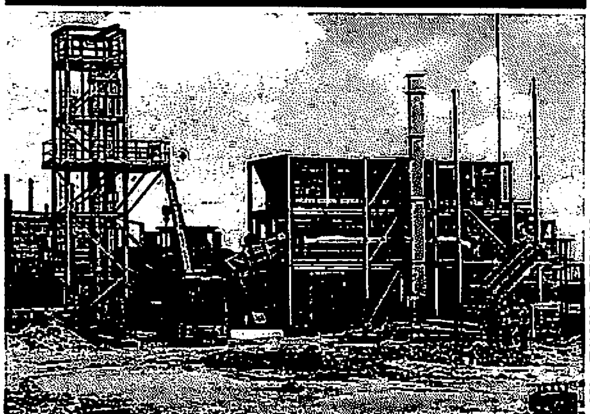
The world's first modular system with a vertical cement mill has been operating since Feb. 2017.

Installation procedure

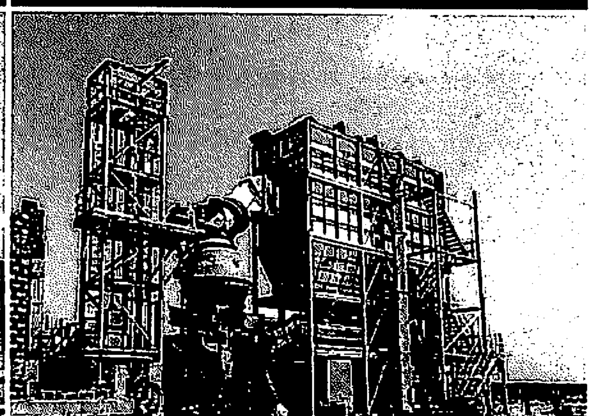
Client has prepared the site



Starting

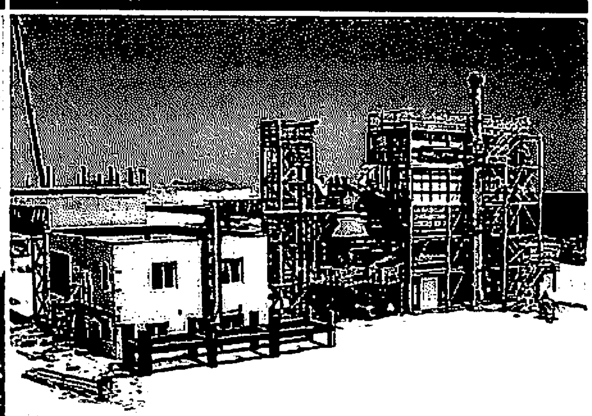


Growing



Nearly ready.

Decoration and small issues



End of installation procedure after 2 months

SCOPE OF EQUIPMENT AND SERVICE SUPPLY

A. BASE PLANT MODULES

A. 1	Feed material dosing and feed hoppers
A. 2	Material feeding to mill
A. 3	Mill, classifier and ancillaries
A. 4	Process filter, hot gas generator and fan
A. 5	Electrical controls and drives

B. OPTIONAL EQUIPMENT MODULES

B. 1	Product transport and storage silos
B. 2	Packing and truck loading
B. 3	Bulk loading equipment
B. 4	Laboratory equipment
B. 5	Fuel storage
B. 6	Intermediate storage silos
B. 7	Transformer station

C. OPTIONAL SERVICE MODULES

C. 1	Operator training
C. 2	Maintenance training
C. 3	Service contracts

153.05.01.EN

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DUFFIELD ASSOCIATES
Soil, Water & the Environment

MSDS for GBFS

Serial number:HNB053
Date created: 2015/1/1
Date of the latest revision:2017/1/1
Third edition

Safety Data Sheet

Section 1: Chemical Product and Company Information

1.1 Product name Granulated blast furnace slag

1.2 Company information

Manufacturer (Chiba) Slag Dept, East Japan Works, JFE Steel Corporation
Address Kawasaki-cho, 1-banchi, Chuo-ku, Chiba-city, Chiba, 210-0868, Japan
Seller and contact point JFE Mineral Company, Ltd. Planning Dept. Iron and Steel Division
Address 5th Floor, Sumitomofudosan Shibakoen First Bldg, 8-2 Shiba, 3-chome
Minato-ku, Tokyo 105-0014 Japan

Phone +81-3-5445-5213
Fax +81-3-5445-5222
Emergency contact Planning Dept. Iron and Steel Division +81-3-5445-5213

1.3 Recommended use Raw material for cement industry, civil engineering

Section 2: Hazards Identification

2.1 GHS classification

This product does not meet the requirement for classification as physical and chemical, health and environmental hazards.

2.2 GHS label

Signal Words: No signal word

2.3 Other hazards

Dust of product can cause mechanical irritation to the eyes and respiratory system.
Leachate may show alkalinity of pH 9-11, after long-term contact with water.

Section 3: Composition and Information on Ingredients

3.1 Simple or Mixture Mixture compound

3.2 General or Chemical Name Blast furnace slag CAS No. 65996-69-2

3.3 Component and content

Granulated blast furnace slag is an amorphous substance, but the following materials may crystallize in a part.

Ingredient	Concentration (% in mass)	CAS No.
Melilite	Not Confirmed	-
Calcium silicate $CaO \cdot SiO_2$	Not Confirmed	1344-95-2

3.4 Hazardous component categorized in GHS

Not applicable

Section 4: First-aid Measures

If inhaled: Remove victim to fresh air. If you feel unwell, consult a physician
If on skin: Immediately wash with water
If in eyes: Immediately rinse with clean water. If irritation persists, consult an ophthalmologist.

If ingested: If you feel unwell, consult a physician.

Section 5: Fire-fighting Measures

This product is not flammable. Use fire foam, powder or carbon dioxide extinguishers in case of the risk of fire. Use proper protective equipments and clothes for extinction.

Section 6: Accidental Release Measures

This product is solid. Recover by sweeping and collecting. However, if dust occurs, wear proper protective equipments (e.g. protective gloves, glasses, masks, etc).

Take necessary measures if leachate from this product flows into surrounding water area (e.g. rivers, lakes etc) and its pH becomes higher.

Section 7: Handling and Storage

7.1 Handling

Secure ventilation in case of handling indoor.

Wear proper protective equipments to avoid the contact onto eyes and skin, etc.

Wash face, hands and mouth etc with clean water after handling.

7.2 Storage

Care should be made so that dust does not occur during storage.

Care should be made so that leachate does not directly flow into surrounding water area (e.g. rivers, lakes etc) because the leachate may show alkalinity.

Section 8: Exposure Control and Personal Protection

8.1 Control/ administrative exposure standards

Dust: E=3.0mg/m^3 (without free silicic acid)

8.2 Threshold values (occupational exposure limits or biological exposure index)

Japan Society for Occupational Health (2015): 1 mg/m^3 (2-class dust, inhalable dust)
4 mg/m^3 (2-class dust, total dust)

8.3 Protective equipments

Wear proper protective equipments (e.g. protective gloves, glasses, masks, etc) if generation of dust is concerned while handling.

8.4 Engineering measures and hygiene measures

Use ventilating equipment as appropriate to reduce the threshold value in case of handling indoor.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Granulated, particle
Colour:	Ash white
Odour:	None
Melting point	1300 degree Celsius
PH:	Leachate may show alkalinity of pH 9-11, after long-term contact with water
Mass of unit volume:	1.3-1.9 t/m^3
Solubility:	Low with water

9.2 Others

Product may consolidate due to latent hydraulicity in case of long-term storage with the presence of moisture.

Section 10: Stability and Reactivity

This product is stable under normal storage and handling condition, and may consolidate in case of long-term storage with the presence of water.

Leachate may show alkalinity of pH 9-11, after long-term contact.

This product is not classified as metal corrosive substance using data on similar slag. The corrosion rate on metal surface of Aluminium and Steel test specimen exposed to Steelmaking slag were max 0.19 mm/year and 0.06 mm/year, respectively, not exceed 6.25 mm/year, when tested in accordance with immersion corrosion test of metal, the United Nations Manual of Tests and Criteria, part 3, section 37.

Section 11: Toxicological information

11.1 Information on toxicological effects

Dust of product can cause mechanical irritation to the eyes and respiratory system.

Leachate may show alkalinity of pH 9-11, after long-term contact.

Acute toxicity;	not classified (oral, dermal, inhalative)
Skin corrosion/irritation;	not classified
Serious eye damage/irritation;	not classified
Respiratory or skin sensitisation;	not classified
Germ cell mutagenicity;	classification not possible
Carcinogenicity;	classification not possible
Reproductive toxicity;	classification not possible
STOT-single exposure;	not classified
STOT-repeated exposure;	classification not possible
Aspiration hazard;	classification not possible

11.1.1 Acute toxicity:

Method: OECD Guideline 423
Species: Rat, Crl:CD(SD)
Routes of exposure: oral
Dose: 2000 mg/kg
Exposure time: 14 days
Results: LD50 > 2000 mg/kg NSR

Method: OECD Guideline 436
Species: Rat, Crl:CD(SD)
Routes of exposure: inhalative
Substance: Steelmaking slag
Dose: 5.9 mg/L
Exposure time: 4 hr
Results: LC50 (powder) (4h) > 5.9 mg/L NSR
Data on similar slag was used to classify criteria.

Method: OECD Guideline 402
Species: Rat, Crl:CD(SD)
Routes of exposure: dermal
Dose: 2000 mg/kg
Exposure time: 14 days
Results: LD50 > 2000 mg/kg NSR

No acute inhalative toxicity was expected according to the absence of industrial disease data.

11.1.2 Skin corrosion/irritation
Method: OECD Guideline 404
Species: Japanese white rabbit
Substance: Air-cooled blast furnace slag
Dose: 0.5 g
Exposure time: 1, 24, 48, 72 hr
Results: not irritant NSR
No irritant effect was expected according to the several rabbit experiment of Air-cooled BF slag in “ECHA CHEM”, Information.

11.1.3 Serious eye damage/irritation
Method: OECD Guideline 405
Species: Japanese white rabbit
Substance: Air-cooled blast furnace slag
Dose: 0.1 g
Exposure time: 1, 24, 48, 72 hr
Results: not irritant NSR

No irritant effect was expected according to the several rabbit experiment of Air-cooled BF slag in “ECHA CHEM”, Information.

11.1.4 Respiratory or skin sensitisation;
skin sensitisation
Method: OECD Guideline 406
Species: Dunkin-Hartley guinea pig
Substance: Blast furnace slag
Results: not sensitive ECHA

respiratory sensitisation
No respiratory sensitisation was expected according to the absence of industrial respiratory disease data.
Respiratory sensitisation data was not available in animal experiment because of technically impossibility.

11.1.5 Germ cell mutagenicity;
Method: OECD Guideline 471
Species: *Salmonella typhimurium*, *Echerichia coli*
Substance: Blast furnace slag
Results: Negative in Ames tests, in vitro ECHA
Based on above data, the classification criteria are not met.

11.1.6 Carcinogenicity; no data available
Air-cooled BF slag was not specifically listed as carcinogens by the National Toxicology Program (NTP), the Occupational Safety and Health Administration (OSHA), or the International Agency for Research on Cancer (IARC).

11.1.7 Reproductive toxicity; no data available

11.1.8 Specific Target Organ Toxicity (STOT) -single exposure;

Method: OECD Guideline 423
Species: Rat, Crl:CD(SD)
Routes of exposure: oral
Dose: 2000 mg/kg
Exposure time: 14 days
Specific target organ: intrapleural organs, intraperitoneal organs
Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

Method: OECD Guideline 436
Species: Rat, Crl:CD(SD)
Routes of exposure: inhalative
Substance: Steelmaking slag
Dose: 5234 mg/m³
Exposure time: 4 hr
Specific target organ: intrapleural organs, intraperitoneal organs
Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

Method: OECD Guideline 402
Species: Rat, Crl:CD(SD)
Routes of exposure: dermal
Dose: 2000 mg/kg
Exposure time: 14 days
Specific target organ: intrapleural organs, intraperitoneal organs
Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

11.1.9 Specific Target Organ Toxicity (STOT)-repeated exposure; no data available
No STOT was expected according to the absence of industrial disease data in specific organ.

11.1.10 Aspiration hazard; no data available
No aspiration hazard was expected according to the absence of industrial disease data.

Section 12: Ecological Information
12.1 Toxicity

Acute (short-term) toxicity;	not classified
Chronic (long-term) toxicity;	not classified as Category 1, 2, 3

12.1.1 Acute (short-term) toxicity;
Fish:
Method: OECD Guideline 203
Species: *Leuciscus idus*
Dose: 100 mg/l
Exposure time: 96 hr
Results: LC50 > 100 mg/l NSR

Crustacea:
Method: OECD Guideline 202
Species: *Daphnia magna*
Dose: 100 mg/l

Exposure time: 48 hr
Results: EC50 > 100 mg/l NSR

Algae:
Method: OECD Guideline 201
Species: *Pseudokirchneriella subcapitata*
Dose: 1、10、100 mg/l
Exposure time: 72 hr
Results: EC50 > 100 mg/l NSR

12.1.2 Chronic (long-term) toxicity;
Crustacea:
Method: OECD Guideline 211
Species: *Daphnia magna*
Substance: Blast furnace slag
Dose: 48, 153, 488, 1563, 5000 mL mg/l
Exposure time: 21 d
Results: NOEC = 1563 mg/l ECHA

Algae:
Method: OECD Guideline 201
Species: *Pseudokirchneriella subcapitata*
Dose: 1、10、100 mg/l
Exposure time: 72 hr
Results: NOEC = 100 mg/l NSR

12.2 Persistence and degradability: not applicable
12.3 Bioaccumulative potential: no evidence for bioaccumulation potential.
12.4 Mobility in soil: no data available
12.5 Results of PBT and vPvB assessment: no data available.
12.6 Other adverse effects
Take necessary measures for the environment, because leachate may show alkali when this product contacts with water.
No negative ecological effects are expected according to the present state of knowledge.

Section 13: Disposal Considerations

The water that contains these products needs to be treated in accordance with related laws and standards (national, regional or local regulations).

Ask to certificated waste traders or local offices, and dispose appropriately in accordance with related laws and standards.

Section 14: Transport Information

14.1 International transport information

United Nations Identification Number:	Not applicable
Marine pollutant:	Not applicable
14.2 Domestic transport information (Japan)	Not applicable
14.3 Guideline for emergency (Yellow-card) number	Not applicable

14.4 Specific measures for safe transport

Make sure to prevent collapse of cargo piles.
Care should be made so that dust does not occur while transporting.
Pay attention to humidity and water leakage.

Section 15: Regulatory Information

Enforcement Order of the Industrial Safety and Health Law (Ordinance on Prevention of Hazards Due to Dust):	Dusty work
Pneumoconiosis Act:	Dusty work
Working Environment Measurement Act:	Specific dusty work

Section 16: Other Information

References

Japan Society for Occupational Health (2015) Recommendation of Occupational Exposure Limits

Chemical Risk Information Platform (CHRIP) (2015) Globally Harmonized System (GHS) Classification Database http://www.safe.nite.go.jp/ghs./list.html

ECHA: ECHA (European Chemicals Agency), website “ECHA CHEM”, Information on Registered Substances (2015).

NSR: Nippon Slag Association Report of Air-cooled blast furnace slag and Steelmaking slag

DISCLAIMER

GBFS Specification and Analysis

Japanese GBFS

Typical Spec

Item	Typical
CaO	38–45%
SiO_2	30–36%
Al_2O_3	12–18%
MgO	4–9%
MnO	1.5%max
FeO	1.5%max
TiO_2	2.0%max
T.S	1.3%max
Moisture Content	10%max
Basicity $(CaO+MgO+Al_2O_2)/SiO_2$	1.75min
Glass Content	95%min
Size Under 5mm	95%min

ITOCHU

Result

We hereby certify that the average sample of the loaded cargo has been determined by the chemical analysis and test results are as follows:-

Results of Analysis & Test:

Item	Results (%)	Item	Results (%)
CaO:	40.9	Mn_2O_3: (convert MnO into Mn2O3)	0.13
SiO_2 :	34.9	Na_2O:	0.27
Al_2O_3 :	15.0	K_2O :	0.35
Fe_2O_3 :	0.77	TiO_2 :	0.68
MgO :	5.61	P_2O_5:	0.02
SO_3 :	0.14	LOI :	0.10
Moisture Contents :	5.3	Chloride:	Less than 0.01
Glass Content :	98.7	Sulfur:	0.84

Method : JIS R5202, R5211, A5011, Z2601 & Slag Industrial method.

JAPAN INSPECTION CO., LTD.

General Manager
fn Marine Dept.

DNREC Permitting Determination Letter

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
DIVISION OF WASTE AND HAZARDOUS SUBSTANCES
SOLID AND HAZARDOUS WASTE MANAGEMENT SECTION

89 KINGS HIGHWAY
DOVER, DELAWARE 19901

TELEPHONE: (302) 739-9403
FAX: (302) 739-5060

February 28, 2018

Mr. Michael D. Logan, Vice President
Compliance Plus Services, Inc.
455 Business Center Drive, Suite 150
Horsham, PA 19044

Subject: Permitting Determination of Production of Ground Granulated Blast Furnace Slag
Reference: Walan Specialty Construction Products, LLC, File Code: 09.A

Dear Mr. Logan:

The Department is in receipt of your email dated February 16, 2018 and exhibits provided during our February 21, 2018 meeting, which were submitted on behalf of Walan Specialty Construction Products, LLC (Walan), regarding solid waste permitting requirements for its production of ground granulated blast furnace slag (GGBFS).

According to the information provided, the iron blast furnace slag is generated at the end of the iron ore processing, when it is separated from the iron and remaining waste stream. Once separated, the slag is rapidly quenched with fresh water and pelletized to produce a granular slag. As Walan explained during our meeting, the iron ore processing facility invests in equipment in order to produce the granular slag, which serves as a feedstock to Walan's operations. Walan proposes to grind the granular slag for use in concrete and as a replacement of Portland cement. In addition to replacing another ingredient, GGBFS adds structural benefits when used in concrete mixes.

While the Department has determined the slag is a solid waste, the granular slag has been determined to be a recycled product. Walan purchases the recycled product as a feedstock in its process. Therefore, on the basis of the information submitted by you and Walan, the SHWMS has determined that as described, Walan's activities do not require a Recycling Permit for its 501 Christiana Avenue operation in Wilmington. In the event Walan's operations are modified from those described in the information provided to the SHWMS by Walan or its representatives, Walan must immediately contact the SHWMS for a re-evaluation of this permitting decision.

If you have any questions, please feel free to contact Mindy Anthony at (302) 739-9403, option 8.

Sincerely,

Jason W. Sunde
Environmental Program Manager
Solid and Hazardous Waste Management Section

JWS:MBCA:cr
MBCA18005

cc: Anil G Bhadsavle, Penn Mag, Inc. (email only)
Lisa Bhadsavle Dharwadkar, Penn Mag, Inc. (email only)

Ground Granulated Blast Furnace Slag (GGBFS)
in
DelDOT Standard Specifications 2016

Ground Granulated Blast Furnace Slag (GGBFS)
in DelDOT Standard Specifications 2016

Since 1988, DelDOT has required that portland cement be blended with GGBFS or fly ash to combat Alkali-silica reaction (ASR). DelDOT's Standard Specifications 2016 specifically address and require GGBFS in the sections identified in the following table. Additionally, specific plans, invitations to bid, and mix design reviews contain separate requirements for the use of GGBFS, with the vast majority of portland cement mix designs approved by DelDOT containing 40-50% GGBFS.

Section	Specification
208.02 1047.01.1	Flowable Fill must contain a combination of portland cement, fine aggregate, water, air entraining admixtures, chemical admixtures, and/or GGBFS, fly ash.
501.02 501.03.1	Portland Cement Concrete Pavement (PCCP) mix designs, including GGBFS, must be submitted to Engineer for approval (specified in Section 1022 Concrete Production; Class B/SF for slip form paving and Class B for fixed form paving).
723.02	Concrete barriers must be constructed using a blended portland cement concrete with a minimum of 40% GGBFS.
1020.01	GGBFS must be Grade 100 or 120 and conform to AASHTO M 302.
1022.01 1022.03	Portland Cement Concrete mix designs, including GGBFS, must be submitted to Engineer for approval.
1022.03.3	Design must include ASR mitigation steps, including one or a combination of GGBFS, low alkali cement, blended hydraulic cement, silica fume, fly ash, or lithium admixture.
1022.06.5	Delivery time restrictions may be extended for portland cement blended with GGBFS (thus exceeding the time permitted for non-blended portland cement).

Engineering properties that make GGBFS beneficial in concrete mixtures include:

- Lower heat of hydration
- Slower strength gain providing better cold join control
- Requires less energy to produce than portland cement
- Resistant to sulfate and chloride
- Less porous
- Long-term cost savings due to better durability

DUFFIELD ASSOCIATES
Soil, Water & the Environment

AQM-3.7
Storage Silo Application

INTRODUCTION TO AQM-3.7: SILO APPLICATION

Form AQM-3.7 provides technical information for two 1,100 ton storage silos that will store ground granulated blast furnace slag (GGBFS) prior to truck loading and distribution of the product. The two silos are fed GGBFS by a bucket elevators. A proposed silo drawing created by the manufacturer, Concrete Plants, Inc., is provided in the AQM-3.7 Supporting information section attached. A glossary of technical terms used in this section is provided below.

Baghouse – an air pollution control device that separates particulates from exhaust gas and collects the separated particulates to keep them from being discharged to the atmosphere.

Actual Cubic Feet per Minute – (ACFM) a unit of volumetric flow that is provided by manufacturers of fans and compressors. The actual volumetric flow is determined with reference to inlet conditions of the gas.

Silo Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **WALAN Specialty Construction Products, LLC**

2. Equipment ID Number: **Two 1,100 Ton Storage Silos**

3. Manufacturer: **Concrete Plants, Inc.**

4. Model:

5. Serial Number:

6. Silo Type: ☒ Tower Silo
☐ Bunker Silo
☐ Other (Specify):

7. Number of Compartments in Silo: **One**

8. Material Stored in Silo:

If there are more than three Materials Stored in the Silo, attach additional copies of this page as needed

	Material	Material Density	Compartment Stored In
8.1.	**Ground granulated blast furnace slag (GGBFS)**	**175 tons/cubic foot**	
8.2.		**tons/cubic foot**	
8.3.		**tons/cubic foot**	

Attach a Material Safety Data Sheet (MSDS) for each Material Stored in the Silo.

9. Silo Storage Capacity: **1,100 tons**

10. Silo Loading Method: ☐ Pneumatic ☐ Hydraulic ☒ Mechanical ☐ Vacuum ☐ Other (Specify):

11. Maximum Rate of Silo Loading: **30 (projected) / 70 (max) tons/hour**

12. Is the Silo Equipped With a Pressure-Vacuum Relief Valve? ☐ YES ☒ NO

If YES, complete the rest of Question 12. If NO, proceed to Question 13.

12.1. Describe the Pressure Relief Valve Settings:

13. Is the Silo Equipped With a System That Prevents Overfilling? ☒ YES ☐ NO

If YES, complete the rest of Question 13. If NO, proceed to Question 14.

13.1. Describe the Overfilling Prevention System: **Level indicator used**

General Information

14. Is the Silo Equipped With a Silo Level Monitoring System?	☒ YES ☐ NO
If YES, complete the rest of Question 14. If NO, proceed to Question 15.	
14.1. Type of Level Indicator:	☐ Point ☒ Continuous ☐ Other (Specify):
15. Is the Silo Equipped With a Power/Control Panel with a High Level Indicator?	☒ YES ☐ NO

Control Device Information

16. Is an Air Pollution Control Device Used?	☒ YES ☐ NO
If an Air Pollution Control Device is used, complete the rest of Question 16. If not, proceed to Question 17.	
16.1. Is Knockout Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.11 and attach it to this application.	
16.2. Is a Settling Chamber Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.10 and attach it to this application.	
16.3. Is an Inertial or Cyclone Collector Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.5 and attach it to this application.	
16.4. Is a Fabric Collector or Baghouse Used?	☒ YES ☐ NO
If YES, complete Form AQM-4.6 and attach it to this application.	
16.5. Is a Venturi Scrubber Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.8 and attach it to this application.	
16.6. Is an Electrostatic Precipitator Used?	☐ YES ☒ NO
If YES, complete Form AQM-4.7 and attach it to this application.	
16.7. Is Any Other Control Device Used?	☐ YES ☒ NO
If YES, attach a copy of the Control Device Manufacturer's Specification Sheets.	
If Any Other Control Device is used, complete the rest of Question 16. If not, proceed to Question 17.	
16.8. Describe Control Device:	
16.9. Pollutants Controlled:	☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ Metals ☐ Other (Specify):
16.10. Control Device Manufacturer:	
16.11. Control Device Model:	
16.12. Control Device Serial Number:	
16.13. Control Device Design Capacity:	
16.14. Control Device Removal or Destruction Efficiency:	

Stack Information

17. How Does the Process Equipment Vent:
(check all that apply)
☐ Directly to the Atmosphere
☒ Through a Control Device Covered by Forms AQM-4.1 through 4.12
☐ Through Another Control Device Described on This Form

If any of the process equipment vents directly to the atmosphere or through another control device described on this form, proceed to Question 18. If the process equipment vents through a control device, provide the stack parameters on the control device form (AQM-4 Series) and proceed to Question 19.

18. Emission Point Name: **EP-4 and EP-5**

18.1. Stack Height Above Grade: **85 feet**

18.2. Stack Exit Diameter: **1.02 feet**
(Provide Stack Dimensions If Rectangular Stack)

18.3. Is a Stack Cap Present? ☐ YES ☒ NO

18.4. Stack Configuration: ☐ Vertical ☒ Horizontal ☐ Downward-Venting
(check all that apply) ☐ Other (Specify):

18.5. Stack Exit Gas Temperature: **Ambient °F**

18.6. Stack Exit Gas Flow Rate: **4000 ACFM**

18.7. Distance to Nearest Property Line: **about 50 feet**

18.8. Describe Nearest Obstruction: **Large 150' x 675' building to the west**

18.9. Height of Nearest Obstruction: **about 50 feet**

18.10. Distance to Nearest Obstruction: **about 325 feet**

18.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO

Monitoring Information

19. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO

If Yes, attach a copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM_{10} ☐ $PM_{2.5}$ ☐ NO_X ☐ SO_X ☐ Metals
☐ Other (Specify):

19.2. Describe the Continuous Emission Monitoring System:

19.3. Manufacturer:

19.4. Model:

19.5. Serial Number:

19.6. Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☐ NO

If YES, complete the rest of Question 19. If NO, proceed to Question 20.

19.7. Emission Units Monitored:

Monitoring Information

19.8.	Will More Than One Emission Unit be Emitting From the Combined Point At Any Time?	☐ YES ☐ NO
If YES, complete the rest of Question 19. If NO, proceed to Question 20.		
19.9.	Emission Units Emitting Simultaneously:	

Visible Emissions Monitoring Information

20.	Proposed Technique Used to Monitor Visible Emissions:	☐ Opacity Monitor (COM) ☐ Manual (Method 9) ☐ Manual (Method 22) ☒ Other (Describe): **Daily observation to determine presence or absence of visible emissions.**
If an Opacity Monitor (COM) is used, complete the rest of Question 20. If not, proceed to Question 21.		
20.1.	Describe the Continuous Opacity Monitoring System:	
20.2.	Manufacturer:	
20.3.	Model:	
20.4.	Serial Number:	
21.	Proposed Frequency of Opacity Monitoring:	

Monitoring and Alarm Information

22.	Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit?	☐ YES ☒ NO
If YES, complete the rest of Question 22. If NO, proceed to Question 23.		
22.1.	Describe the System Alarm(s):	

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	Describe Alarm Trigger	Monitoring Device or Alarm Type	Does the Alarm Initiate an Automated Response?
22.1.1.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
22.1.2.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
22.1.3.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Monitoring and Alarm Information

22.1.4.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
22.1.5.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Voluntary Emission Limitation Request Information

23. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.?	☐ YES ☒ NO

If YES, complete the rest of Question 23. If NO, proceed to Question 24.

23.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

24. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.?	☐ YES ☒ NO

If YES, complete the rest of Question 24. If NO, proceed to Question 25.

24.1. Describe Any Proposed Operating Limitations:

Additional Information

25. Is There Any Additional Information Pertinent to this Application? ☒ YES ☐ NO

If YES, complete the rest of Question 25.

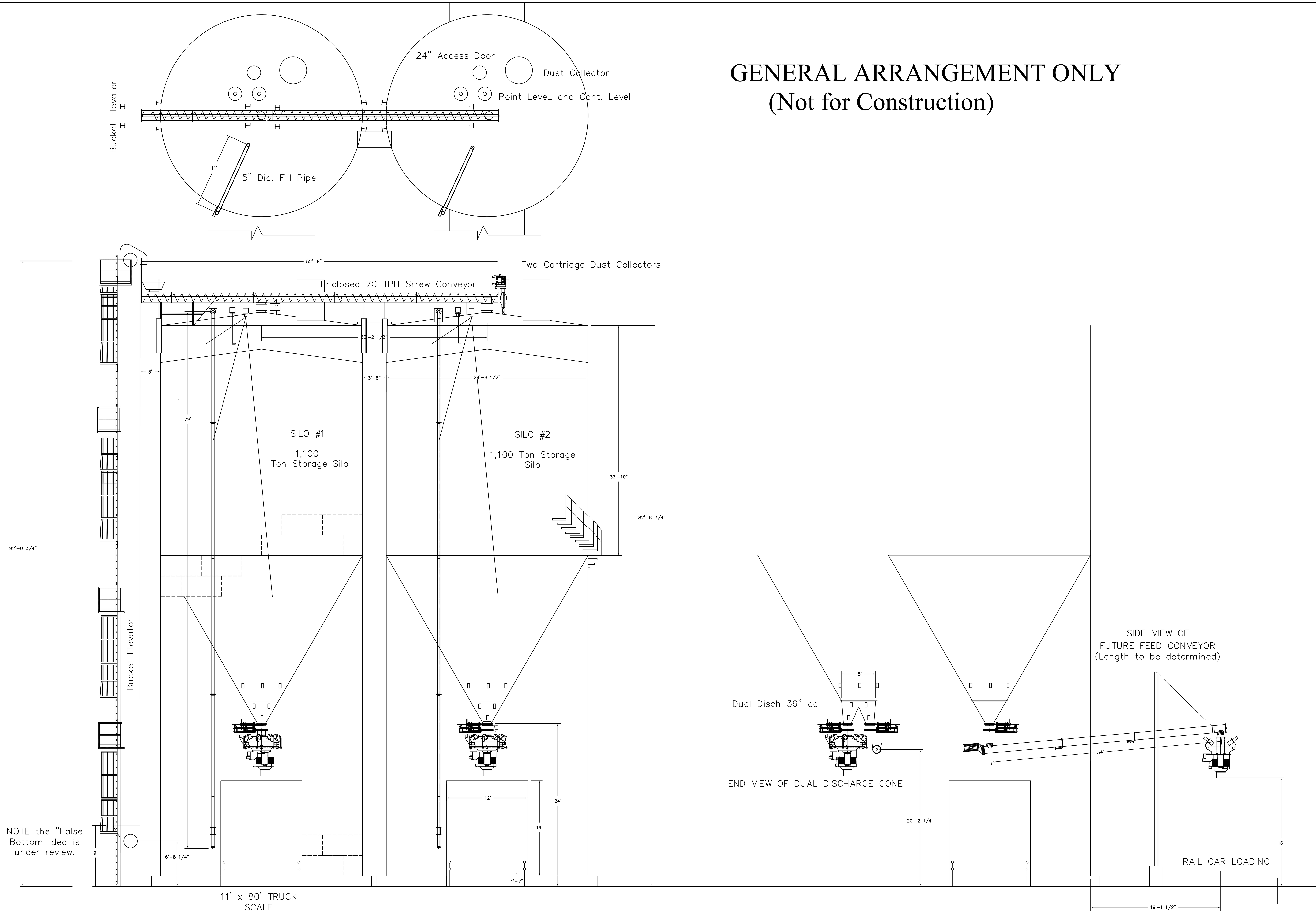
25.1. Describe: **Enclosed bucket elevator carrying GGBFS will be used to fill silos.**

AQM-3.7
Supporting Information

DUFFIELD ASSOCIATES
Soil, Water & the Environment

General Configuration of Storage Silos

GENERAL ARRANGEMENT ONLY
(Not for Construction)



DRAWING NO.	REFERENCE	NO.	DATE	REVISION
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–

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DRAWN BY: EFG
DATE: 10-31-17
SCALE: NTS

FOR: PENN MAG INC.
TITLE: WILMINGTON LOADOUT SILOS
JOB NO.
SHEET NO. 1 OF 1
REV. NO. 2

DUFFIELD ASSOCIATES
Soil, Water & the Environment

MSDS for GBFS

Serial number:HNB053
Date created: 2015/1/1
Date of the latest revision:2017/1/1
Third edition

Safety Data Sheet

Section 1: Chemical Product and Company Information

1.1 Product name Granulated blast furnace slag

1.2 Company information

Manufacturer (Chiba) Slag Dept, East Japan Works, JFE Steel Corporation
Address Kawasaki-cho, 1-banchi, Chuo-ku, Chiba-city, Chiba, 210-0868, Japan
Seller and contact point JFE Mineral Company, Ltd. Planning Dept. Iron and Steel Division
Address 5th Floor, Sumitomofudosan Shibakoen First Bldg, 8-2 Shiba, 3-chome Minato-ku, Tokyo 105-0014 Japan

Phone +81-3-5445-5213
Fax +81-3-5445-5222
Emergency contact Planning Dept. Iron and Steel Division +81-3-5445-5213

1.3 Recommended use Raw material for cement industry, civil engineering

Section 2: Hazards Identification

2.1 GHS classification

This product does not meet the requirement for classification as physical and chemical, health and environmental hazards.

2.2 GHS label

Signal Words: No signal word

2.3 Other hazards

Dust of product can cause mechanical irritation to the eyes and respiratory system.
Leachate may show alkalinity of pH 9-11, after long-term contact with water.

Section 3: Composition and Information on Ingredients

3.1 Simple or Mixture Mixture compound

3.2 General or Chemical Name Blast furnace slag CAS No. 65996-69-2

3.3 Component and content

Granulated blast furnace slag is an amorphous substance, but the following materials may crystallize in a part.

Ingredient	Concentration (% in mass)	CAS No.
Melilite	Not Confirmed	-
Calcium silicate $CaO \cdot SiO_2$	Not Confirmed	1344-95-2

3.4 Hazardous component categorized in GHS

Not applicable

Section 4: First-aid Measures

If inhaled: Remove victim to fresh air. If you feel unwell, consult a physician
If on skin: Immediately wash with water
If in eyes: Immediately rinse with clean water. If irritation persists, consult an ophthalmologist.

If ingested: If you feel unwell, consult a physician.

Section 5: Fire-fighting Measures

This product is not flammable. Use fire foam, powder or carbon dioxide extinguishers in case of the risk of fire. Use proper protective equipments and clothes for extinction.

Section 6: Accidental Release Measures

This product is solid. Recover by sweeping and collecting. However, if dust occurs, wear proper protective equipments (e.g. protective gloves, glasses, masks, etc).

Take necessary measures if leachate from this product flows into surrounding water area (e.g. rivers, lakes etc) and its pH becomes higher.

Section 7: Handling and Storage

7.1 Handling

Secure ventilation in case of handling indoor.

Wear proper protective equipments to avoid the contact onto eyes and skin, etc.

Wash face, hands and mouth etc with clean water after handling.

7.2 Storage

Care should be made so that dust does not occur during storage.

Care should be made so that leachate does not directly flow into surrounding water area (e.g. rivers, lakes etc) because the leachate may show alkalinity.

Section 8: Exposure Control and Personal Protection

8.1 Control/ administrative exposure standards

Dust: E=3.0mg/m^3 (without free silicic acid)

8.2 Threshold values (occupational exposure limits or biological exposure index)

Japan Society for Occupational Health (2015): 1 mg/m^3 (2-class dust, inhalable dust)
4 mg/m^3 (2-class dust, total dust)

8.3 Protective equipments

Wear proper protective equipments (e.g. protective gloves, glasses, masks, etc) if generation of dust is concerned while handling.

8.4 Engineering measures and hygiene measures

Use ventilating equipment as appropriate to reduce the threshold value in case of handling indoor.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Granulated, particle
Colour:	Ash white
Odour:	None
Melting point	1300 degree Celsius
PH:	Leachate may show alkalinity of pH 9-11, after long-term contact with water
Mass of unit volume:	1.3-1.9 t/m^3
Solubility:	Low with water

9.2 Others

Product may consolidate due to latent hydraulicity in case of long-term storage with the presence of moisture.

Section 10: Stability and Reactivity

This product is stable under normal storage and handling condition, and may consolidate in case of long-term storage with the presence of water.

Leachate may show alkalinity of pH 9-11, after long-term contact.

This product is not classified as metal corrosive substance using data on similar slag. The corrosion rate on metal surface of Aluminium and Steel test specimen exposed to Steelmaking slag were max 0.19 mm/year and 0.06 mm/year, respectively, not exceed 6.25 mm/year, when tested in accordance with immersion corrosion test of metal, the United Nations Manual of Tests and Criteria, part 3, section 37.

Section 11: Toxicological information

11.1 Information on toxicological effects

Dust of product can cause mechanical irritation to the eyes and respiratory system.

Leachate may show alkalinity of pH 9-11, after long-term contact.

Acute toxicity;	not classified (oral, dermal, inhalative)
Skin corrosion/irritation;	not classified
Serious eye damage/irritation;	not classified
Respiratory or skin sensitisation;	not classified
Germ cell mutagenicity;	classification not possible
Carcinogenicity;	classification not possible
Reproductive toxicity;	classification not possible
STOT-single exposure;	not classified
STOT-repeated exposure;	classification not possible
Aspiration hazard;	classification not possible

11.1.1 Acute toxicity:

Method: OECD Guideline 423
Species: Rat, Crl:CD(SD)
Routes of exposure: oral
Dose: 2000 mg/kg
Exposure time: 14 days
Results: LD50 > 2000 mg/kg NSR

Method: OECD Guideline 436
Species: Rat, Crl:CD(SD)
Routes of exposure: inhalative
Substance: Steelmaking slag
Dose: 5.9 mg/L
Exposure time: 4 hr
Results: LC50 (powder) (4h) > 5.9 mg/L NSR
Data on similar slag was used to classify criteria.

Method: OECD Guideline 402
Species: Rat, Crl:CD(SD)
Routes of exposure: dermal
Dose: 2000 mg/kg
Exposure time: 14 days
Results: LD50 > 2000 mg/kg NSR

No acute inhalative toxicity was expected according to the absence of industrial disease data.

11.1.2 Skin corrosion/irritation
Method: OECD Guideline 404
Species: Japanese white rabbit
Substance: Air-cooled blast furnace slag
Dose: 0.5 g
Exposure time: 1, 24, 48, 72 hr
Results: not irritant NSR
No irritant effect was expected according to the several rabbit experiment of Air-cooled BF slag in “ECHA CHEM”, Information.

11.1.3 Serious eye damage/irritation
Method: OECD Guideline 405
Species: Japanese white rabbit
Substance: Air-cooled blast furnace slag
Dose: 0.1 g
Exposure time: 1, 24, 48, 72 hr
Results: not irritant NSR

No irritant effect was expected according to the several rabbit experiment of Air-cooled BF slag in “ECHA CHEM”, Information.

11.1.4 Respiratory or skin sensitisation;
skin sensitisation
Method: OECD Guideline 406
Species: Dunkin-Hartley guinea pig
Substance: Blast furnace slag
Results: not sensitive ECHA

respiratory sensitisation
No respiratory sensitisation was expected according to the absence of industrial respiratory disease data.
Respiratory sensitisation data was not available in animal experiment because of technically impossibility.

11.1.5 Germ cell mutagenicity;
Method: OECD Guideline 471
Species: *Salmonella typhimurium*, *Echerichia coli*
Substance: Blast furnace slag
Results: Negative in Ames tests, in vitro ECHA
Based on above data, the classification criteria are not met.

11.1.6 Carcinogenicity; no data available
Air-cooled BF slag was not specifically listed as carcinogens by the National Toxicology Program (NTP), the Occupational Safety and Health Administration (OSHA), or the International Agency for Research on Cancer (IARC).

11.1.7 Reproductive toxicity; no data available

11.1.8 Specific Target Organ Toxicity (STOT) -single exposure;

Method: OECD Guideline 423
Species: Rat, Crl:CD(SD)
Routes of exposure: oral
Dose: 2000 mg/kg
Exposure time: 14 days
Specific target organ: intrapleural organs, intraperitoneal organs
Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

Method: OECD Guideline 436
Species: Rat, Crl:CD(SD)
Routes of exposure: inhalative
Substance: Steelmaking slag
Dose: 5234 mg/m³
Exposure time: 4 hr
Specific target organ: intrapleural organs, intraperitoneal organs
Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

Method: OECD Guideline 402
Species: Rat, Crl:CD(SD)
Routes of exposure: dermal
Dose: 2000 mg/kg
Exposure time: 14 days
Specific target organ: intrapleural organs, intraperitoneal organs
Results: No abnormalities were macroscopically observed at necropsy in any animals. NSR

11.1.9 Specific Target Organ Toxicity (STOT)-repeated exposure; no data available
No STOT was expected according to the absence of industrial disease data in specific organ.

11.1.10 Aspiration hazard; no data available
No aspiration hazard was expected according to the absence of industrial disease data.

Section 12: Ecological Information
12.1 Toxicity

Acute (short-term) toxicity;	not classified
Chronic (long-term) toxicity;	not classified as Category 1, 2, 3

12.1.1 Acute (short-term) toxicity;
Fish:
Method: OECD Guideline 203
Species: *Leuciscus idus*
Dose: 100 mg/l
Exposure time: 96 hr
Results: LC50 > 100 mg/l NSR

Crustacea:
Method: OECD Guideline 202
Species: *Daphnia magna*
Dose: 100 mg/l

Exposure time: 48 hr
Results: EC50 > 100 mg/l NSR

Algae:
Method: OECD Guideline 201
Species: *Pseudokirchneriella subcapitata*
Dose: 1、10、100 mg/l
Exposure time: 72 hr
Results: EC50 > 100 mg/l NSR

12.1.2 Chronic (long-term) toxicity;
Crustacea:
Method: OECD Guideline 211
Species: *Daphnia magna*
Substance: Blast furnace slag
Dose: 48, 153, 488, 1563, 5000 mL mg/l
Exposure time: 21 d
Results: NOEC = 1563 mg/l ECHA

Algae:
Method: OECD Guideline 201
Species: *Pseudokirchneriella subcapitata*
Dose: 1、10、100 mg/l
Exposure time: 72 hr
Results: NOEC = 100 mg/l NSR

12.2 Persistence and degradability: not applicable
12.3 Bioaccumulative potential: no evidence for bioaccumulation potential.
12.4 Mobility in soil: no data available
12.5 Results of PBT and vPvB assessment: no data available.
12.6 Other adverse effects
Take necessary measures for the environment, because leachate may show alkali when this product contacts with water.
No negative ecological effects are expected according to the present state of knowledge.

Section 13: Disposal Considerations

The water that contains these products needs to be treated in accordance with related laws and standards (national, regional or local regulations).

Ask to certificated waste traders or local offices, and dispose appropriately in accordance with related laws and standards.

Section 14: Transport Information

14.1 International transport information

United Nations Identification Number:	Not applicable
Marine pollutant:	Not applicable
14.2 Domestic transport information (Japan)	Not applicable
14.3 Guideline for emergency (Yellow-card) number	Not applicable

14.4 Specific measures for safe transport

Make sure to prevent collapse of cargo piles.
Care should be made so that dust does not occur while transporting.
Pay attention to humidity and water leakage.

Section 15: Regulatory Information

Enforcement Order of the Industrial Safety and Health Law (Ordinance on Prevention of Hazards Due to Dust):	Dusty work
Pneumoconiosis Act:	Dusty work
Working Environment Measurement Act:	Specific dusty work

Section 16: Other Information

References

Japan Society for Occupational Health (2015) Recommendation of Occupational Exposure Limits
Chemical Risk Information Platform (CHRIP) (2015) Globally Harmonized System (GHS) Classification Database http://www.safe.nite.go.jp/ghs./list.html
ECHA: ECHA (European Chemicals Agency), website “ECHA CHEM”, Information on Registered Substances (2015).
NSR: Nippon Slag Association Report of Air-cooled blast furnace slag and Steelmaking slag

DISCLAIMER

GBFS Specification and Analysis

Japanese GBFS

Typical Spec

Item	Typical
CaO	38–45%
SiO_2	30–36%
Al_2O_3	12–18%
MgO	4–9%
MnO	1.5%max
FeO	1.5%max
TiO_2	2.0%max
T.S	1.3%max
Moisture Content	10%max
Basicity $(CaO+MgO+Al_2O_2)/SiO_2$	1.75min
Glass Content	95%min
Size Under 5mm	95%min

Result

We hereby certify that the average sample of the loaded cargo has been determined by the chemical analysis and test results are as follows:-

Results of Analysis & Test:

Item	Results (%)	Item	Results (%)
CaO:	40.9	Mn_2O_3: (convert MnO into Mn2O3)	0.13
SiO_2 :	34.9	Na_2O:	0.27
Al_2O_3 :	15.0	K_2O :	0.35
Fe_2O_3 :	0.77	TiO_2 :	0.68
MgO :	5.61	P_2O_5:	0.02
SO_3 :	0.14	LOI :	0.10
Moisture Contents :	5.3	Chloride:	Less than 0.01
Glass Content :	98.7	Sulfur:	0.84

Method : JIS R5202, R5211, A5011, Z2601 & Slag Industrial method.

JAPAN INSPECTION CO., LTD.

General Manager
fn Marine Dept.

DNREC Permitting Determination Letter

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
DIVISION OF WASTE AND HAZARDOUS SUBSTANCES
SOLID AND HAZARDOUS WASTE MANAGEMENT SECTION

89 KINGS HIGHWAY
DOVER, DELAWARE 19901

TELEPHONE: (302) 739-9403
FAX: (302) 739-5060

February 28, 2018

Mr. Michael D. Logan, Vice President
Compliance Plus Services, Inc.
455 Business Center Drive, Suite 150
Horsham, PA 19044

Subject: Permitting Determination of Production of Ground Granulated Blast Furnace Slag
Reference: Walan Specialty Construction Products, LLC, File Code: 09.A

Dear Mr. Logan:

The Department is in receipt of your email dated February 16, 2018 and exhibits provided during our February 21, 2018 meeting, which were submitted on behalf of Walan Specialty Construction Products, LLC (Walan), regarding solid waste permitting requirements for its production of ground granulated blast furnace slag (GGBFS).

According to the information provided, the iron blast furnace slag is generated at the end of the iron ore processing, when it is separated from the iron and remaining waste stream. Once separated, the slag is rapidly quenched with fresh water and pelletized to produce a granular slag. As Walan explained during our meeting, the iron ore processing facility invests in equipment in order to produce the granular slag, which serves as a feedstock to Walan's operations. Walan proposes to grind the granular slag for use in concrete and as a replacement of Portland cement. In addition to replacing another ingredient, GGBFS adds structural benefits when used in concrete mixes.

While the Department has determined the slag is a solid waste, the granular slag has been determined to be a recycled product. Walan purchases the recycled product as a feedstock in its process. Therefore, on the basis of the information submitted by you and Walan, the SHWMS has determined that as described, Walan's activities do not require a Recycling Permit for its 501 Christiana Avenue operation in Wilmington. In the event Walan's operations are modified from those described in the information provided to the SHWMS by Walan or its representatives, Walan must immediately contact the SHWMS for a re-evaluation of this permitting decision.

If you have any questions, please feel free to contact Mindy Anthony at (302) 739-9403, option 8.

Sincerely,

Jason W. Sunde
Environmental Program Manager
Solid and Hazardous Waste Management Section

JWS:MBCA:cr
MBCA18005

cc: Anil G Bhadsavle, Penn Mag, Inc. (email only)
Lisa Bhadsavle Dharwadkar, Penn Mag, Inc. (email only)

DUFFIELD ASSOCIATES
Soil, Water & the Environment

AQM-4.6
Baghouse Application

INTRODUCTION TO AQM-4.6

Three forms are provided in AQM-4.6 which provide technical information for the air pollution control devices that will be implemented in the grinding mill, two (2) storage silos, and 2 dustless loadout chutes. A traditional baghouse will be installed at the grinding mill which is designed to capture fugitive dust emitted during grinding. The 2 storage silos will be equipped with bin vents containing cartridge filters. This is another configuration of the traditional baghouse that captures fugitive dust that is released into the air during storage. The dustless loadout chutes that are used to load outgoing trucks with product are equipped with cartridge filters. Technical information for the air pollution control devices is attached in the supporting information sections of AQM-4.6. Below is a glossary of technical terms used in this section.

Baghouse – an air pollution control device that separates particulates from exhaust gas and collects the separated particulates to keep them from being discharged to the atmosphere.

Actual Cubic Feet per Minute – (ACFM) a unit of volumetric flow that is provided by manufacturers of fans and compressors. The actual volumetric flow is determined with reference to inlet conditions of the gas.

Pound-force per square inch – (psi) a unit of pressure that is the result of a force of one (1) pound-force applied to 1 square inch of area.

Permeability – a measurement of the ability of a porous material to allow a fluid to pass through it. Fabric permeability is reported in standard cubic feet per minute per square foot ($\mathrm{scfm/ft^2}$) at a given pressure measured in inches of water.

MINOR NEW SOURCE REVIEW AND BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS FOR A GRANULATED BLAST FURNACE SLAG (GBFS) GRINDING FACILITY

WALAN SPECIALTY CONSTRUCTION PRODUCTS, LLC
WILMINGTON, DELAWARE

October 2018

Prepared for:

State of Delaware
Department of Natural Resources
and Environmental Control
Division of Air Quality
100 West Water Street, Suite 6A
Dover, Delaware 19904

On behalf of:

WALAN Specialty Construction Products, LLC
501 Christina Avenue
Wilmington, Delaware 19801

Prepared by:

Duffield Associates, Inc.
5400 Limestone Road
Wilmington, Delaware 19808

Project No. 8850.ED

DUFFIELD ASSOCIATES
Soil, Water & the Environment

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APPENDICES

1.0 INTRODUCTION

This document summarizes a minor new source review (MNSR) for the proposed WALAN Specialty Construction Products, LLC (WALAN) that will be located at 501 Christina Avenue, in Wilmington, Delaware (see Figure 1). WALAN is proposing to develop, construct, and operate a Granulated Blast Furnace Slag (GBFS) Grinding Facility. The GBFS Grinding Facility will include a grinding mill/dryer, two product storage silos, and two truck loading chutes, each of which will be new sources of particulate matter (PM) emissions that require control per the State of Delaware and federal regulations. These pieces of equipment will emit particulate matter (PM) including particles less than or equal to 10 micrometers in aerodynamic diameter (PM_{10}) and particles less than or equal to 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$).

In aggregate, these sources have the potential to emit particulate matter at a rate of more than 5 tons per year (tpy). As such, an MNSR to determine best available control technology (BACT) is required for each new source per 7 DE Admin. Code 1125 Section 4.1.4 for pollutants, including $PM_{2.5}$ and PM_{10}.

2.0 DESCRIPTION OF PROPOSED FACILITY

2.1 FACILITY DESCRIPTION, LOCATION MAPS, AND PLOT PLAN

As discussed in Section 1.0, the proposed GBFS Grinding Facility will be located at 501 Christina Avenue in Wilmington, Delaware. Figure 1 shows the site location within the State of Delaware and within the local area. Figure 2 shows the general process flow diagram for the GBFS Grinding Facility.

Major components of the GBFS Grinding Facility that will be discussed in this report will consist of:

- One grinding mill and dryer;
- Two ground GBFS storage silos; and
- Two truck loading chute systems

2.2 PROCESS DESCRIPTIONS

The grinding/drying mill reduces the GBFS materials to the necessary product size range. Fine dust particles carried by exhaust flow from the grind mill/dryer will be captured by an air pollution control device (APC) prior to discharge of the exhaust to the atmosphere. This APC must be BACT. The ground GBFS is fed by bucket elevator to two 1,100 ton storage silos. Air displaced by the ground GBFS will contain dust particles. The displaced air will be discharged to the atmosphere through a BACT APC. The ground GBFS in the silos will be loaded into enclosed trucks' compartments for delivery to customers. Air displaced from the enclosed truck compartments will contain dust particles. The displaced air will be discharged to the atmosphere through a BACT APC. See Figure 2 for the detailed process flow diagram.

3.0 CONTROL TECHNOLOGY ANALYSES

The proposed GBFS Grinding Facility is subject to review for PM, $PM_{2.5}$, and PM_{10} BACT to comply with minor new source review requirements of 7 DE Admin. Code 1125.

3.1 BEST AVAILABLE CONTROL TECHNOLOGY

3.1.1 Pollutant Applicability

Pursuant to 40 CFR 52.21(j)(2), an analysis of BACT is required for each pollutant source that has the potential to emit in significant amounts. In addition, BACT is also required for new minor source facilities in Delaware when a category of potential emissions exceed 5 tpy per 7 DE Admin. Code 1125 Section 4.1.4. The proposed GBFS Grinding Facility has the potential to emit $PM/PM_{10}/PM_{2.5}$ in amounts that will exceed 5 tpy. Therefore, $PM/PM_{10}/PM_{2.5}$ are addressed through this BACT analysis.

3.1.2 Methodology

BACT is defined in 7 DE Admin. Code 1125 Section 1.9, as:

> "…an emissions limitation (including a visible emissions standard) based on the maximum degree of reduction for each pollutant subject to regulation under CAA which would be emitted from any proposed major stationary source or major modification which the Department, on a case-by-case basis, takes into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 7 DE Admin. Code 1120 and 1121. If the Department determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results."

The first step in the top-down BACT procedure is the identification of available control technologies. Alternatives considered included process designs and operating practices that reduce the formation of emissions, post-process exhaust controls that reduce emissions after they are formed, and combinations of these two control categories. Sources of information used to identify control alternatives include:

- EPA's RBLC database;
- Environmental Protection Agency Compilation of Air Pollutant Emissions Factors (EPA AP-42, 2003), Chapter 11: Mineral Products Industry, Section 11.19.2.1 for Crushed Stone Processing and Pulverized Mineral Processing, Section 11.12 for Concrete Batching, and Appendix B.2 Generalized Particle Size Distributions;
- Current Permit Application for Granular Blast Furnace Slag (GBFS) Grinding Facility;
- National Service Center for Environmental Publications (NSCEP) *Air Pollutant Control Techniques for Crushed and Broken Stone Industry*;
- Colinet, et, al., *Best Practices for Dust Control in Metal/Nonmetal Mining*, 2010.; and
- National Materials Advisory Board, *Pneumatic Dust Control in Grain Elevators: Guidelines for Design Operation and Maintenance*, 1982.

Following the identification of available control technologies, the next step in the analysis is to determine which technologies may be infeasible technically. The third step in the top-down BACT process is the ranking of the remaining technically feasible control technologies from high to low in order of control effectiveness. An assessment of energy, environmental, and economic impacts is then performed. If the most stringent or top control technology is selected, an assessment of energy and economic impacts is not required. The fifth and final step is the selection of a BACT emissions limitation or a design, equipment, work practice, operational standard, or combination thereof corresponding to the most stringent, technically feasible control technology that was not eliminated based on adverse energy, environmental, or economic grounds.

BACT analyses were performed for PM/PM_{10}/$PM_{2.5}$ for three different sources of emissions: the grinding/drying mill, the two silos used for storing the material, and the loading of the finished product into trucks. Sections 3.2.3 through 3.2.5 of this report will focus on the BACT analysis performed for each of these sources of emissions.

3.1.3 BACT Analysis for $PM/PM_{10}/PM_{2.5}$ from Grinding/Drying Mill

Operation of the grinding/drying mill will be a source of PM emissions. $PM/PM_{10}/PM_{2.5}$ emissions from operation of the grinding/drying mill will be the particles formed by grinding the GBFS. The more GBFS that is processed at one time, the greater amount of particulate matter that is emitted.

3.1.3.1 Potential Control Technologies for Grinding/Drying Mill PM

Fabric filters are a potential control technology for $PM/PM_{10}/PM_{2.5}$ emissions from grinding mills. Fabric filters control particulate matter emissions from the grinding operation by passing emissions through a flexible liner material prior to allowing emissions to be released to the environment. Fabric filters allow for constant effluent concentration with intermittent cleaning cycles to remove the filter cake and loosen particulates. The EPA's AP-42 has indicated fabric filters as a common and efficient control technology for crushed stone and pulverized mineral processing. In Appendix B.2 of the AP-42, the Generalized Particle Size Distribution, the fabric filter is shown to have an efficiency of 99% with particle size 0-2.5 micrometers and an efficiency of 99.5% with particle size 2.5-10 micrometers. The National Service Center for Environmental Publications' (NSCEP's) *Air Pollutant Control Techniques for Crushed and Broken Stone Industry* states that the fabric filter exhibits collection efficiencies in excess of 99% through the submicron particle range (1980).

Literary review of the EPA RACT/BACT/LAER Clearinghouse (RBLC) database revealed that the Rochester Metal Products Corporation uses a baghouse during their cooling and grinding operation (see Appendix A). The baghouse is synonymous to a fabric filter and, since this grinding operation is used for minerals of similar density, Duffield has determined that the control technology used would be comparable to that of the ground GBFS produced by the grinding/drying mill. Duffield did not find alternative control technologies to the fabric filter for this type of application or similar applications. Information regarding other control technology options during the GBFS grinding process were not found during Duffield's literary review. In this case, the fabric filter control technology for the grinding mill is the only known control technology and is the most effective. Since this control technology is also the BACT, a demonstration of infeasibility based on the criteria in subsection 4.3.1.4.3.1 through subsection 4.3.1.4.3.4 of the Delaware Division of Air Quality 7 Delaware Admin Code 1125 is not required.

3.1.4 BACT Analysis for $PM/PM_{10}/PM_{2.5}$ from Storage Silos

The transfer of product from the grinding mill to the two product storage silos will be a source of PM emissions. $PM/PM_{10}/PM_{2.5}$ emissions will result from the particles disturbed by the transfer of ground GBFS. The more ground GBFS that is transferred to the product storage silos at one time, the greater amount of PM that is emitted.

3.1.4.1 Potential Control Technologies for Product Storage Silo PM

A control technology commonly used with product storage in silos for mineral grinding facilities is the bin vent. The EPA AP-42 Section 11.12 for Concrete Batching states that the point source transfer of cement and pozzolan material to silos usually uses a fabric filter or "sock" as the control technology. Cement has a density of approximately 3.15 g/cm^3 while ground GBFS has a density of approximately 3.05 g/cm^3. Since these densities are similar, the control technologies for concrete batching can be seen as comparable to the control technologies used for the GBFS storage silos. The storage bin vents proposed for use by WALAN Specialty Construction Products, LLC are similar to the fabric filters used during concrete batching. Chapter 11 of AP-42, Mineral Products Industry, discusses the storage of dry rock in enclosed bins or silos which are vented to the atmosphere with fabric filters frequently used to control emissions (2006).

Literary review of the EPA RACT/BACT/LAER Clearinghouse (RBLC) database revealed the following about the control technologies used for product storage silos:

- Baghouse for Limestone/Dolomite Grinding Mill Bin Area
- Baghouse for Product Transfer, Processed Stone, Conveying at Kiln
- Fabric Filter for Limestone Storage Silos
- Baghouse Vent for Slag Mill Product Silo for Nucor Steel Louisiana Facility
- Enclosed Vent to a Dust Extraction System or Baghouse for truck/rail conveyor transfer tower; truck stations unloading to a truck hopper; and truck hopper unloading to the conveyor belts

The results found from the RBLC database search confirm that the bin vent is a common control technology used by mineral grinding facilities. See Appendix B for details regarding the above listed control technologies found through searching the RBLC database.

Information regarding other control technology options for the product storage silos were not found during Duffield's literary review. In this case, the bin/baghouse vent, fabric filter, and baghouse are synonymous terms for the same control technology. The bin vent control technology for the storage silos is the only known control technology and is the most effective. Since this control technology is also the BACT, a demonstration of infeasibility based on the criteria in subsection 4.3.1.4.3.1 through subsection 4.3.1.4.3.4 of the Delaware Division of Air Quality 7 Delaware Admin Code 1125 is not required.

3.1.5 BACT Analysis for PM/PM_{10}/$PM_{2.5}$ for Loading Trucks

The transfer of product from the product storage silos to trucks will be a source of PM emissions due to the disturbance of ground GBFS particles during transfer activities. The more ground GBFS that is transferred to the trucks at one time, the greater amount of particulate matter that is emitted.

3.1.5.1 Potential Control Technologies for PM Emissions Related to Truck Loading

AP-42 Section 11.12 for Concrete Batching mentions truck loading emissions as a fugitive emissions source depending on the moisture level which implies that no control technology is typically used when loading concrete into trucks/hoppers. *Best Practices for Dust Control in Metal/Nonmetal Mining* discusses packaging and bagging products for shipping using a dual bag nozzle system (Colinet, et al, 2010). This system has a bag clamp that reduces the blowback of material during bag filling. The inner nozzle is the normal fill nozzle and the outer nozzle is an air exhaust system which depressurizes the nozzle system to reduce the blowback of material into the bag, minimizing PM emissions. Though the final product of the GBFS Grinding Facility is being transferred to trucks and not bags, the function of this dual bag nozzle system is much like the loadout chute and cartridge filter proposed for controlling PM emissions during truck loading. The loadout chute and cartridge filter take what would be a fugitive source and create a point source of PM emissions. The truck is fully enclosed when the material is being transferred via the loadout chute and cartridge filter except for the hole at the top of the chute that is receiving materials.

Literary review of the EPA RACT/BACT/LAER Clearinghouse (RBLC) database revealed the following about the control technologies used during the transfer from product storage silos to trucks:

- Fabric filters for treating displaced air during the truck and rail loadout process for Mississippi Lime Company

Lime has a density of approximately 3.35 g/cm^3 which is similar to the approximate density of GBFS, 3.05 g/cm^3. Therefore, the control technology used for this portion of the lime manufacturing facility and the GBFS grinding facility are comparable.

Information regarding other control technology options for the transfer of the final product from the storage silos to trucks for a dry mineral grinding operation were not found during Duffield's literary review. In this case, the loadout chute with a cartridge filter control technology is the most effective control technology for the truck loading process. The loadout chute and cartridge filter combines the fabric filter with the nozzle system, both found through research as separate control technologies, which increases the PM reduction. Since this control technology is also the BACT, a demonstration of infeasibility based on the criteria in subsection 4.3.1.4.3.1 through subsection 4.3.1.4.3.4 of the Delaware Division of Air Quality 7 Delaware Admin Code 1125 is not required.

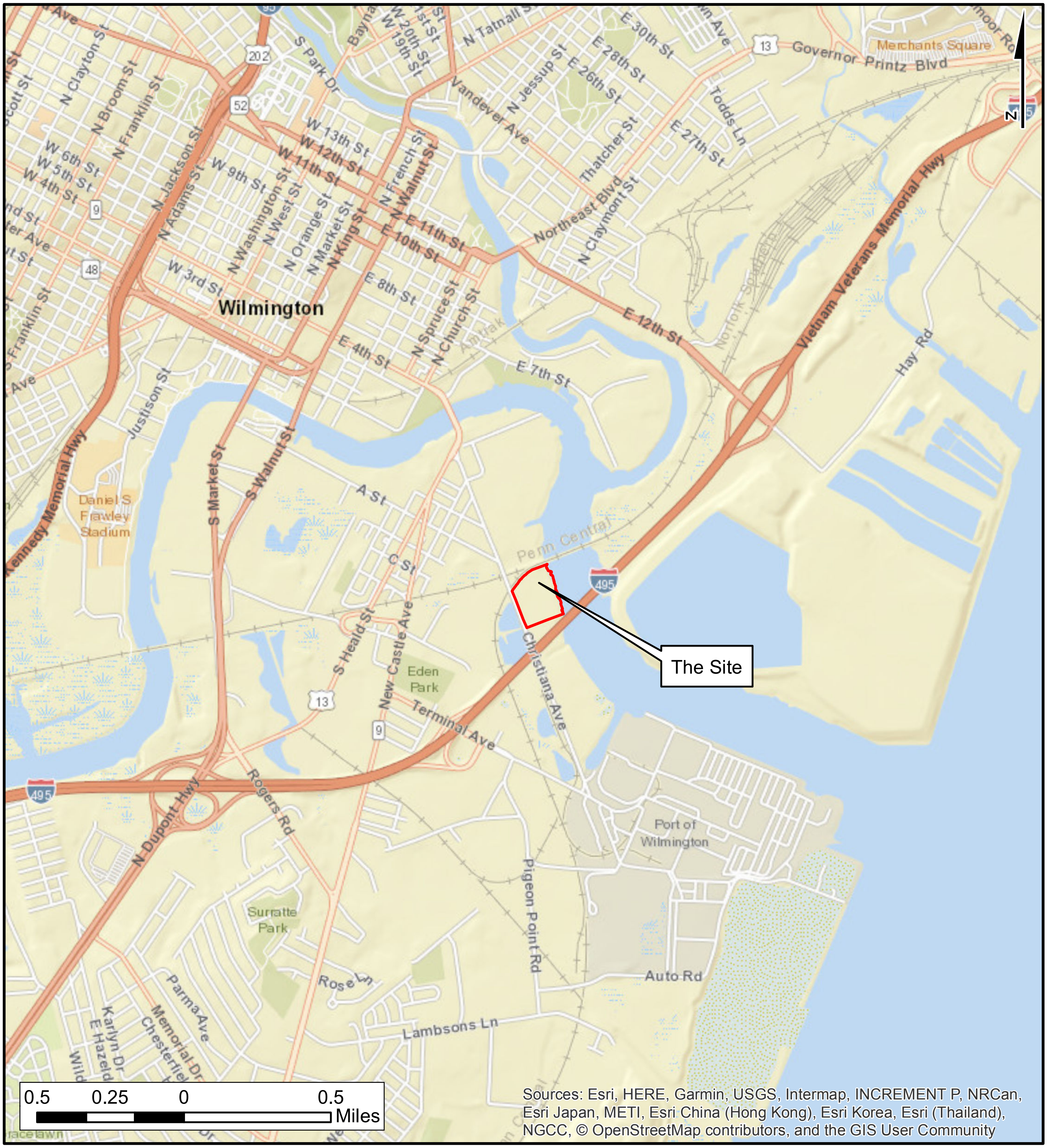
4.0 PROPOSED PM/PM10/PM2.5 BACT EMISSIONS LIMIT FOR GBFS GRINDING FACILITY OPERATIONS

WALAN proposes to use fabric filters in a baghouse for the grinding mill exhaust, bin vents for the exhaust from each of the two product storage silos, and loadout chutes with cartridge filters for the exhaust associated with the transfer of the ground GBFS from the storage silos to the trucks as BACT for addressing PM/PM_{10}/$PM_{2.5}$ emissions. To view the estimated PM/PM_{10}/$PM_{2.5}$ emissions and the proposed emissions limits for each source, please see the Emissions Summary Table in AQM-5 (see Appendix D). The grinding/drying mill is Emission Point-3 (EP-3), loading of ground GBFS into the two storage silos is EP-4 & EP-5, and the loading of ground GBFS into enclosed trucks is EP-6 & EP-7.

5.0 SUMMARY OF PROPOSED EMISSIONS LIMITATIONS AND DEMONSTRATION OF COMPLIANCE

WALAN will comply with the BACT emissions limitations described in the AQM-5 (see Appendix D). Initial and periodic testing will take place at each emission point location associated with each BACT and documentation of daily operating conditions will be used to demonstrate compliance with the anticipated permit conditions.

FIGURES



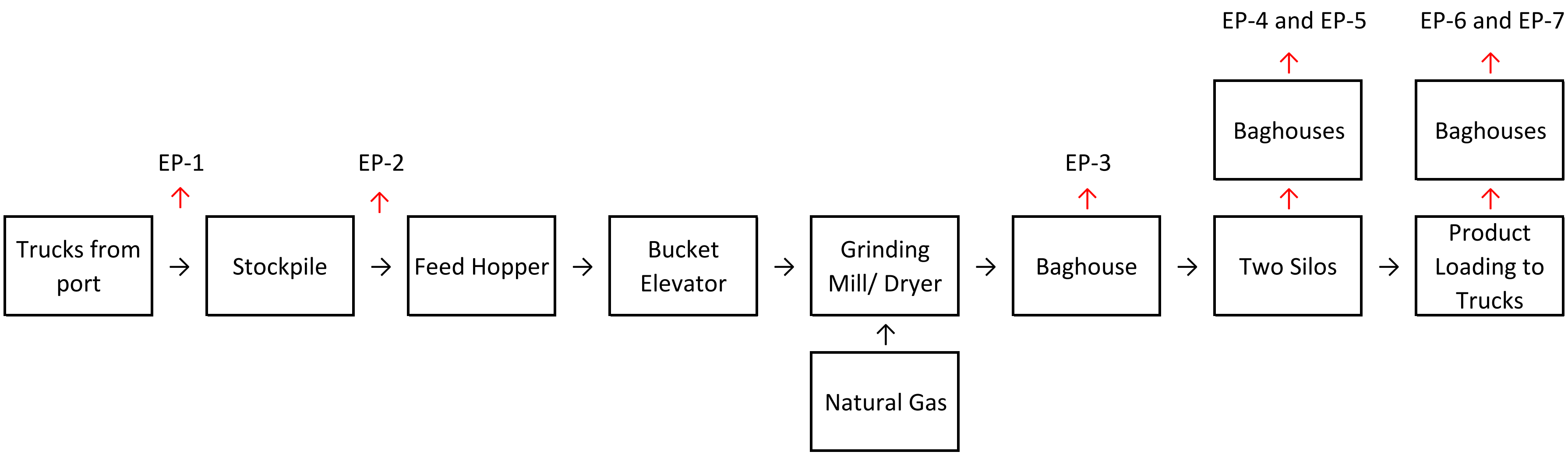
Date: 10/2018	**Site Location Map**	DESIGNED BY: BNM	DUFFIELD ASSOCIATES Soil, Water & the Environment
SCALE: AS SHOWN		DRAWN BY: CSP	5400 LIMESTONE ROAD WILMINGTON, DE 19808-1232 TEL. (302)239-6634 FAX (302)239-8485
PROJECT NO. 8850.ED		CHECKED BY: MRB	OFFICES IN PENNSYLVANIA, SOUTHERN DELAWARE, MARYLAND AND NEW JERSEY
FIGURE 1		FILE: 8850.ED.mxd	EMAIL: DUFFIELD@DUFFNET.COM

AQM-2
Process Flow Diagram

Process Flow Diagram

Sketch the Process Flow Diagram for the equipment or process being applied for. Include each emission unit and control device (even existing emission units that will not be modified by this application). You may identify each emission unit with a simple shape. Label each emission unit and control device with a unique identifier. Show the relationship between each emission unit and/or control device by drawing arrows between them to indicate the flow of air pollutants. List which application forms are included for each emission unit or control device below the shape representing each emission unit or control device . See http://www.delaware.gov/reg2/default.htm for example Process Flow Diagrams for common processes. If you already have a Process Flow Diagram for the equipment or process being applied for, you may attach it to the application instead of using this form.

See Process Flow Diagram attached



DATE: 10/2018	**Process Flow Diagram**	DRAWN BY: BNM	DUFFIELD ASSOCIATES Soil, Water & the Environment
PROJECT NO: 8850.ED	WALAN Specialty Construction Products, LLC	CHECKED BY: MRB	5400 LIMESTONE ROAD WILMINGTON, DE 19808-1232 TEL. (302)239-6634 FAX (302)239-8485
SHEET: FIGURE 2	Wilmington~Delaware	FILE: 8850.ED.Process_Flow_Diagram.xlxs	OFFICES IN PENNSYLVANIA, SOUTHERN DELAWARE, MARYLAND AND NEW JERSEY *EMAIL: DUFFIELD@DUFFNET.COM*

APPENDIX A

EPA RBLC SEARCH – CONTROL TECHNOLOGY FOR GRINDING/DRYING MILL

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

Help
FINAL

RBLC ID: IN-0147
Corporate/Company: ROCHESTER METAL PRODUCTS CORP.
Facility Name: ROCHESTER METAL PRODUCTS CORP.
Process: DISA 2 CASTING COOLING (EU-335) AND THE DISA 2 GRINDING (EU-433)

Pollutant: Particulate matter, filterable (FPM)
CAS Number: PM

Pollutant Group(s): Particulate Matter (PM),
Substance Registry System: Particulate matter, filterable (FPM)

Pollution Prevention/**A**dd-on Control Equipment/**B**oth/**N**o Controls Feasible: A
P2/Add-on Description: BAGHOUSE (DC-12)

Test Method: Unspecified
EPA/OAR Methods | All Other Methods

Percent Efficiency: 0
Compliance Verified: Unknown
EMISSION LIMITS:
Case-by-Case Basis: OTHER CASE-BY-CASE
Other Applicable Requirements: N/A
Other Factors Influence Decision: Unknown
Emission Limit 1: 0.0030 GR/DSCF OF* 3 HRS
Emission Limit 2: 0.8400 LB/H 3 HRS
Standard Emission Limit: 0
COST DATA:
Cost Verified? No
Dollar Year Used in Cost Estimates:
Cost Effectiveness: 0 $/ton
Incremental Cost Effectiveness: 0 $/ton
Pollutant Notes: *OF EXHAUST AIR PSD BACT

APPENDIX B

EPA RBLC SEARCH – CONTROL TECHNOLOGY FOR STORAGE SILOS

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help
FINAL

RBLC ID: IN-0167
Corporate/Company: MAGNETATION LLC
Facility Name: MAGNETATION LLC
Process: LIMESTONE/DOLOMITE GRINDING MILL BIN AREA

Primary Fuel:
Throughput: 495.00 T/H
Process Code: 90.019

Pollutant Information - List of Pollutants
Help

Pollutant	Primary Emission Limit	Basis	Verified
Particulate matter, filterable (FPM)	0.0020 GR/DSCF	BACT-PSD	NO
Particulate matter, total < 10 µ (TPM10)	0.0020 GR/DSCF	BACT-PSD	NO
Particulate matter, total < 2.5 µ (TPM2.5)	0.0020 GR/DSCF	BACT-PSD	NO

Process Notes: CONSISTED IN ONE (1) LIMESTONE AND DOLOMITE GRINDING MILL BIN AREA IS ONE (1) ADDIDTIVE CONVEYOR, ONE (1) DOLOMITE GRINDING MILL BIN WITH A MAXIMUM CAPACITY OF 440 TONS, AND ONE (1) LIMESTONE GRINDING MILL BIN WITH A MAXIMUM CAPACITY OF 440 TONS, IDENTIFIED AS EU025B. USING BAGHOUSE CE023, EXHAUSTS INSIDE THE BUILDING AND ARE CONSIDERED AFFECTED FACILITIES.

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

Help

FINAL

RBLC ID: OH-0321
Corporate/Company: MARTIN MARIETTA MAGNESIA SPECIALTIES, LLC
Facility Name: MARTIN MARIETTA MATERIALS
Process: PRODUCT TRANSFER, PROCESSED STONE, CONVEYING AT KILN

Pollutant: Visible Emissions (VE) **CAS Number:** VE

Pollutant Group(s): **Substance Registry System:** Visible Emissions (VE)

Pollution Prevention/**A**dd-on Control Equipment/**B**oth/**N**o Controls Feasible: A
P2/Add-on Description: BAGHOUSE

Test Method: Unspecified EPA/OAR Methods | All Other Methods

Percent Efficiency:	0
Compliance Verified:	No
EMISSION LIMITS:	
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Other Factors Influence Decision:	Unknown
Emission Limit 1:	20.0000 % OPACITY OF FUGITIVE DUST AS 3-MIN. AVG.
Emission Limit 2:	0
Standard Emission Limit:	0 % OPACITY AS 6-MIN. AVERAGE FROM BAGHOUSE
COST DATA:	
Cost Verified?	No
Dollar Year Used in Cost Estimates:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Pollutant Notes:	BAGHOUSE STACK IS PRODUCT CONVEYOR STACK. FUGITIVE DUST IS FROM MATERIAL HANDLING OPERATIONS.

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

Help
FINAL

RBLC ID: KY-0100
Corporate/Company: EAST KENTUCKY POWER COOPERATIVE, INC
Facility Name: J.K. SMITH GENERATING STATION
Process: LIMESTONE STORAGE SILOS

Pollutant: Particulate matter, filterable < 10 µ (FPM10)
CAS Number: PM

Pollutant Group(s): Particulate Matter (PM),
Substance Registry System: Particulate matter, filterable < 10 µ (FPM10)

Pollution Prevention/**A**dd-on Control Equipment/**B**oth/**N**o Controls Feasible: A
P2/Add-on Description: FABRIC FILTER

Test Method: EPA/OAR Mthd 201 — EPA/OAR Methods | All Other Methods

Percent Efficiency:	0
Compliance Verified:	
EMISSION LIMITS:	
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	NSPS
Other Factors Influence Decision:	No
Emission Limit 1:	0.0050 GR/DSCF 24 HR
Emission Limit 2:	0.5100 LB/H (EACH) 24 HR
Standard Emission Limit:	0
COST DATA:	
Cost Verified?	No
Dollar Year Used in Cost Estimates:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Pollutant Notes:	ALSO LISTED AS PM2.5 LIMIT.

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

Help
FINAL

RBLC ID: IN-0166
Corporate/Company: INDIANA GASIFICATION, LLC
Facility Name: INDIANA GASIFICATION, LLC
Process: TRUCK/RAIL CONVEYOR TRANSFER TOWER; TRUCK STATIONS UNLOADING TO A TRUCK HOPPER; AND TRUCK HOPPER UNLOADING TO THE CONVEYOR BELTS

Pollutant: Particulate matter, filterable (FPM)
CAS Number: PM

Pollutant Group(s): Particulate Matter (PM),
Substance Registry System: Particulate matter, filterable (FPM)

Pollution Prevention/**A**dd-on Control Equipment/**B**oth/**N**o Controls Feasible: A
P2/Add-on Description: ENCLOSED VENT TO A DUST EXTRACTION SYSTEM OR BAGHOUSE

Test Method: Unspecified
EPA/OAR Methods | All Other Methods

Percent Efficiency: 99.000
Compliance Verified:
EMISSION LIMITS:
Case-by-Case Basis: BACT-PSD
Other Applicable Requirements:
Other Factors Influence Decision: No
Emission Limit 1: 0.0030 GR/DSCF 3 HR AVE
Emission Limit 2: 0
Standard Emission Limit: 0
COST DATA:
Cost Verified? No
Dollar Year Used in Cost Estimates: 2012
Cost Effectiveness: 28701 $/ton
Incremental Cost Effectiveness: 0 $/ton
Pollutant Notes: BAGHOUSE ACHIEVING 0.001 GR/DSCF NOT COST EFFECTIVE.

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

Process Information - Details

For information about the pollutants related to this process, click on the specific pollutant in the list below.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information

Help

FINAL

RBLC ID: LA-0239
Corporate/Company: CONSOLIDATED ENVIRONMENTAL MANAGEMENT INC
Facility Name: NUCOR STEEL LOUISIANA
Process: SLG-408 - SLAG MILL PRODUCT SILO BAGHOUSE VENT

Primary Fuel:
Throughput: 75.40 T/H
Process Code: 81.290

Pollutant Information - List of Pollutants

Help

Pollutant	Primary Emission Limit	Basis	Verified
Particulate matter, total (TPM)	0.7500 LB/H	BACT-PSD	YES

Process Notes: TOTAL THROUGHPUT 1.92 MILLION TONS PER YEAR

APPENDIX C

EPA RBLC SEARCH – CONTROL TECHNOLOGY FOR TRUCK LOADING

Technology Transfer Network
Clean Air Technology Center - RACT/BACT/LAER Clearinghouse

Pollutant Information

Click on the Process Information button to see more information about the process associated with this pollutant.
Or click on the Process List button to return to the list of processes.

RBLC Home | New Search | Search Results | Facility Information | Process List | Process Information | Pollutant Information

Help
FINAL

RBLC ID: IL-0117
Corporate/Company: MISSISSIPPI LIME COMPANY
Facility Name: MISSISSIPPI LIME COMPANY
Process: Truck and Rail Loadout

Pollutant: Particulate matter, filterable (FPM)
CAS Number: PM

Pollutant Group(s): Particulate Matter (PM),
Substance Registry System: Particulate matter, filterable (FPM)

Pollution Prevention/**A**dd-on Control Equipment/**B**oth/**N**o Controls Feasible: A
P2/Add-on Description: Partial enclosure; fabric filters to treat displaced air during loadout; and loadout practices to minimize spillage.

Test Method: EPA/OAR Mthd 5

EPA/OAR Methods | All Other Methods

Percent Efficiency:	0
Compliance Verified:	No
EMISSION LIMITS:	
Case-by-Case Basis:	BACT-PSD
Other Applicable Requirements:	SIP
Other Factors Influence Decision:	No
Emission Limit 1:	0.0040 GR/SCF
Emission Limit 2:	0
Standard Emission Limit:	0
COST DATA:	
Cost Verified?	No
Dollar Year Used in Cost Estimates:	
Cost Effectiveness:	0 $/ton
Incremental Cost Effectiveness:	0 $/ton
Pollutant Notes:	Opacity: 7%

APPENDIX D

AQM-5 (BACT TABLES)

AQM-5
Emissions Calculations

WALAN Specialty Construction Products, LLC
501 Christina Avenue, Wilmington, DE 19801
Emission Points Summary Table

Emission Point (1)	Description	Process	Maximum Annual GGBFS Throughput (Tons) (2)	Pollutants Emitted (3)
EP-1	Dust drop from trucks to stockpile (fugitive dust emissions)	Handling	262,800	PM
EP-2	Dust drop from front end loader into feed hopper (fugitive dust emissions)	Handling		PM
EP-3	Grinding mill (stack emissions)	Grinding		PM, PM10, PM2.5
	Integral Dryer (stack emissions)	Drying		PM2.5, NOx, SOx, CO, VOC
EP-4 and EP-5	Baghouses on two storage silos (stack emissions)	Storage		PM10, PM2.5
EP-6 and EP-7	Baghouses on two dustless loadout chutes (stack emissions)	Loadout		PM10, PM2.5

Notes:
(1) See process flow diagram
(2) The maximum GBFS throughput rate is 30 tons/hour. The facility has the potential to process GBFS three shifts per day, 365 days per year for a total of 8760 operational hours per year.
(3) Estimated particle sizes for GBFS range from 200 - 4750 microns. Emissions from material handling operations are expressed as PM only.

WALAN Specialty Construction Products, LLC
Handling Operations PM Emissions

EP-1 - Dust drops from trucks to stockpile								
Substance	Moisture Content (%) *(a)*	k *(b)*	U (mph) *(c)*	E (lb/ton) *(d)*	Maximum Hourly Throughput (ton/hr) *(e)*	Uncontrolled Hourly Emissions (lb/hr)	Controlled Hourly Emissions (lb/hr)	PTE (tons/year) *(f)*
PM	9	0.74	10.84	7.884E-04	30	2.365E-02	2.365E-02	1.036E-01

EP-2 - Dust drops from stockpile to feed hopper								
Substance	Moisture Content *(a)*	k *(b)*	U (mph) *(c)*	E (lb/ton) *(d)*	Maximum Hourly Throughput (ton/hr) *(e)*	Uncontrolled Hourly Emissions (lb/hr)	Controlled Hourly Emissions (lb/hr)	PTE (tons/year) *(f)*
PM	9	0.74	10.84	7.884E-04	30	2.365E-02	2.365E-02	1.036E-01

	Uncontrolled Hourly Emissions (lb/hr)	Controlled Hourly Emissions (lb/hr)	PTE (tons/year) *(f)*
Total Emissions =	**0.047**	**0.047**	**0.207**

(a) Estimated moisture content of salt used for calculation.

(b) k = particle size multiplier for average particle diameter for PM < 30 microns

(c) U = Mean wind speed for Wilmington, DE (Source: www.usa.com/wilmington-de.htm)

(d) E = Emission factor. Equation provided below detailed in USEPA AP-42 Section 13.2.4 (Revised 11/06)

(e) Estimated GBFS throughput rate

(f) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

Operational flexibility allows the facility to operatre anytime during the week's two shifts. Actual operation schedule will likely be less.

Emission Factor Equation:

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

Where:
E = Emission Factor (lb/ton)
k = particle size multiplier
U = mean wind speed (mph)
M = GBFS moisture content (%)

WALAN Specialty Construction Products, LLC
EP-3 - Emissions from GBFS Grinding

	Uncontrolled Emissions		Controlled Emissions		
Substance	**Emission Factor (lb/ton)** *(a)*	**Emissions Rate (lb/hr)** *(b)*	**Emission Factor (lb/ton)** *(c)*	**Emissions Rate (lb/hr)** *(b)*	**PTE (tons/year)** *(d)*
PM	8.08	242.4	0.0404	1.212	5.309
PM10	6.78	203.4	0.0339	1.017	4.454
PM2.5	2.42	72.6	0.0121	0.363	1.590

Notes:

(a) Uncontrolled emission factors were calculated using the controlled emissions factors and a baghouse removal efficiency of 99.5%

(b) Emission rates calculated using a maximum hourly GBFS throughput of 30 tons/hour

(c) Emission factors provided in AP-42, Table 11.19.2-4

(d) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

WALAN Specialty Construction Products, LLC
Emissions from Natural Gas Combustion

EP-3 - Natural gas-firing Air Heating Unit				
Substance	**Emission Factor (lb/10^6 scf)** *(a)*	**Uncontrolled Hourly Emissions (lb/hr)** *(b)*	**Controlled Hourly Emissions (lb/hr)** *(b)*	**PTE (tons/year)** *(c)*
PM2.5	7.6	0.055	0.0003	0.0012
CO	84	0.608	NA	2.664
NOx	100	0.724		3.171
SOx	0.6	0.004		0.019
VOC	5.5	0.040		0.174

Notes:

(a) Emissions factors taken from AP-42, Tables 1.4-1 and 1.4-2

(b) A maximum firing rate of 7,240 scf/ft2 for the natural gas fired burner was used in the calculation

A 99.5% removal efficiency of PM2.5 by the baghouse is assumed for calculations

(c) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

WALAN Specialty Construction Products, LLC
Storage Silos and Loadout PM Emissions

	EP-4 & EP-5 - Loading of GGBFS into Two Storage Silos (Baghouse)				
	Uncontrolled Emissions		Controlled Emissions		
Substance	**Emission Factor (lb/ton)** *(a)*	**Emissions Rate (lb/hr)** *(b)*	**Emission Factor (lb/ton)** *(a)*	**Emissions Rate (lb/hr)** *(b)*	**PTE (tons/year)** *(c)*
PM	0.73	21.9	0.00099	0.0297	0.130
PM10	0.47	14.1	0.00034	0.0102	0.045

	EP-6 & EP-7 - Loading of GGBFS into Enclosed Trucks (Cartridge Filter)				
	Uncontrolled Emissions		Controlled Emissions		
Substance	**Emission Factor (lb/ton)** *(a)*	**Emissions Rate (lb/hr)** *(b)*	**Emission Factor (lb/ton)** *(a)*	**Emissions Rate (lb/hr)** *(b)*	**PTE (tons/year)** *(c)*
PM	0.73	21.9	0.00099	0.0297	0.130
PM10	0.47	14.1	0.00034	0.0102	0.045

Total Emissions			
Substance	**Uncontrolled Hourly Emissions (lb/hr)**	**Controlled Hourly Emissions (lb/hr)**	**PTE (tons/year)** *(f)*
PM	**43.8**	**0.059**	**0.260**
PM10	**28.2**	**0.020**	**0.089**

Notes:

(a) Emission rates calculated using a maximum hourly GBFS throughput of 30 tons/hour

(b) Emission factors for concrete batching - cement silo loading were used and are provided in AP-42, Table 11.19.2-4

The same emission factors were used for enclosed truck loading because it is a similar process

and any dust captured during loadout is vented through similar baghouses.

(c) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

WALAN Specialty Construction Products, LLC
Summary of Emissions

Emission Point	PM			PM10			PM2.5		
	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)
EP-1, EP-2 - Material Handling	0.047	0.047	0.207						
EP-3 - Grinding	242.4	1.212	5.309	203.4	1.017	4.454	72.6	0.363	1.59
EP-3 - Drying							0.055	0.003	0.0012
EP-4, EP-5, EP-6, EP-7 - GGBFS Storage and Loadout	43.8	0.059	0.26	28.2	0.02	0.089			
Total Emissions	286.247	1.318	5.776	231.600	1.037	4.543	72.655	0.366	1.591

WALAN Specialty Construction Products, LLC
Summary of Emissions

Emission Point	SOx			NOx		
	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)
EP-1, EP-2 - Material Handling						
EP-3 - Grinding						
EP-3 - Drying	0.004	0.004	0.019	0.724	0.724	3.171
EP-4, EP-5, EP-6, EP-7 - GGBFS Storage and Loadout						
Total Emissions	0.004	0.004	0.019	0.724	0.724	3.171

Emission Point	CO			VOC		
	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)
EP-1, EP-2 - Material Handling						
EP-3 - Grinding						
EP-3 - Drying	0.608	0.608	2.664	0.04	0.04	0.174
EP-4, EP-5, EP-6, EP-7 - GGBFS Storage and Loadout						
Total Emissions	0.608	0.608	2.664	0.040	0.040	0.174

Table 11.19.2-3 (Metric Units). EMISSION FACTORS FOR PULVERIZED MINERAL PROCESSING OPERATIONS [a]

Source [b]	Total Particulate Matter	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Grinding (Dry) with Fabric Filter Control (SCC 3-05-038-11)	0.0202	D	0.0169	B	0.0060	B
Classifiers (Dry) with Fabric Filter Control (SCC 3-05-038-12)	0.0112	E	0.0052	E	0.0020	E
Flash Drying with Fabric Filter Control (SCC 3-05-038-35)	0.0134	C	0.0073	C	0.0042	C
Product Storage with Fabric Filter Control (SCC 3-05-38-13)	0.0055	E	0.0008	E	0.0003	E

a. Emission factors represent controlled emissions unless noted. Emission factors are in kg/Mg of material throughput.

b. Date from references 16 through 23

Table 11.19.2-4 (English Units). EMISSION FACTORS FOR PULVERIZED MINERAL PROCESSING OPERATIONS [a]

Source [b]	Total Particulate Matter	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Grinding (Dry) with Fabric Filter Control (SCC 3-05-038-11)	0.0404	D	0.0339	B	0.0121	B
Classifiers (Dry) with Fabric Filter Control (SCC 3-05-038-12)	0.0225	E	0.0104	E	0.0041	E
Flash Drying with Fabric Filter Control (SCC 3-05-038-35)	0.0268	C	0.0146	C	0.0083	C
Product Storage with Fabric Filter Control (SCC 3-05-038-13)	0.0099	E	0.0016	E	0.0006	E

a. Emission factors represent controlled emissions unless noted. Emission factors are in lb/Ton of material throughput.

b. Data from references 16 through 23

TABLE 11.12-2 (ENGLISH UNITS)
EMISSION FACTORS FOR CONCRETE BATCHING [a]

Source (SCC)	Uncontrolled				Controlled			
	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating
Aggregate transfer [b] (3-05-011-04,-21,23)	0.0069	D	0.0033	D	ND		ND	
Sand transfer [b] (3-05-011-05,22,24)	0.0021	D	0.00099	D	ND		ND	
Cement unloading to elevated storage silo (pneumatic)[c] (3-05-011-07)	0.73	E	0.47	E	0.00099	D	0.00034	D
Cement supplement unloading to elevated storage silo (pneumatic)[d] (3-05-011-17)	3.14	E	1.10	E	0.0089	D	0.0049	E
Weigh hopper loading [e] (3-05-011-08)	0.0048	D	0.0028	D	ND		ND	
Mixer loading (central mix)[f] (3-05-011-09)	0.572 or Eqn. 11.12-1	B	0.156 or Eqn. 11.12-1	B	0.0184 or Eqn. 11.12-1	B	0.0055 or Eqn. 11.12-1	B
Truck loading (truck mix)[g] (3-05-011-10)	1.118	B	0.310	B	0.098 or Eqn. 11.12-1	B	0.0263 or Eqn. 11.12-1	B
Vehicle traffic (paved roads)	See AP-42 Section 13.2.1, Paved Roads							
Vehicle traffic (unpaved roads)	See AP-42 Section 13.2.2, Unpaved Roads							
Wind erosion from aggregate and sand storage piles	See AP-42 Section 13.2.5, Industrial Wind Erosion							

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_x emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_x emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6 \text{ scf}] = (3.67)$ (CON) (C)(D), where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, $4.2x10^4$ $lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2.
Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

AQM-4.6
Baghouse - Grinding/Drying

Baghouse Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **WALAN Specialty Construction Products, LLC**
2. Equipment ID Number: **EP-3 Grinding Mill with Integral Heater**
3. Manufacturer: **Redecam**
4. Model: **2 DPZ 60x10/7-W**
5. Serial Number: **N/A**
6. Is the Baghouse Insulated? ☒ YES ☐ NO
7. Design Minimum Operating Temperature: **203 °F**
8. Design Maximum Operating Temperature: **257 °F**
9. Are Temperature Controls Provided? ☐ YES ☒ NO

If Yes, complete the rest of Question 9. If no, proceed to Question 10.

9.1. Describe the Temperature Controls:

10. Air Flow Through Baghouse: ☐ Forced
☒ Induced
☐ Other (Specify):
11. Direction of Flow Through Filters: ☐ Inside Out
☒ Outside In
12. Particulate Removal Efficiency: **99.9+** %

Attach the Manufacturer's Specification Sheet for the Baghouse and Particle Size Removal Efficiency Curve and basis of determination.

Compartment Information

13. Number of Compartments: **Two**
14. Number of Filters (Bags) Per Compartment: **600**
15. Can the Compartments be Isolated for Replacement or Repair? ☐ YES ☒ NO

Gas Stream Information

16. Maximum Inlet Volumetric Gas Flow Rate: **design value with 80-85% recirculated - 48,144 acfm at 204.8 °F**
17. Maximum Outlet Volumetric Gas Flow Rate: **stack exhaust gas - 10,463 acfm at 204.8 °F**
18. Dew Point at Maximum Moisture Content of Gas: **123.8 °F**

Gas Stream Information

19. pH of Gas Handled: **N/A**

20. Dust Characteristics: (Check All That Apply)
- ☐ Sticky
- ☐ Wet
- ☐ Corrosive
- ☒ Dry
- ☐ Other (Specify):

Contaminant Information

21. Percent of Each Contaminant in the Waste Gas and Removal Efficiency

If more than five Contaminants are present, attach additional copies of this page as needed.

	Contaminant Name	Contaminant CAS Number	Percent of Waste Gas	Removal Efficiency
21.1.	**GGBFS**	**N/A**	**100 %**	**99.9+** %
21.2.			**%**	%
21.3.			**%**	%
21.4.			**%**	%
21.5.			**%**	%

Fabric Filter (Bag) Information

22. Fabric Type:
- ☐ Felted
- ☒ Woven
- ☐ Felted-Woven
- ☐ Membrane
- ☐ PTFE Membrane
- ☐ Sintered Metal
- ☐ Ceramic Cartridge
- ☐ Other (Specify):

23. Fabric Material: **Polyester/Acrylic**

24. Maximum Continuous Filter Operating Temperature: **257 °F**

25. Clean Fabric Permeability: **29.53** scfm/ft^2 at ΔP **N/A** inches of water

26. Fabric Filter (Bag) Diameter or Width: **5 inches**

27. Fabric Filter (Bag) Length: **22.9 feet**

28. Effective Area Per Filter: **30 square inches**

29. Minimum Effective Air to Cloth Ratio: Operating = 0.73 **feet/min**

30. Maximum Effective Air to Cloth Ratio: 1.15 **feet/min**

31. Design Pressure Drop Across Baghouse: 6.02 **inches water**

32. Describe Determining Factor Fabric Filter Changing/Replacement: **Vendor recommendations are followed. The company's other facilities operating in PA have implemented an effective baghouse maintenance plan as follows: (1) Baghouse, filters, and cages are inspected every 3 months by the plant foreman for the first 6 months; (2) After 6 months, the baghouse, filters, and cages are inspected monthly; and (3) Bags and cages are changed when required following inspection (typically 8-12 months).**

Attach the Manufacturer's Specification Sheet for the Fabric Filters (Bags).

Filter Cleaning Information

33. Filter Cleaning Method: ☐ Manual Cleaning ☐ Mechanical Shakers ☐ Pneumatic Shakers ☐ Bag Collapse ☐ Sonic Cleaning ☐ Reverse Air Flow ☐ Reverse Air Jet ☒ Pulse Jet ☐ Other (Specify):

If Reverse Air Jet or Pulse Jet is used, complete the rest of Question 33. If not, proceed to Question 34.

33.1. Air Pressure: 80 **psi**

33.2. Describe How Air Is Supplied to System: **WALAN Specialty Construction Products, LLC compressors will supply air with an air pressure regulator group to the air collectors located on the platforms on the filter roof. The connection is made through pneumatic valves to the ramps. Ramps blow the compressed air inside each bag and the pressure wave caused by the double ejection system causes both a sudden shake of the bag and an air flow in the opposite direction. The two combined effects cause the crumbling of the dust layer deposited on the bags and the dust falls into the hopper.**

34. Describe How Filter Cleaning Is Initiated: ☐ Manual ☐ Timer ☒ Pressure Drop ☐ Other (Specify):

Hopper Information

35. Is the Hopper Heated? ☐ YES ☒ NO

36. Is there a Hopper Vibrator? ☐ YES ☒ NO

37. Describe How Collected Material is Treated or Disposed of: **Collected material is considered product and is fed via a bucket elevator to the two 1,100 ton product storage silos.**

Stack Information

38. Emission Point Name: **EP-3**

38.1. Stack Height Above Grade: **85 feet**

38.2. Stack Exit Diameter: **3 feet**
(Provide Stack Dimensions If Rectangular Stack)

38.3. Is a Stack Cap Present? ☐ YES ☒ NO

38.4. Stack Configuration: ☒ Vertical ☐ Horizontal ☐ Downward-Venting ☐ Other (Specify):
(check all that apply)

38.5. Stack Exit Gas Temperature: **204.8 °F**

38.6. Stack Exit Gas Flow Rate: **10,463 ACFM**

38.7. Distance to Nearest Property Line: **about 125 feet**

38.8. Describe Nearest Obstruction: **Large 150' x 675' building to the west**

38.9. Height of Nearest Obstruction: **about 50 feet**

Stack Information

38.10. Distance to Nearest Obstruction: **about 265 feet**	
38.11. Are Stack Sampling Ports Provided?	☐ YES ☒ NO

Monitoring and Alarm Information

39. Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit? ☐ YES ☒ NO

If YES, complete the rest of Question 39. If NO, proceed to Question 40.

39.1. Describe the System Alarm(s):

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	**Describe Alarm Trigger**	**Monitoring Device or Alarm Type**	**Does the Alarm Initiate an Automated Response?**
39.1.1.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.2.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.3.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.4.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.5.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Additional Information

40. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 40.

Additional Information
40.1. Describe:

AQM-4.6
Baghouse - Grinding/drying
Supporting Information

Grinding Operation Baghouse
Technical Information

BAG FILTERS (BAGHOUSES)

Bag Filters (baghouses) have been our core product for over 30 years. With our own proprietary technology, our Bag Filters offer the highest particulate removal efficiency on the market, far exceeding the most stringent emissions regulations worldwide. Our secret has been to constantly evolve with technology and search for improvements to provide our customers with optimum air filtration solutions.

WHY CHOOSE OUR BAG FILTERS?

Unsurpassed filtration

Our Bag Filters can far exceed the strictest regulations and can remove more fine and ultra-fine particulates than any other on the market.

Incomparable life expectancy

We have Bag Filters that were installed over 25 years ago that still achieve the strictest emission requirements today.

Innovative solutions

Our persistent R&D has led to innovations such as our Dual- and Multi-Input Integrated Systems, saving CAPEX and space.

Guaranteed casing tightness

Our SPS bag fixation system ensures 100% casing tightness, meaning no dust leakages.

Reduced energy costs

Redecam's Bi-Jet Bag Cleaning System reduces your system's compressed air usage by up to 40%, lowering energy costs.

High temperature capacity

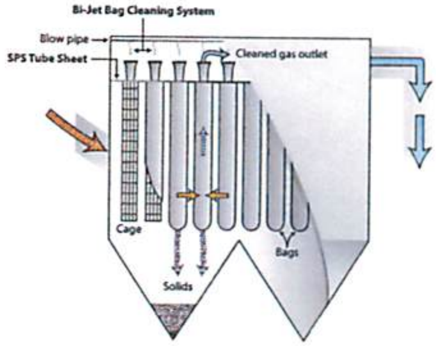
We offer Extreme High Temperature Bag Filters which can withstand temperatures of up to 1000°C (1832°F).

REDECAMGROUP

BAG FILTERS: MODELS AND UNIQUE FEATURES

We offer a wide variety of Bag Filters and Nuisance Filters to suit any flow rate and dust burden. All models feature our innovative SPS bag fixation system and our Bi-Jet Bag Cleaning System, ensuring optimal air filtration and lower operating costs (SPS and Bi-Jet are optional on Nuisance Filters). All of our models are also available as retrofits, upgrades or transformations. Among our most popular models are our DPD- and DPM-Model Bag Filters.

Please visit the Products section of our website at **www.redecam.com** for information about our other Bag Filter models.



We offer multiple Bag Filter models for flow rates from 10,000 m^3 to 3,000,000 m^3 (353,000 ft^3 to 105,000,000 ft^3) and for dust loads of 1 g to 1 kg (0.035 oz to 35 oz).

Our DPD-Model Bag Filter

DPD-Model Bag Filters are suited for high flow rates (above 1.5 million m^3/hr or 883,000 ACFM) and medium inlet dust burden applications (up to 200 g/Nm^3 or 0.087 gr/ft^3). Examples include installations with 3-fan kiln circuits, clinker coolers or our Dual-Input Integrated System, as well as solutions in large power plants or integrating flue gas treatment.

This model has compartments placed in pairs on either side of a large central duct. The central duct contains separate ducts for the inlet (dirty) gas and the outlet (clean) gas.

The baffles (pipes and perforated plates) are specially designed for each project to ensure the ideal permeability and orientation in order to obtain a uniform gas velocity throughout each pair of compartments. As particles are captured, they enter hoppers through isolation dampers, designed to provide superior airflow control in severe environments.

Our DPM-Model Bag Filter

DPM-Model Bag Filters are suitable for high flow rates (above 1.5 million m^3/hr or 883,000 ACFM) and high inlet dust burden applications (up to 1000 g/Nm^3 or 0.44 gr/ft^3). Examples include installations with 2-fan kiln systems, in cement mills or on separators. In such cases, there is a need for efficient dust pre-separation to reduce the dust burden reaching the bags.

A wide central hopper is used to decrease the axial gas velocity so that a dust pre-dropping action takes place. Suitable baffles between the gas inlet and the central hopper ensure a uniform gas flow and velocity across the hopper cross section. Indeed the gas, after being largely pre-separated of its dust, rises up in the central hopper and passes through **our unique Distribution Screen**, which acts as another dust separator. This screen disperses the gas/dust evenly throughout the filter bag compartments, resulting in a highly efficient process. This translates into a lower pressure drop, fewer cleaning cycles, a longer bag lifetime and significant compressed air savings, meaning lower energy consumption.

While the air-to-cloth ratio is of utmost importance for DPM-Model Bag Filters, the can velocity has no impact on the design since the gas flow to bags is horizontal. Access is made on one side of the bags in order to avoid the gas rising after mixing with the dropping dust.

OUR EXTREME HIGH TEMPERATURE BAG FILTER

This new technology extends our air pollution control offering, as our Extreme High Temperature Bag Filter (EHT-Bag Filter) can remove both solids and tars while withstanding temperatures of up to 850°C (1562°F). It can even treat peak temperatures of **up to 1000°C** (1832°F).

Our EHT-Bag Filters are therefore ideal for the Oil & Gas industry and offer benefits for certain applications in the Cement, Metals & Mining and Waste-to-Energy & Biomass Power industries. Equipped with ceramic catalytic candles, our EHT-Bag Filters can be paired with our full flue gas treatment (FGT) system – whether to treat acid gases, mercury and metals or NO_x – or all of these pollutants.

Our Extreme High Temperature Bag Filters can withstand temperatures of up to 1000°C (1832°F)

ADVANTAGES OF OUR EXTREME HIGH TEMPERATURE BAG FILTER:

1. **Optimal performance.** Our filters can achieve near zero emission levels.
2. **Lower CAPEX & OPEX.** There's no need for further cooling systems, as the bags can withstand such high temperatures.
3. **Saves on energy costs.** It is possible to recover heat by installing a waste heat recovery system downstream of the EHT-Bag Filter.
4. **Safe.** Our special filter bags are non-flammable and 100% spark resistant.
5. **Easy installation and maintenance.** Our outer and inner collar sealing sets have readjustable bayonet locks and are flexible.

The design of our EHT-Bag Filter is not unlike our regular Bag Filters, but the filter material and the sealing technology are very different. The filters in the EHT-Bag Filter are rigid with a consistency like cardboard, and they don't need a cage inside as they are self-supporting.

IDEAL APPLICATIONS FOR OUR EHT-BAG FILTER:

Oil & Gas industry (gasification)

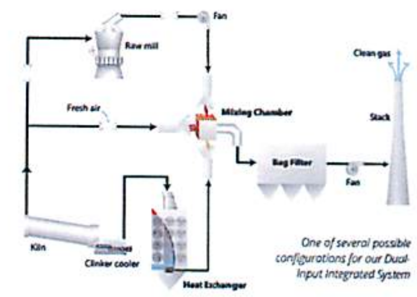
Cement industry (clinker cooler)

Biomass and WTE (incineration)

Metals & Mining (aluminum calcination, melting process and separation of precious metals)

OUR DUAL- AND MULTI-INPUT INTEGRATED SYSTEMS

Amongst our innovations are systems in which ***one* Redecam Bag Filter** is used to dedust gases from **two or more** process or unit points to save our clients significant space and CAPEX. Our Dual-Input Integrated System, developed for the cement industry, uses one Bag Filter to dedust both the kiln & raw mill and the clinker cooler. For the Metals & Mining and Oil & Gas industries, we created Multi-Input Integrated Systems, which collect flows from several process points or units and converge them into one Bag Filter (ex: converging the gases from the Electric Arc Furnace or another primary hot source with gases from a secondary cold source into one baghouse).



One of several possible configurations for our Dual-Input Integrated System

OUR SPECIALIZED RETROFIT & TRANSFORMATION SOLUTIONS

Redecam is a market leader in carrying out retrofit and transformation solutions: they are among our specialties. Many existing bag filters and electrostatic precipitators (ESPs) have become obsolete, either due to their age or their lower performance than current standards require. However in several cases, existing bag filters can be upgraded or retrofitted (taking out what's inside, keeping the casing and installing new Redecam components inside).

Transformations are also possible. This means changing an existing ESP into a Bag Filter, or vice-versa.

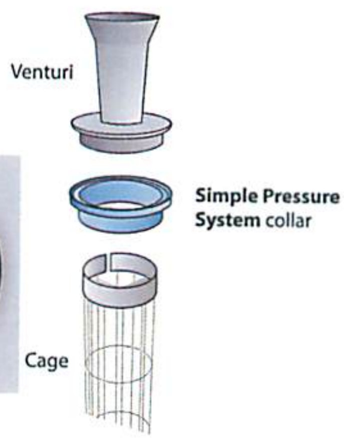
Advantages:

1. Lower CAPEX than replacing with a new model
2. Emissions can be reduced to well under the world's strictest emissions limits
3. Transformations can be made within the existing footprint
4. Minimal ductwork modifications/additions
5. Reuse of existing ancillary equipment

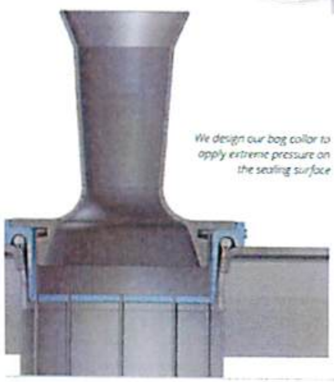
OUR SPS BAG FIXATION SYSTEM

Continuous laboratory tests and on-site work experience inspired us to develop the most advanced, user-friendly and efficient bag fixation system on the market: our Simple Pressure System (SPS). Our SPS guarantees that the tightness of the casing between the dusty and clean sides is 100% effective.

To prevent dust leakage at weak points, we increased the contact surface area of the bag against the tube sheet by extending and contouring the tube sheet opening. The surface contact is therefore not limited to the pure thickness (typically 4 mm or 5/32") of the plate, but is extended to the entire internal surface of the drawn hole (around 18 mm or 45/64").



Our Simple Pressure System offers quick and easy installation



We design our bag collar to apply extreme pressure on the sealing surface

We increased the pressure of the bag collar on the drawn edge of the tube sheet hole, firmly securing the bag's cloth. The collar is also designed to take advantage of the temperature: the tube sheet is carbon steel and the collar is in aluminum, resulting in extreme pressure being generated on the sealing surface.

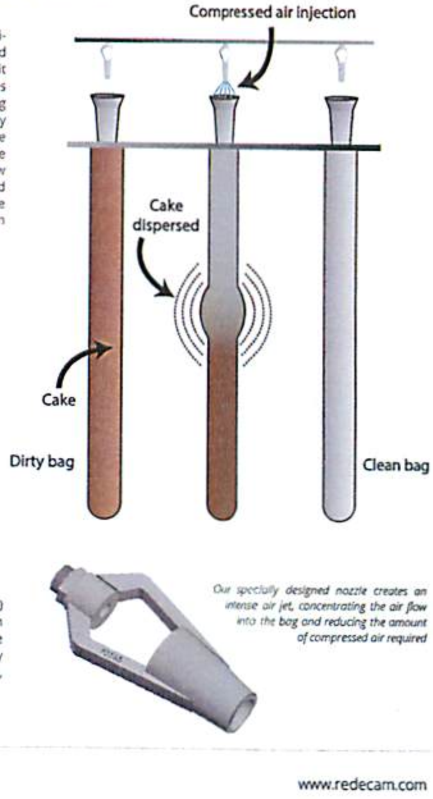
Other advantages to our SPS:

1. Bag installation and removal is simple and quick
2. No risk of bags falling during installation or maintenance
3. Bags cannot drop into the hopper thanks to the ring in solid steel embedded at the top of each bag

OUR BI-JET BAG CLEANING SYSTEM

Our Bi-Jet Bag Cleaning System increases the volume of air that is forced into the bag inlet, while reducing the consumption of compressed air. How? We use a Dual Venturi arrangement: one pipe is located downstream of the nozzle and the other, above the bag inlet. This system minimizes the dispersion of compressed air during the injection phase, thus increasing the volume of air forced into the bag. In turn, this reduces the quantity of air needed to pulsate the bag and achieves a higher flow velocity than in systems equipped with one Venturi.

Redecam offers both online and offline/semi-offline cleaning systems. We recommend our online system for most customers as it provides less stress on mechanical devices (since its compartments do not close during cleaning operations) and consequently reduces power consumption. Our online system maintains both a constant pressure across the filter and a constant dust flow toward the dust discharge system. Compared to an offline filter that operates at the same air-to-cloth ratio, a filter cleaned with an online process has less cloth surface area.



Our Dual Venturi arrangement optimizes the pressure for bag cleaning, reducing costs

Redecam recommends offline (or semi-offline) cleaning filters for certain applications: when the dust contains very high quantities of fine particulates or if the filter does not act simply as a dust collector, but as a reactor as well, using its bags as a reaction layer.

Our specially designed nozzle creates an intense air jet, concentrating the air flow into the bag and reducing the amount of compressed air required

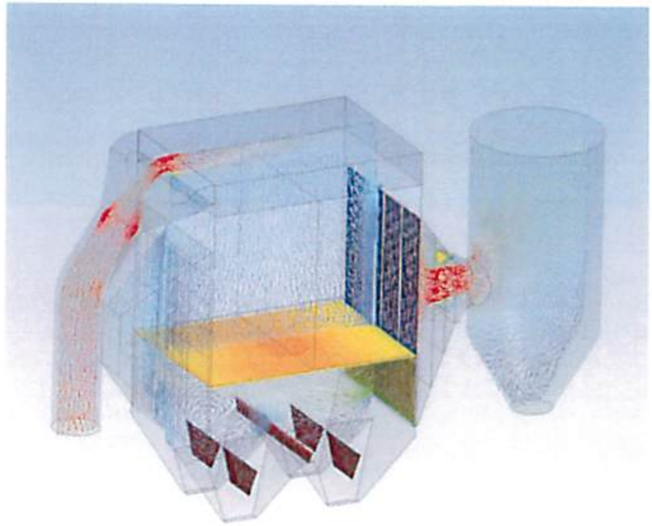
DESIGN & MODELLING

DESIGN PARAMETERS

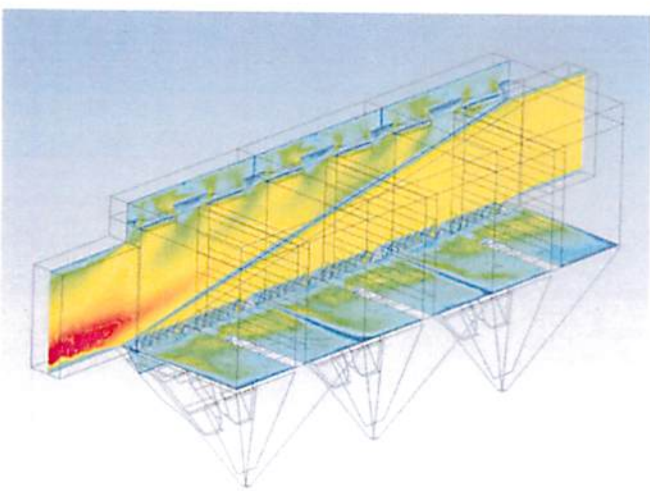
Your process parameters are key in selecting an appropriate Bag Filter design. Our engineering team has 30+ years of experience in surveying the output and needs of various plants, and will study yours to find an appropriate solution to reach your desired emissions reductions.

To determine the appropriate filter size, we must study the air-to-cloth ratio and can velocity. An appropriate air-to-cloth ratio is required to avoid high-speed impact of dust particles against the cloth, as this leads to early bag replacement.

To optimize the can velocity in the Bag Filter compartments, the distance between bags in each row as well as between the rows is calculated and defined for each specific case. These considerations are also used to determine the most suitable bag length and the number of compartments needed.



We develop the highest quality air pollution control products available.



MODELLING

We use Ansys's Fluent software to accurately design and study every solution. This allows us to engineer and analyze each system's broad physical capabilities, optimize the fluid dynamics and study the efficiency of pollutants removal. When a computerized simulation is not sufficient, we undertake a physical simulation on a 1:7 scale in our Milan workshop.

Redecam offers a comprehensive portfolio of air filtration, flue gas treatment (FGT), gas conditioning and transportation, handling & storage products. Please contact us to see how we can take care of all your air pollution control needs.

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TYPICAL DESIGN FOR THE GPINC "READY2GRIND" SYSTEM

Typical design GBFS Handling, Grinding, Storage and Loadout

- **Equipment information: Process Baghouse Filter**

Vendor: Redecam

MECHANICAL DESIGN		
Filter type		2 DPZ 60x10/7-W
Housing design pressure @ 150 °C	daPa	-1200
Type of construction		welded
Housing width	mm	6.932
Housing length	mm	11.944
Clean gas chamber height	mm	850
Hopper type		Trough
Hopper face angle	°	61
Number of compartments		2
Excludable compartments		no
Compartment width	mm	2.284
Compartment lenght	mm	11.944
Gas flow distribution at bag contact		double
CLEANING SYSTEM		
Type of cleaning system		on-line
Cleaning valves		
Valve size		2"
Total valves quantity		120
Quantity of valves each compartment		60
Quantity of bags each valve		10
Compressed air		
Normal compressed air consumption	Nm3/h	70
Maximum compressed air consumption	Nm3/h	174
Compressed air pressure at our mains	bar(g)	5,5
BAGS & CAGES		
Bags		
Fixation system		Snap-ring
Bag material		Polyester/Acrylic
Bag specific weight - nominal	g/m2	600
Treatment		Hydro-Oil Repellent Treatment
Max. operating temperature	°C	125
Bags nominal diameter	mm	127
Bags nominal length	mm	7.000

Total bags quantity		1.200
Cloth area	m2	3.351
Rows of bags per compartment		60
Number of bags per compartment		600
Cages		
Quantity of cage split		2
Number of vertical wires of the cages		12

Fan Specifications

Fan type: VR53S0mH1AK2000

General description			Surface [m²]	Mass [kg]
1	fan with back blade with cleaning opening with condensate drain with suction box with cleaning opening with condensate drain coupling with protection Primary drive motor assembly test run			7.677
2	primary drive			4.200
3	accessories			
3.1	Kompensatoren S1 material three layer PU/Glastextile - PTFE - PTFE/Glastextil A: 1888mm, B: 1048mm, EH: 300mm flow plate material 1.0038 mobile flange material 1.0038			133
3.2	Kompensatoren VD material three layer PU/Glastextile - PTFE - PTFE/Glastextil A: 1580mm, B: 780mm, EH: 200mm flow plate material 1.0038 mobile flange material 1.0038			97
3.3	vibration control VIBREX VIB 5.762 I 2-channel vibration control, 10 m			
3.4	heat control 2 x Pt100, 4-way conductor, with Transmitter E+H TMT 182, 4-			
3.5	Set Anchor bolts			
3.6	additional price flender arpex with spacer			
	Sum			12.107

REDECAMGROUP	Job Nr.	**C118016**	
	Date	**15-Jun-18**	
	Client	**Gebr. Pfeiffer Inc.**	
	Plant	**Penn Mag Inc. - Wilmington (USA)**	
BAG FILTER DATA SHEET	Item	**Mill Bag Filter**	

PROCESS DATA

Operating condition		Operating	Design
Gas flow at the filter inlet @ 0 °C	Nm^3/h	99.573	146.950
Gas flow at the filter inlet	Am^3/h	146.614	232.000
Gas temperature at the filter inlet	°C	95	120
Gas static pressure at filter inlet	mbar	-45	-50
Air-to-cloth ratio	$m^3/m^2/min$	0,73	1,15
Air-to-cloth ratio (N-1)	$m^3/m^2/min$	Not possible	Not possible
Can velocity	m/s	0,74	1,16
Flange-to-flange pressure drop (estimated)	mbar	12	16
Dust load			
Inlet dust load	g/Nm^3	301	374
Inlet dust load	g/Am^3	205	237
Outlet dust load	mg/Nm^3	10	10
Recovered dust	kg/h	30.000	55.000

MECHANICAL DESIGN

Filter type		2 DPZ 60x10/7-W
Housing design pressure @ 150 °C	mbar	-120
Type of construction		welded
Housing width	mm	6.932
Housing length	mm	11.944
Clean gas chamber height	mm	850
Hopper type		Trough
Hopper face angle	°	61
Number of compartments		2
Excludable compartments		no
Compartment width	mm	2.284
Compartment lenght	mm	11.944
Gas flow distribution at bag contact		double

CLEANING SYSTEM

Type of cleaning system		on-line
Cleaning valves		
Valve size		2"
Total valves quantity		120
Quantity of valves each compartment		60
Quantity of bags each valve		10
Compressed air		
Normal compressed air consumption	Nm^3/h	70
Maximum compressed air consumption	Nm^3/h	174
Compressed air pressure at our mains	bar(g)	5,5

BAGS & CAGES

Bags		
Fixation system		Snap-ring
Venturi		no
Bag material		Polyester/Acrylic
Bag specific weight - nominal	g/m^2	600
Treatment		Hydro-Oil Repellent Treatment
Max. operating temperature	°C	125
Bags nominal diameter	mm	127
Bags nominal length	mm	7.000
Total bags quantity		1.200
Cloth area	m^2	3.351
Rows of bags per compartment		60
Number of bags per compartment		600
Cages		
Cage material		Painted Carbon Steel
Quantity of cage split		2
Number of vertical wires of the cages		12

GEBR. PFEIFFER

Penn Mag Inc. – Wilmington (USA)

Mill Bag Filter

Bag Filter Functional Description

Table of Content

1 FOREWORD

This specification concerns the control of the part of plants supplied by Redecam, focused on the filter operations; this document is intended as a guideline to the system, for all the aspects connected to the control and the safe operation of the plant.

This document has to be integrated with:

- Client’s safety procedures
- Client's requirements
- Local operators' practise and procedures
- Process specifications pertinent to areas out of Redecam scope
- Client operative specification

This document shall be read in conjunction with the following documents:

- C118016-1BF1_BF-A5-01 – Bag filter P&ID
- C118016-1AA1_AA-L1-02 – Set points, thresholds and timers list

All the values included in this document, as temperatures, pressures and positions, have to be considered as indicative; details at regard will be delivered separately.

2 BAG FILTER OVERVIEW

The bag filter is designed to remove the particulate content from the flue gases.

A proper tuning of the cleaning system of the filter allows a high filtration efficiency, through the generation of a dust layer on the bags (the “dust cake”), with an acceptable filter pressure drop.
The bag filter is made of the following main items:

1. **Inlet Duct**: distributing and equalizing the flue gases going to the bags.

2. **Filtering bags**: the upper end rests on the bag holding plate through a special sealing system, while the surface is supported by a metal cage located inside the bag. The gas coming from the inlet duct goes through the bag and deposits particulate on the bag external surface; a pneumatic cleaning system removes the dust from the bags, and let it fall in the hoppers.

3. **Hoppers**: hoppers collect the dust falling from the bags. Each hopper can be equipped with a pneumatic operated valve that is used to isolate the filter section, in case the filter is divided in compartments. Hoppers are designed to ensure a proper gas distribution and approach to the bags, in order to limit the upward gas velocity and avoid in the same time dust bridges in the bottom.

4. **Clean gas box (Plenum)**: the clean gas comes out from the upper part of the bag, and reaches the output duct. In case the filter is divided in compartments, each section can be isolated by suitable outlet valves, same we have at the inlet. The distribution ramps of the compressed air used for cleaning are inside the plenum as well.

5. **Bags Cleaning System:** the pressure wave caused by the double ejection system causes both a sudden shake of the bag, and an air flow in the direction opposite to the filtering one. The two combined effects cause the crumbling of the dust layer deposited on the bags and its fall into the hopper.
   The system is composed by:

   - ✓ Air supply with air pressure regulator group
   - ✓ Air collectors, located on the platforms on the filter roof, connected through pneumatic valves to the ramps.
   - ✓ Ramps which blow the compressed air inside each bag.

6. **Control and Cleaning Panel (BF.C):** it sequentially commands the opening of the pneumatic valves, by means of pilot solenoid valves boxes, to supply the compressed air necessary to clean the filter bags. It processes and transmits some operation data (bags differential pressure, gas temperature, filter diagnostic etc.) to the MAIN PLC or Main Control System of the plant.

7. **Outlet Duct**: it collects the gas coming from the filtering bags and directs it to the ID fans

3 DEFINITIONS

TRANSIENTS

Transient is typical a sudden change in the system operation parameters (pressures, temperatures, mass velocities etc.) which shall be kept under control. A transient can be programmed or can happen independently from the operator will.

The following are the typical transients for the installation:

- **Mill start-up**
- **Mill shut down**

When a transient is not foreseen (black-out, fan trip, material feeding cut-off, etc.) can generate dangerous situation for the installation, the so called “emergencies”.

EMERGENCIES

Whenever the system operating parameters (pressures, temperatures, mass velocities etc.) cannot be kept under control the system is in “emergency”.

Most common emergencies are the following:

- **Power Black out**
- **Compressed air failure**
- **Fan trip**

ANOMALOUS SITUATIONS

Sometimes, one or more parameters can be temporarily out of their normal range. However they can be quickly corrected through a suitable action before the situation becomes dangerous. We can speak in these cases of "anomalous situations".

Most common anomalous situations are:

- **High filter temperature**
- **High bags differential pressure**
- **Low compressed air pressure**
- **Hopper blocking**

In these conditions dedicated safety procedure shall be executed to protect the installation.

Auxiliary pieces of equipment failures can cause anomalous situations, but these cases are out of the aim of this document.

4 INSTRUMENT LIST

The instruments listed below are those strictly necessary to control all regulation loops described in this paper; fittings and components such as hand operated valves not involved in the plant control have been omitted.

Equipment/instrument	***Code***	***Description***
Pressure Switch	1BF1.PSL3001	Cleaning Compressed Air Pressure Switch
Diff. Pressure Transmitter	1BF1.DPT1001	Bag Filter Differential Pressure Transmitter
Pressure Transmitters	1BF1.PT1001 (*) 1BF1.PT1002 (*)	Bag Filter Inlet Pressure Transmitter Bag Filter Outlet Pressure Transmitter
Temperature Transmitters	1BF1.TT1001 (*) 1BF1.TT1002 (*)	Bag Filter Inlet Temperature Transmitters Bag Filter Outlet Temperature Transmitter
Triboelectric Probe	1BF1.AT1001	Bag Filter Dust Analyzer
Level Switches	1BF1.LSH1103-1 1BF1.LSH1203-1	Hopper Level Switches
Speed Switches	1BF1.SSL1104 (*) 1BF1.SSL1204 (*) 1BF1.SSL1301 (*) 1BF1.SSL1302 (*) 1BF1.SSL1303 (*)	Screw Conveyor SC1104 (*A59-SC01*) Speed Switch Screw Conveyor SC1204 (*A59-SC02*) Speed Switch Screw Conveyor SC1301 (*A59-SC03*) Speed Switch Rotary Valve SC1302 (*A59-RF01*) Speed Switch Screw Conveyor SC1303 (*A59-SC04*) Speed Switch
ID Fan	(*)	Bag Filter ID Fan

(*) out of Redecam scope of supply

5 CONTROLS

During the normal functioning of the installation there will be two type of regulation:

- **Automatic**: the stop/start commands, open/close and the control loops depend from the process parameters
- **Manual**: the stop/start commands, open/close and the activation/deactivation of the control loops are given by the operators and can be independent from the process parameters

For each equipment, a selector Manual/Automatic shall be realized on the supervisor page permitting the operator to choose the preferred regulating mode.

Normally the manual conduct of the installation is necessary during the start-up and shut-down procedure and in some critical conditions.

To ensure stability to operations, pressure and temperature at BF inlet should be kept under constant watch in order to avoid big fluctuations of these parameters.

Methods to adjust these values are out of REDECAM scope of supply.

6 SPECIAL CONDITIONS

In special conditions, as transients between modes, start-up and stop of parts of the plant suitable procedures must be active.

Temperature, pressure and time values given in the following procedures are based upon previous experiences; for a complete list of all of them from the commissioning phase to the final setting, you can refer to the document C118016-1AA1_AA-L1-02. These values can be subject of corrections afterwards, according to the experience on site. Operators should be particularly careful during the first start up and ready to change any parameter, if necessary.

6.1 Mill Start-Up

At the mill start-up, nothing changes in the described procedures, the temperature control at the bag filter is always active.

6.2 Mill Shut-Down

An unexpected mill shut-down can be normally due to either problems at the mill feeding system, or to trips at the fan or the mill motor.

In such conditions, the temperatures at the bag filter can raise suddenly. All the actions described are the same than the ordinary loops and safety procedures, but some of them can be anticipated, for further safety.

7 SAFETY AUTOMATIC ACTIONS

7.1 High Filter Temperature

The meaning of the bag house inlet and outlet temperature is different:

- The inlet temperature is not directly related to the bags' temperature, because the casing inertia is big and can dump high but short temperature spikes.
- The bag filter outlet temperature is very close to the bags' temperature. If it exceeds the set point, the bags are in a dangerous situation.

For the maximum protection, all the actions will be connected to the maximum temperature at inlet and outlet of the bag filter (*), and we'll call it TBF.

- When TBF exceeds a set value **TBFA**, a warning signal shall be displayed.
- If TBF exceeds the first threshold **TBFH**, alarm signal will rise. The system is not in real danger, but very close to it. Human intervention is required to decrease the temperature.
- If in any condition TBF reaches **TBFHH**, the **BF Fan shall be stopped and the related safety procedure will start**.
- At the opposite, if the temperature at BF inlet has become lower than **TBFL**, the normal controls can be reset.
- The peak conditions (T above TBFH) should not be reached more than 15'/day, otherwise the emergency stop will be requested anyway. An automatic counter should memorize what time TBF lays above TBFH during the last 24h, actuating emergency procedure if it reaches 15min: this info should be displayable.

**Bag Filter inlet and outlet temperature transmitters are out of REDECAM scope of supply.*

7.2 High Bags Differential Pressure

When **1BF1.DPT1001**, is higher than a first threshold (**DPBFH**) an alarm will be displayed ("HIGH DP ON FILTER BAGS") and the following actions shall be taken from the operator:

- Decrease the gas flow to the filter
- Check of the bag filter cleaning system (compressed air pressure, etc.)

If **1BF1.DPT1001** is higher than a second threshold (**DPBFHH**) an alarm will be displayed ("VERY HIGH DP ON FILTER BAGS") and the following actions shall be taken:

- **BF Fan shall be stopped and the related safety procedure will start**
- Filter shall be cleaned without gas stream
- Bag filter condition/status has to be checked

7.3 Low Compressed Air Pressure

If the compressed air pressure **1BF1.PSL3001** is lower than a settable threshold (**PAL**), then an alarm is generated ("LOW COMPRESSED AIR PRESSURE") and the following actions shall be taken from the operator:

- Check of the bag filter cleaning system (regular shooting of the valves, broken valves etc.)
- Check of the compressed air feeding (air leakages, possible overconsumption of other users etc.)
- Lowering of the bags cleaning frequency (manually decreasing the number of cycle/hour, if the Fixed Cleaning Cycle is selected, or by increasing the Δp setpoint, if the Variable Cleaning Cycle is selected)

7.4 Hopper Blocking

The filter dust disposal is based upon a couple of screw conveyors **1BF1.SC1104** and **1BF1.SC1204** in parallel downward the two hoppers banks, followed by one collecting screw conveyor **1BF1.SC1301,** a rotary valve **1BF1.RV1302** and another screw conveyor **1BF1.SC1303**.

- In case the level sensor **1BF1.LSH1103-1** or **1BF1.LSH1203-1** is activated, an alarm shall be displayed ("HIGH LEVEL ON BF HOPPER"). A programmable timer will start. The system will keep working till the timer expires or the LSH alarm condition subsides. If the timer expires with the LSH alarm condition still active the **BF Fan shall be stopped and the related safety procedure will start**

- A motion detector unit detects unexpected transport stoppage of the related transport device (either screw conveyor or rotary valve). In case of unexpected stoppage, all the transports above the failed item shall be stopped

8 EMERGENCIES

8.1 Power Blackout

In case of a black out, the system has to secure the bag house.

The fresh air damper (if any) will be open and the BF Fan will keep the air draft for some time due to its mechanical inertia.

8.2 Compressed Air Failure

In case of compressed air failure, the filter cleaning will be out of service. If the bag differential pressure will become higher than **DPBFHH**, the related safety procedure will start and will require the fan stop.

8.3 ID Fan Trip

In case of BF ID Fan Trip, dust transport shall keep running till bag filter cleaning is deactivated.

9 CLEANING SYSTEM OPERATING PRINCIPLES – PROCESS FILTERS

9.1 Remote or Local Control

The BF.C can be controlled either in REMOTE or in LOCAL mode.

REMOTE mode is the default operational working mode, in which only the MAIN PLC can give the “start” or “stop” to the BF.C.

In this mode, the control on cleaning parameters by local push buttons is disabled.

LOCAL mode shall be used only during maintenance to check in front of the panel all the filter features by trained operator.

LOCAL mode could be MANUAL (for instance, the cleaning cycle is stopped; the energization of single solenoid valves can be done by individual selection), or AUTOMATIC (in which the cleaning cycle sequence is still provided by BF.C, but started by local push button and not by the MAIN PLC).

9.2 Cleaning Modes and Cycles

The sequence of actions that take place during the bags cleaning can change depending on the presence of dusty gas flow towards the bags or not.

– ON-LINE cleaning is defined when the cleaning happens while the gas is streaming into the whole Bag filter.
– OFF-LINE cleaning (NOT APPLICABLE) cleaning is defined when the cleaning happens while the bag is not interested by the dirty gas stream (inlet-outlet dampers closed). This mode is possible only when the filter is divided in compartments excludible at both inlet and outlet.
– SEMI OFF-LINE cleaning (NOT APPLICABLE) cleaning is defined when only the outlet dampers are closed. This mode is possible when the filter is divided in compartments excludible at least at the outlet.

In all cleaning modes, the operator can select between three different cleaning control strategies:

– FIXED CYCLE
– FIXED ON-OFF CYCLE
– VARIABLE CYCLE

Each cleaning mode and cycle type is described here below.

9.2.1 FIXED CYCLE

In this configuration the system works at constant cleaning frequency, stated by the operator.

The operator defines how many times the cleaning cycle should be performed every hour (cycles/h). So the BF.C calculates the time between two consecutive valves excitations of the automatic cleaning sequence.

In any case the cleaning frequency cannot be higher than a maximum value or lower than a minimum value, both settable into the BF.C (see par. 9.2.4).

The following parameters can be set:

	Parameter	Default value
a	Number of cycles/hour (set-point)	4

Parameter a) is usually adjustable by the client's operators. A first reference for commissioning can be the guaranteed value or the filter datasheet value.

9.2.2 FIXED CYCLE ON-OFF

In this configuration the system works at constant cleaning frequency, stated by the operator.

The operator defines how many times the cleaning cycle should be performed every hour. So the BF.C calculates the time between two consecutive valves excitations of the automatic cleaning sequence.

Unlike the previous mode, the cleaning cycle will be activated when bags differential pressure is higher than the value set as start cleaning pressure. The cleaning cycle will be deactivated when bags differential pressure results lower than the value set as end cleaning pressure.

The following parameters can be set:

	Parameter	Default value
a	Start cleaning pressure	15 mbar
b	End cleaning pressure	5 mbar

9.2.3 VARIABLE CYCLE

The operator sets this feature if he wants to keep a defined filter bags differential pressure (set-point value).

The system reads the filter Δp each xx seconds (adjustable time), and compares the measured value with the setpoint value.

When the measured Δp is inside a deadband (adjustable) with respect to the setpoint, the cleaning frequency remains the last one achieved during operation.

If the measured Δp is higher, the system reduce the time between two consecutive valves excitations by an adjustable percentage. It does the opposite in case the measured Δp is lower.

The operator sets also a minimum and a maximum possible cleaning frequency, according to the same criteria described for fixed cycle (see par. 9.2.4).

The following parameters can be set:

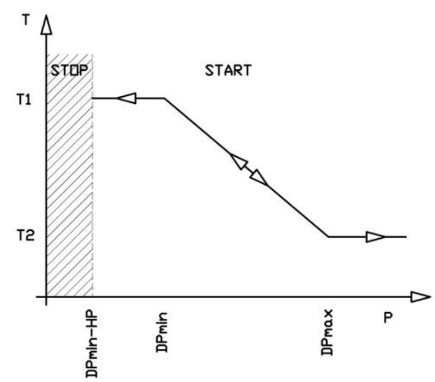
	Parameter	Default value
a	Δp set-point	12 mbar
b	Δp allowed variability range or deadband	± 0.3 mbar
c	Δp checking frequency	20 s
d	Percent variation of the pause time between two shots	3 %

Parameter a) is usually adjustable by the client's operators. A first reference for commissioning can be the guaranteed value or the filter datasheet value.

Parameters b), c) and d) have to be properly tuned during commissioning by Redecam.

Parameter c) in particular must be set considering the number of valves, the actual cleaning frequency and the consequent response time of the system.

b), c) and d) can be adjusted by the client's operators accessing to the system through password.



9.2.4 COMMON ON-LINE CLEANING PARAMETERS

The following parameters are not depending on the cycle modes, and are always valid:

	Parameter	Default value	
a	Maximum number of cycles/hour	10	
b	Minimum number of cycles/hour	2/shift	
c	Compressed air pressure in the collectors	5 bar	
d	Opening time of the valves	2”	Min 100 ms

Parameter a) (max cleaning frequency) is determined case by case depending on the compressed air supply capacity or on the process.

Parameter b) (min cleaning frequency) is driven in principle by the necessity to avoid a sudden and unpredictable discharge by gravity of a huge amount of dust into the transports below the filter, so is depending on the dust quality and on the dust load at the filter inlet. A minimum of one cycle per shift is advisable.

Default value of parameter c) is depending on the bag material (usually max 3.5 bar for fiberglass bags, up to 5.5 bar for other materials). This parameter is regulated acting manually on the pressure regulator at the inlet of the system.

Parameters a) and b) can be modified by client through password.

Parameter d) can be modified only by Redecam on client's demand.

9.2.5 ΔP MEASUREMENT

Unless asked otherwise by the client, as standard the reference Δp for the variable cycle regulation is the flange-to-flange pressure drop of the filter, measured through a dedicated sensor.

Specific configurations coming from "out of standard" filter arrangements have to be discussed case by case.

In case the Δp signal is lost, an alarm is generated.

9.2.6 CLEANING SEQUENCE

The bags cleaning cycle will be performed according to the following logics:

- Petra Cement Plant bag filter is equipped with 4 compressed air collectors, each one consisting of 30 valves.
- The xx valve (xx goes from 1 to 30) is shot simultaneously on each collector.
- On the same collector valves are shot sequentially from valve n.1 to valve n.30.
- It is strongly recommended to draw the scheme of compartments, collectors and valves in order to be sure of the correspondence between logic sequence, P&ID, electrical and mechanical installation.

9.3 Switching from Variable to Fixed Cycle in Emergency

The fixed or variable cleaning condition could be set both from MAIN PLC and on the BF.C.

In case of lost communication between MAIN PLC and BF.C a switch to fixed cleaning cycles condition is mandatory:

- if the BF.C is programmed to recognize the lost of communication, it will automatically switch to the fixed cleaning cycle condition keeping as set-point the last value of cycles per hour and displaying an alarm condition on its screen. An operator will be sent to check if the switch is occurred.
- if the BF.C is not programmed to recognize the lost of communication, an operator has to verify the problem and manually switch to the fixed cleaning cycle condition.

9.4 Bags cleaning after plant shutdown

When the plant is stopped, it can be decided if it is necessary to clean the bags in offline after stop, or to stop immediately the cleaning. The choice is depending on the kind of process, on the quality of the dust, the duration of the outage and the actual conditions of the bags.

A specific functionality is foreseen to cover this need.

When this functionality is enabled:

- the filter cleaning is switched automatically from Variable cycle to Fixed cycle, with a cleaning frequency that must be set by the operator
- the stop of the cleaning is delayed for a settable number of cycles after the stop of the line
- the stop of the dust transports below the filter is also delayed for a settable time after the stop of the cleaning system

9.5 Cleaning system diagnostic

During the cleaning cycle, we have the following alarm functions related to the cleaning system:

- Broken bag n. *xx*

Default values given in the following sections are only indicative. They have to be adjusted by Redecam during commissioning.

9.5.1 BROKEN BAG N. XX

This alarm arrives if, within the time of 1 s (set point) by the opening of the valve, a peak or increase on the dust emission measurement is detected. Emission measurement is done by a triboelectric probe usually installed in the filter outlet duct and connected to the panel.

This alarm must be reset with dedicated "Reset" in the supervision. For alarm transmission, the verification on the same valve will have to be repeated with negative results for at least 3 times consecutively (set point). The "broken bag detection" function can be disabled by supervision.

The valve corresponding to the identified faulty bag will be skipped by the successive cleaning cycles (this function can be disabled on client's demand).

It is anyway recommended to check and replace at the soonest the broken bag in order to avoid further damages to the filter.

Moreover, since the probe is subject to easy fouling and consequent drift of the signal, a threshold is foreseen, above which it is necessary to clean up the probe (always switch off the probe!). An alarm warn the operator about this issue.

Alarm	Settable parameters	Default value
Broken bag n. *xx*	Waiting time from valve opening command	1 s
	Probe fouling threshold	XX mA
	N. of verifications before alarm transmission	3

10 START-UP AND SHUT-DOWN PROCEDURES

This document concerns the start-up procedure of the parts of plant supplied by Redecam.

This document is intended as a guideline to the start-up; details can change depending on the actual contingencies.

10.1 Preliminary Operations

All the plant shall be successfully tested without material (i.e. cold commissioning completed, including check of the start-up sequences and interlocks, and filter solenoid valves correct operation).

Fluorescent powder test must have been successfully performed to the filter.

All tools and all foreign objects must have been removed from all plant machines.

All BF manholes and doors must be closed.

BF protection by fresh air damper (if any) must be active.

Compressed air must be available.

10.2 Start-up Procedure

STEP 0 – PRE-COATING

Start Dust Transport.

If after a settable time the equipment is not detected “IN OPERATION”, an alarm shall be generated and the starting sequence shall be interrupted.

Perform bags pre-coating procedure (*refer to Doc. C118016-1BF1_BF-SR-02*).

At the end of pre-coating, the plant configuration is the following:

- Filter fan in operation indicatively at 50% speed
- Dust transport in operation
- BF cleaning deactivated

STEP 1 – MILL START UP

Once pre-coating is completed, the cement mill can be started up.

STEP 2 – START OF THE BAGS CLEANING

Open the manual valves for air supply of the bag filter compressed air manifolds.

The bag filter cleaning system can be activated in Manual Mode with cleaning set point at 4 cycles/h.

Cleaning air pressure can be set at 5 bar.

STEP 3 – BAGS CLEANING IN VARIABLE MODE

Once stable operating conditions have been reached, filter cleaning in Variable Mode can be started.

10.3 Shut-down Procedure

In case of voluntary shutdown of the line, the customer’s mill shutdown procedure takes place.

The stop of the bag filter cleaning is delayed for a settable number of cycles after the line stop.

Dust transport can be stopped once bag filter cleaning is deactivated.

A. KAYSER TEXTILE FILTERMEDIEN GmbH u. Co. KG

Technical data sheet

Article :	*5038203* series ***SPEZIAL***
Type of filtermedia :	*KYS- needlefelt PES-PAN/PES-PAN*
Fibre : fibre web	*Polyester - Polyacrylnitril, homopolymer*
scrim	*Polyester - Polyacrylnitril, homopolymer*
Treatment :	*BS001 heat set* *BS006 hydrophobic and oleophobic* *BS041 singed, glazed*
Weight [g/m²] : EN 12127	*600*
Air permeability [l/(dm²*min)] EN ISO 9237	*90*
Thickness [mm] : DIN 53855	*2,6*

Tensile strength [daN/5cm], elongation at break [%] :		
vertical	*110*	*20*
ISO 13934-1 horizontal	*135*	*30*

Shrinkage [%] : at 125 °C Kayser-factory specification 001, 10/02	*< 1*
Heat resistance [°C]: permanent	*125*
peak	*140*

All technical data are approximate values. Normal tolerances and technical modifications are kept in reserve.

Preliminary Signals List

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
511-BF01.L01:PLS	LSA	bag filter		fill level measurement				:H	alarm & stop of mill fan		DI	
511-BF01.P01:PLS	PSA	bag filter		pressure measurement	bar	0.2	6	:L	alarm		DI	
511-BF01.P02:H	PDA	bag filter		differential pressure measurement	mbar	-10	100	:H	alarm	-	value calculated in PLC	
511-BF01.P02:PV	PDA	bag filter		differential pressure measurement	mbar	-10	100		analog value	4…20mA	AI	
511-BF01.X01:PLS	XS	bag filter		signal				:H	remote start	NO contact	DI	
511-BF01.X02:RM	XS	bag filter		signal				:H	local/remote mode	NO contact	DO	
511-BF01.X03:RDY	XS	bag filter		signal				:H	control board ready - alarm	NC contact	DO	
511-BF01.X04:D	XS	bag filter		signal				:H	run	NO contact	DO	
511-FV01.X01:X	XS	dedusting filter discharge (511-BF01)		limit position				:L		NO contact	DI	
511-FV01.Y01:Y	YS	dedusting filter discharge (511-BF01)		limit position				:H		NO contact	DI	
511-HP01.W01:PV	WISAC	bin	load cell	signal	t/h	0	18.8		analog value	4…20mA	AI	
511-HP01.W01:N	WISAC	bin	load cell	signal	t/h	0	18.8	:LL	stop weigh belt feeder	-	value calculated in PLC	
511-HP01.W01:L	WISAC	bin	load cell	signal	t/h	0	18.8	:L	alarm at 10% of level	-	value calculated in PLC	
511-HP01.W01:M	WISA	bin	load cell	signal	t/h	0	18.8	:HH	stop filling	-	value calculated in PLC	
511-HP01.W01:H	WISAC	bin	load cell	signal	t/h	0	18.8	:H	alarm at 80% of level	-	value calculated in PLC	
531-BC01.D01:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
531-BC01.D02:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
531-BC01.D03:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
531-BC01.D04:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
531-BC01.D05:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
531-BC01.D06:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
531-BC01.R01:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
531-BC01.R02:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
531-BC01.R03:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
531-BC01.R04:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
531-BC01.S01:PLS	SSA	feed belt		standstill monitoring	Hz			:L	alarm & stop of drive	NO contact	DI	
531-BC01.S02:PV	SIC	feed belt	frequency converter	speed measurement	1/min				analog value	4…20mA	AI	
531-BC01.S03:SP	SETPOINT	feed belt	frequency converter	speed control	1/min				analog value	4…20mA	AO	input by operator in DCS
531-BC01.T01:PLS	TS	feed belt	drive, winding	temperature measurement	°C	0	150	:H	stop of drive	NC contact	DI	evaluation in frequency converter
531-MS01.X01:GR	XS	magnet separator		signal				:H	remote control	NO contact	DO	
531-MS01.X02:D	XS	magnet separator		signal				:H	start electromanet	NO contact	DO	
531-MS01.X03:PLS	XSA	magnet separator		signal				:H	overload relay	NO contact	DI	
531-MS01.X04:PLS	XSA	magnet separator		signal				:H	rotation monitoring	NO contact	DI	
531-MT01.X01:ERR	XSA	metal detector	control	signal				:H	error alarm	NO contact	DI	
531-MT01.X02:PLS	XSA	metal detector	control	signal				:H	metal detected	NO contact	DI	
531-MW01.V01:D	ZS	material gate	solenoid valve	actuator				:H	divert raw material	NC contact	DO	
531-MW01.X01:X	XS	material gate		limit position				:L	changeover to reject receptacle	NO contact	DI	
531-MW01.Y01:Y	XS	material gate		limit position				:H	changeover to mill	NO contact	DI	
531-WF01.D01:F	ZS	weigh belt feeder	belt misalignment switch	limit position				:H	alarm	NC contact	DI	
531-WF01.D02:F	ZS	weigh belt feeder	belt misalignment switch	limit position				:H	alarm	NC contact	DI	
531-WF01.S01:PV	SSA	weigh belt feeder		standstill monitoring	Hz				analog value	4…20mA	AI	
531-WF01.W01:PV	WISA	weigh belt feeder	load cell	signal					analog value	4…20mA	AI	
531-WF01.X01:SP	XS	weigh belt feeder	weighing electronic	signal					setpoint to weigh feeder (%)	Profinet	BUS	
531-WF01.X02:D	XS	weigh belt feeder	weighing electronic	signal				:H	reset signal to clear stored and actual errors	Profinet	BUS	
531-WF01.X03:D	XS	weigh belt feeder	weighing electronic	signal				:H	quantity counter B print/clear	Profinet	BUS	
531-WF01.X04:GR	XS	weigh belt feeder	weighing electronic	signal				:H	remote start (static contact)	Profinet	BUS	
531-WF01.X05:GR	XS	weigh belt feeder	weighing electronic	signal				:H	switch to remote mode	Profinet	BUS	
531-WF01.X06:PV	XS	weigh belt feeder	weighing electronic	signal					capacity (kg/h)	Profinet	BUS	
531-WF01.X07:PV	XS	weigh belt feeder	weighing electronic	signal					counter A (kg)	Profinet	BUS	
531-WF01.X08:PV	XS	weigh belt feeder	weighing electronic	signal					counter B (kg)	Profinet	BUS	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
531-WF01.X09:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	difference between set point and actual capacity it out of limit	Profinet	BUS	
531-WF01.X10:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	tare or test procedure is currently active	Profinet	BUS	
531-WF01.X11:W	XS	weigh belt feeder	weighing electronic	signal				:H	warning (sum signal)	Profinet	BUS	
531-WF01.X12:F	XS	weigh belt feeder	weighing electronic	signal				:H	fault (system not operational)	Profinet	BUS	
531-WF01.X13:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	conveying system stopped (inversely usable as belt runs)	Profinet	BUS	
531-WF01.X14:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	no product at load measurement system	Profinet	BUS	
531-WF01.X15:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	load at g3 < min limit	Profinet	BUS	
531-WF01.X16:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	load at g3 > max limit	Profinet	BUS	
531-WF01.X17:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	belt mis run left	Profinet	BUS	
531-WF01.X18:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	belt mis run right	Profinet	BUS	
531-WF01.X19:PLS	XS	weigh belt feeder	weighing electronic	signal				:H	load cell mV fault channel 0	Profinet	BUS	
531-WF01.X20:PV	XS	weigh belt feeder	weighing electronic	signal					load (%)	Profinet	BUS	
531-WF01.X21:PV	XS	weigh belt feeder	weighing electronic	signal					speed (%)	Profinet	BUS	
531-WP01.S01:PV	SIC	grinding aid pump	frequency converter	speed measurement	%	0	100		analog value	4…20mA	AI	
531-WP01.S02:SP	SETPOINT	grinding aid pump	frequency converter	speed control	%				analog value	4…20mA	AO	input by operator in DCS
531-WP01.T01:M	TS	grinding aid pump	drive, winding	temperature measurement	°C	0	150	:H	stop of drive		-	evaluation in frequency converter
531-WP01.T02:H	TSA	grinding aid pump	stator protector	temperature measurement	°C	0	100	x + 5 :H	alarm	-	value calculated in PLC	x: maximum temperature of medium in summer
531-WP01.T02:M	TSA	grinding aid pump	stator protector	temperature measurement	°C	0	100	x + 10 :HH	stop of drive	-	value calculated in PLC	x: maximum temperature of medium in summer
531-WP01.T02:PV	TSA	grinding aid pump	stator protector	temperature measurement	°C	0	100		analog value	4…20mA	AI	
551-HG01.X01:D	XS	hot gas generator	burner	return signal				:H	enabling burner start	Profinet	BUS	DO
551-HG01.X02:D	XS	hot gas generator	burner	return signal				:H	enabling burner start local	Profinet	BUS	DO
551-HG01.X03:RDY	XS	hot gas generator	burner	return signal				:H	burner ready for operation	Profinet	BUS	DI
551-HG01.X04:PLS	XS	hot gas generator	burner	return signal				:H	burner operation with gas	Profinet	BUS	DI
551-HG01.X05:PLS	XS	hot gas generator	burner	return signal				:H	breaking watching control voltage	Profinet	BUS	DI
551-HG01.X06:PLS	XS	hot gas generator	burner	return signal				:H	Max. temperature limiter 1	Profinet	BUS	DI
551-HG01.X07:PLS	XS	hot gas generator	burner	return signal				:H	Max. temperature limiter 2	Profinet	BUS	DI
551-HG01.X08:PLS	XS	hot gas generator	burner	return signal				:H	burner fault	Profinet	BUS	DI
551-HG01.X09:PLS	XS	hot gas generator	burner	return signal				:H	fault mixed air fan	Profinet	BUS	DI
551-HG01.X10:PLS	XS	hot gas generator	burner	return signal				:H	emergency stop button activated	Profinet	BUS	DI
551-HG01.X11:PLS	XS	hot gas generator	burner	return signal				:H	collective fault	Profinet	BUS	DI
551-HG01.X12:PLS	XS	hot gas generator	burner	return signal				:H	emergency stop escape door panel	Profinet	BUS	DI
551-HG01.X13:PV	ZIRQ	hot gas generator	load position	position monitoring	%	0	100		analog value	Profinet	BUS	AI
551-HG01.X14:PV	XI	hot gas generator	hot gas temperature	temperature measurement	°C	0	400		temperature at mill outlet	Profinet	BUS	AI
551-HG01.X15:SP	XI	hot gas generator	burner	return signal					external setpoint 0-400°C	Profinet	BUS	A0
561-1U10.X01:RDY	XS	mill fan drive	frequency converter	signal					ready - relay	Profinet	BUS	
561-1U10.X02:R	XS	mill fan drive	frequency converter	signal					running	Profinet	BUS	
561-1U10.X03:F	XS	mill fan drive	frequency converter	signal					fault	Profinet	BUS	
561-1U10.X04:PV	XI	mill fan drive	frequency converter	signal					reference voltage	Profinet	BUS	
561-1U10.X05:SP	XI	mill fan drive	frequency converter	signal					speed reference	Profinet	BUS	
561-1U10.X06:PV	XI	mill fan drive	frequency converter	signal					speed	Profinet	BUS	
561-1U10.X07:PV	XI	mill fan drive	frequency converter	signal					current	Profinet	BUS	
561-1U10.X08:D	XS	mill fan drive	frequency converter	signal					start / stop	Profinet	BUS	
561-1U10.X09:D	XS	mill fan drive	frequency converter	signal					forward / reverse	Profinet	BUS	
561-1U10.X10:D	XS	mill fan drive	frequency converter	signal					reset	Profinet	BUS	
561-1U10.X11:D	XS	mill fan drive	frequency converter	signal					ACC / DEC time set	Profinet	BUS	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation Used for Machinery / Equipment	Location	Device (What)	Measurement Unit (Phys)	Span min.	max.	Limit	Function	I/O PLC	I/O PLC	Comment
561-1U10.X12:D	XS	mill fan drive	frequency converter	signal					constant speed 1	Profinet	BUS	
561-1U10.X13:D	XS	mill fan drive	frequency converter	signal					digitalinterlock	Profinet	BUS	
561-1U10.X14:RDY	XS	mill fan drive	frequency converter	signal					ready	Profinet	BUS	
561-1U10.X15:R	XS	mill fan drive	frequency converter	signal					running	Profinet	BUS	
561-1U20.X01:RDY	XS	mill main drive	frequency converter	signal					ready - relay	Profinet	BUS	
561-1U20.X02:R	XS	mill main drive	frequency converter	signal					running	Profinet	BUS	
561-1U20.X03:F	XS	mill main drive	frequency converter	signal					fault	Profinet	BUS	
561-1U20.X04:PV	XI	mill main drive	frequency converter	signal					reference voltage	Profinet	BUS	
561-1U20.X05:SP	XI	mill main drive	frequency converter	signal					spedd reference	Profinet	BUS	
561-1U20.X06:PV	XI	mill main drive	frequency converter	signal					speed	Profinet	BUS	
561-1U20.X07:PV	XI	mill main drive	frequency converter	signal					current	Profinet	BUS	
561-1U20.X08:D	XS	mill main drive	frequency converter	signal					start / stop	Profinet	BUS	
561-1U20.X09:D	XS	mill main drive	frequency converter	signal					forward / reverse	Profinet	BUS	
561-1U20.X10:D	XS	mill main drive	frequency converter	signal					reset	Profinet	BUS	
561-1U20.X11:D	XS	mill main drive	frequency converter	signal					ACC / DEC time set	Profinet	BUS	
561-1U20.X12:D	XS	mill main drive	frequency converter	signal					constant speed 1	Profinet	BUS	
561-1U20.X13:D	XS	mill main drive	frequency converter	signal					digitalinterlock	Profinet	BUS	
561-1U20.X14:RDY	XS	mill main drive	frequency converter	signal					ready	Profinet	BUS	
561-1U20.X15:R	XS	mill main drive	frequency converter	signal					running	Profinet	BUS	
561-1Z10.T01:H	TISA	mill fan motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z10.T01:M	TISA	mill fan motor	winding	temperature measurement	°C	0	...	160 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T01:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T02:H	TISA	mill fan motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z10.T02:M	TISA	mill fan motor	winding	temperature measurement	°C	0	...	160 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T02:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T03:H	TISA	mill fan motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z10.T03:M	TISA	mill fan motor	winding	temperature measurement	°C	0	...	160 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T03:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T04:H	TISA	mill fan motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z10.T04:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T04:M	TISA	mill fan motor	winding	temperature measurement	°C	0	...	160 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T05:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T05:M	TISA	mill fan motor	winding	temperature measurement	°C	0	...	160 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T05:H	TISA	mill fan motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z10.T06:M	TISA	mill fan motor	winding	temperature measurement	°C	0	...	160 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T06:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T06:H	TISA	mill fan motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z10.T07:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T07:M	TISA	mill fan motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T07:H	TISA	mill fan motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-1Z10.T08:PV	TISA	mill fan motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z10.T08:M	TISA	mill fan motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of drive	-	value calculated in PLC	
561-1Z10.T08:H	TISA	mill fan motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-1Z20.T01:M	TISA	mill main motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T01:H	TISA	mill main motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z20.T01:PV	TISA	mill main motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T02:PV	TISA	mill main motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T02:M	TISA	mill main motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T02:H	TISA	mill main motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z20.T03:PV	TISA	mill main motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T03:H	TISA	mill main motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z20.T03:M	TISA	mill main motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T04:M	TISA	mill main motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T04:H	TISA	mill main motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-1Z20.T04:PV	TISA	mill main motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T05:M	TISA	mill main motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T05:PV	TISA	mill main motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T05:H	TISA	mill main motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z20.T06:H	TISA	mill main motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-1Z20.T06:M	TISA	mill main motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T06:PV	TISA	mill main motor	winding	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T07:M	TISA	mill main motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T07:H	TISA	mill main motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-1Z20.T07:PV	TISA	mill main motor	bearing	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T08:H	TISA	mill main motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-1Z20.T08:M	TISA	mill main motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T08:PV	TISA	mill main motor	bearing	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T09:PV	TISA	mill main motor	bearing	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T09:H	TISA	mill main motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-1Z20.T09:M	TISA	mill main motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T10:M	TISA	mill main motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of mill main drive	-	value calculated in PLC	
561-1Z20.T10:PV	TISA	mill main motor	bearing	temperature measurement	°C	0	...		analog value	4...20mA	AI	
561-1Z20.T10:H	TISA	mill main motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-2N01.F01:PV	FIRCA	ducting after filter	control loop D	flow measurement	m³/h	0	400000		analog value	4...20mA (HART)	AI	with local display: characteristic curve (measuring): square root
561-2N01.F01:L	FIRCA	ducting after filter	control loop D	flow measurement	m³/h	0	4000	:L	alarm	-	value calculated in PLC	-
561-2NCM.N01:PV	SIR	gearbox		acceleration sensor						2...20 mA to CMS	-	to CMS
561-2NCM.N02:PV	SIR	gearbox		acceleration sensor						2...20 mA to CMS	-	to CMS
561-2NCM.N03:PV	SIR	gearbox		acceleration sensor						2...20 mA to CMS	-	to CMS
561-2NCM.N04:PV	SIR	gearbox		acceleration sensor						2...20 mA to CMS	-	to CMS
561-2NCM.N05:PV	SIR	gearbox		acceleration sensor						2...20 mA to CMS	-	to CMS
561-2NCM.N06:PV	SIR	gearbox		Vibration Velocity Sensor						2...20 mA to CMS	-	to CMS
561-2NCM.N07:PV	SIR	gearbox		Vibration Velocity Sensor						2...20 mA to CMS	-	to CMS
561-2NCM.S01:PV	SIR	gearbox		speed measurement						0...20mA	-	to CMS
561-2NCM.S02:PV	SIR	gearbox		speed measurement						0...20mA	-	to CMS
561-BC01.D01:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
561-BC01.D02:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
561-BC01.R01:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
561-BC01.R02:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
561-BC01.S01:PLS	SSA	feed belt		standstill monitoring	Hz			:L	alarm & stop of drive	NO contact	DI	
561-BC01.S02:PV	SIC	feed belt		speed measurement	1/min				analog value	4...20mA	AI	
561-BC01.T01:PLS	TS	feed belt	drive, winding	temperature measurement	°C	0	150	:H	stop of drive	NC contact	-	evaluation in frequency converter
561-BC02.D01:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
561-BC02.D02:F	ZS	feed belt	belt misalignment switch	limit position				:H	stop of drive	changeover contact	DI	
561-BC02.R01:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
561-BC02.R02:ILK	HS	feed belt		emergency stop				:H	stop of drive	changeover contact	DI	
561-BC02.S01:PLS	SSA	feed belt		standstill monitoring	Hz			:L	alarm & stop of drive	NO contact	DI	
561-BE01.I01:M	IISA	bucket elevator	MCC	current measurement	A			:HH	stop of drive	-	value calculated in PLC	
561-BE01.I01:PV	IISA	bucket elevator	MCC	current measurement	A				analog value	4...20mA	AI	
561-BE01.I01:H	IISA	bucket elevator	MCC	current measurement	A			:H	alarm	-	value calculated in PLC	
561-BE01.L01:PLS	LSA	bucket elevator	monitoring of spillage at bucket elevator foot	fill level measurement				:H	stop of drive	NC contact	DI	
561-BE01.S01:PLS	SSA	bucket elevator		standstill monitoring	1/min			20 :L	stop of drive	NC contact	DI	
561-BE01.S02:PLS	SSA	bucket elevator		standstill monitoring	1/min			2 :H	stop of drive	NC contact	DI	
561-BE01.S03:PLS	SSA	bucket elevator		standstill monitoring	1/min			:L	stop of drive	NC contact	DI	
561-BF10.L01:PLS	LSA	bag filter		fill level measurement				:H	alarm & stop of mill fan	changeover contact	DI	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	max.					
561-BF10.L02:PLS	LSA	bag filter		fill level measurement				:H	alarm & stop of mill fan	changeover contact	DI	
561-BF10.P01:PLS	PSA	bag filter	compressed air supply	pressure measurement	bar	0.2	6	:L		changeover contact	DI	
561-BF10.P02:H	PDSA	bag filter		differential pressure measurement	mbar	-10	100			-	value calculated in PLC	
561-BF10.P02:PV	PDSA	bag filter		differential pressure measurement	mbar	-10	100		analog value	4...20mA	AI	
561-BF10.X01:PLS	XS	bag filter	control	signal					start	NC contact	DI	
561-BF10.X02:D	XS	bag filter	control	signal					run	NC contact	DO	
561-BF10.X03:D	XS	bag filter	control	signal					alarm	NO contact	DO	
561-FA01.I01:L	IISA	seal air fan	MCC	current measurement	A	0	...	:L	stop of classifier and mill	-	value calculated in PLC	switching point about 25% below nominal current of motor, precise setting during commissioning
561-FA01.I01:H	IISA	seal air fan	MCC	current measurement	A	0	...	:H	stop of classifier and mill	-	value calculated in PLC	switching point about 25% above nominal current of motor, precise setting during commissioning
561-FA01.I01:PV	IISA	seal air fan	MCC	current measurement	A	0	...		analog value	4...20mA	AI	
561-FA01.P01:PV	PISA	seal air ducting	grinding roller 1	pressure measurement	mbar	0	100		analog value	4...20mA	AI	
561-FA01.P01:L	PISA	seal air ducting	grinding roller 1	pressure measurement	mbar	0	100	:L	0.7 x preset pressure = alarm	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.P01:N	PISA	seal air ducting	grinding roller 1	pressure measurement	mbar	0	100	:LL	0.5 x preset pressure = stop of classifier & mill	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.P02:PV	PISA	seal air ducting	grinding roller 2	pressure measurement	mbar	0	100		analog value	4...20mA	AI	
561-FA01.P02:N	PISA	seal air ducting	grinding roller 2	pressure measurement	mbar	0	100	:LL	0.5 x preset pressure = stop of classifier & mill	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.P02:L	PISA	seal air ducting	grinding roller 2	pressure measurement	mbar	0	100	:L	0.7 x preset pressure = alarm	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.P03:N	PISA	seal air ducting	grinding roller 3	pressure measurement	mbar	0	100	:LL	0.5 x preset pressure = stop of classifier & mill	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.P03:L	PISA	seal air ducting	grinding roller 3	pressure measurement	mbar	0	100	:L	0.7 x preset pressure = alarm	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.P03:PV	PISA	seal air ducting	grinding roller 3	pressure measurement	mbar	0	100		analog value	4...20mA	AI	
561-FA01.P04:L	PISA	seal air ducting	grinding roller 4	pressure measurement	mbar	0	100	:L	0.7 x preset pressure = alarm	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.P04:PV	PISA	seal air ducting	grinding roller 4	pressure measurement	mbar	0	100		analog value	4...20mA	AI	
561-FA01.P04:N	PISA	seal air ducting	grinding roller 4	pressure measurement	mbar	0	100	:LL	0.5 x preset pressure = stop of classifier & mill	-	value calculated in PLC	preset pressure to be determined during commissioning
561-FA01.T01:PLS	TS	seal air fan	winding	temperature measurement	°C			:H	stop of drive		-	evaluation by customer
561-FN10.N01:PV	N	mill fan	vibration at locating bearing	vibration measurement	mm/s	0	20			mm/s	-	vertical vibration velocity sensor: evaluation in vibrocontrol
561-FN10.N02:PV	N	mill fan	vibraion at mobile bearing	vibration measurement	mm/s	0	20			mm/s	-	vertical vibration velocity sensor: evaluation in vibrocontrol
561-FN10.T01:H	TISA	mill fan	bearing	temperature measurement	°C	-20	160	95 :H	alarm	-	value calculated in PLC	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-FN10.T01:PV	TISA	mill fan	bearing	temperature measurement	°C	-20	160		analog value	4…20mA	AI	
561-FN10.T01:M	TISA	mill fan	bearing	temperature measurement	°C	-20	160	115 :HH	stop of drive	-	value calculated in PLC	
561-FN10.T02:PV	TISA	mill fan	bearing	temperature measurement	°C	-20	160		analog value	4…20mA	AI	
561-FN10.T02:H	TISA	mill fan	bearing	temperature measurement	°C	-20	160	95 :H	alarm	-	value calculated in PLC	
561-FN10.T02:M	TISA	mill fan	bearing	temperature measurement	°C	-20	160	115 :HH	stop of drive	-	value calculated in PLC	
561-FN10.X01:RDY	XSA	mill fan	vibration measuring device	signal				:H	Vibrocontrol ready for operation (OK relay - sensor 1)	NO contact	DI	
561-FN10.X02:PLS	XSA	mill fan	vibration measuring device	signal				:H	alarm - sensor 1	NC contact	DI	
561-FN10.X03:RDY	XSA	mill fan	vibration measuring device	signal				:H	Vibrocontrol ready for operation (OK relay - sensor 2)	NO contact	DI	
561-FN10.X04:PLS	XSA	mill fan	vibration measuring device	signal				:H	alarm - sensor 2	NC contact	DI	
561-FN10.X05:PV	XIR	mill fan	vibration measuring device	signal	mm/s	0	20		analog value	4…20mA	AI	
561-FN10.X05:H	XIR	mill fan	vibration measuring device	signal	mm/s	0	20	4.5 :H	alarm	-	value calculated in PLC	
561-FN10.X05:M	XIR	mill fan	vibration measuring device	signal	mm/s	0	20	7.1 :HH	stop of drive	-	value calculated in PLC	
561-FN10.X06:H	XIR	mill fan	vibration measuring device	signal	mm/s	0	20	4.5 :H	alarm	-	value calculated in PLC	
561-FN10.X06:M	XIR	mill fan	vibration measuring device	signal	mm/s	0	20	7.1 :HH	stop of drive	-	value calculated in PLC	
561-FN10.X06:PV	XIR	mill fan	vibration measuring device	signal	mm/s	0	20		analog value	4…20mA	AI	
561-FV02.Z01:PLS	ZSA	two-flap gate lock		standstill monitoring				:L	alarm	NO contact	DI	
561-GB01.N01:PV	N	mill	gearbox base plate	vibration measurement	mV/mm/s					mV	-	vertical vibration velocity sensor: evaluation in vibrocontrol
561-GB01.T01:PV	TIS	gearbox	gearbox sump	temperature measurement	°C	0	200		analog value	4…20mA	AI	
561-GB01.T01:M	TIS	gearbox	gearbox sump	temperature measurement	°C	0	200	20 :HH	stop of cartridge heaters (2.6/1 - 2.6/4)	-	value calculated in PLC	
561-GB01.T01:L	TIS	gearbox	gearbox sump	temperature measurement	°C	0	200	15 :L	start of cartridge heaters (2.6/1 - 2.6/4)	-	value calculated in PLC	
561-GB01.T01:H	TIS	gearbox	gearbox sump	temperature measurement	°C	0	200	5 :H	release start of LP pump (3.2) and cartridge heater (2.6/1 - 2.6/4)	-	value calculated in PLC	
561-GB01.T02:HH	TIRSA	gearbox	segmented thrust bearing	temperature measurement	°C	0	200	70 :HH	alarm	-	value calculated in PLC	
561-GB01.T02:H	TIRSA	gearbox	segmented thrust bearing	temperature measurement	°C	0	200	15 :H	release start mill main drive	-	value calculated in PLC	
561-GB01.T02:M	TIRSA	gearbox	segmented thrust bearing	temperature measurement	°C	0	200	75 :HHH	stop of mill main drive	-	value calculated in PLC	
561-GB01.T02:PV	TIRSA	gearbox	segmented thrust bearing	temperature measurement	°C	0	200		analog value	4…20mA	AI	
561-GB01.T03:PV	TIRSA	gearbox	segmented thrust bearing sump	temperature measurement	°C	0	200		analog value	4…20mA	AI	
561-GB01.T03:M	TIRSA	gearbox	segmented thrust bearing sump	temperature measurement	°C	0	200	65 :HH	stop of mill main drive	-	value calculated in PLC	
561-GB01.T03:H	TIRSA	gearbox	segmented thrust bearing sump	temperature measurement	°C	0	200	60 :H	alarm	-	value calculated in PLC	
561-GB01.T04:PLS	TSA	gearbox	cartridge heater	temperature measurement	°C	0	140	40 :H	stop of cartridge heaters (2.6/1 - 2.6/4)	NO contact	DI	
561-GB01.T05:H	TS	mill maintenance drive	winding	temperature measurement	°C			:H	stop of maintenance drive		2), DI	included in maintenance drive, evaluation in customer's MCC
561-GB01.X01:RDY	XS	mill	vibration measuring device	vibration measurement				:H	Vibrocontrol ready for operation (OK relay)	NO contact	DI	
561-GB01.X02:PLS	NSA	mill	vibration measuring device	vibration measurement	mm/s	0	10	:HH	preset value + 0.8 mm/s = stop of mill main drive	NC contact	DI	preset value to be determined during commissioning
561-GB01.X03:PLS	NSA	mill	vibration measuring device	vibration measurement	mm/s	0	10	:H	preset value + 0.5 mm/s = alarm	NC contact	DI	preset value to be determined during commissioning
561-GB01.X04:PV	NIR	mill	vibration measuring device	vibration measurement	mm/s	0	10		analog value	4…20mA	AI	
561-GB01.Z01:PLS	ZS	mill maintenance drive	chain	position monitoring				:H	release start mill main drive	NC contact	DI	
561-HS01.L01:PLS	LSA	hydraulic tension system	oil tank	fill level measurement	mm	0	390	205 :L	alarm	NC contact	-	
561-HS01.L02:PLS	LSA	hydraulic tension system	oil tank	fill level measurement	mm	0	390	266 :LL	no start release for mill main drive and oil pump (50)	NC contact	-	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span						
						min.	max.					
561-HS01.P01:PLS	PDA	hydraulic tension system	filter contamination indication	differential pressure measurement	bar			:H	alarm	NC contact	-	
561-HS01.P02:PLS	PDA	hydraulic tension system	filter contamination indication	differential pressure measurement	bar			:H	alarm	NC contact	-	
561-HS01.P03:LL	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 1/3	pressure measurement	bar	0	450	:LL	alarm	-	-	
561-HS01.P03:H	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 1/3	pressure measurement	bar	0	450	:H	stop of oil pump (50)	-	-	
561-HS01.P03:L	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 1/3	pressure measurement	bar	0	450	:L	start of oil pump (50)	-	-	
561-HS01.P03:N	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 1/3	pressure measurement	bar	0	450	:LLL	stop of mill main drive	-	-	
561-HS01.P04:L	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 2/4	pressure measurement	bar	0	450	:L	start of oil pump (50)	-	-	
561-HS01.P04:N	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 2/4	pressure measurement	bar	0	450	:LLL	stop of mill main drive	-	-	evaluation at SUB-PLC
561-HS01.P04:LL	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 2/4	pressure measurement	bar	0	450	:LL	alarm	-	-	
561-HS01.P04:H	PIRCSA	hydraulic tension system	operating pressure - tensioning grinding rollers 2/4	pressure measurement	bar	0	450	:H	stop of oil pump (50)	-	-	
561-HS01.P05:M	PIRSA	hydraulic tension system	lifting pressure grinding roller 1	pressure measurement	bar	0	450	:HHH	stop of oil pump (50)	-	-	
561-HS01.P05:L	PIRSA	hydraulic tension system	lifting pressure grinding roller 1	pressure measurement	bar	0	450	:L	changeover to tensioning mode after lowering of grinding rollers	-	-	
561-HS01.P05:H	PIRSA	hydraulic tension system	lifting pressure grinding roller 1	pressure measurement	bar	0	450	:H	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P05:HH	PIRSA	hydraulic tension system	lifting pressure grinding roller 1	pressure measurement	bar	0	450	:HH	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P06:M	PIRSA	hydraulic tension system	lifting pressure grinding roller 2	pressure measurement	bar	0	450	:HHH	stop of oil pump (50)	-	-	
561-HS01.P06:L	PIRSA	hydraulic tension system	lifting pressure grinding roller 2	pressure measurement	bar	0	450	:L	changeover to tensioning mode after lowering of grinding rollers	-	-	
561-HS01.P06:H	PIRSA	hydraulic tension system	lifting pressure grinding roller 2	pressure measurement	bar	0	450	:H	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P06:HH	PIRSA	hydraulic tension system	lifting pressure grinding roller 2	pressure measurement	bar	0	450	:HH	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P07:H	PIRSA	hydraulic tension system	lifting pressure grinding roller 3	pressure measurement	bar	0	450	:H	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P07:M	PIRSA	hydraulic tension system	lifting pressure grinding roller 3	pressure measurement	bar	0	450	:HHH	stop of oil pump (50)	-	-	
561-HS01.P07:L	PIRSA	hydraulic tension system	lifting pressure grinding roller 3	pressure measurement	bar	0	450	:L	changeover to tensioning mode after lowering of grinding rollers	-	-	
561-HS01.P07:HH	PIRSA	hydraulic tension system	lifting pressure grinding roller 3	pressure measurement	bar	0	450	:HH	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P08:M	PIRSA	hydraulic tension system	lifting pressure grinding roller 4	pressure measurement	bar	0	450	:HHH	stop of oil pump (50)	-	-	
561-HS01.P08:HH	PIRSA	hydraulic tension system	lifting pressure grinding roller 4	pressure measurement	bar	0	450	:HH	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P08:H	PIRSA	hydraulic tension system	lifting pressure grinding roller 4	pressure measurement	bar	0	450	:H	stop of oil pump (50), lifting in maintenance operation	-	-	
561-HS01.P08:L	PIRSA	hydraulic tension system	lifting pressure grinding roller 4	pressure measurement	bar	0	450	:L	changeover to tensioning mode after lowering of grinding rollers	-	-	
561-HS01.P09:H	PIRCSA	hydraulic tension system	lifting pressure	pressure measurement	bar	0	450	:H	stop of oil pump (400)	-	-	
561-HS01.X01:WD	XS	hydraulic tension system	SUB-PLC	signal				:H	watchdog PROFIBUS: cyclic pulses	Profinet	BUS	2s="1", 2s="0"; no pulses = alarm
561-HS01.X02:D	XS	hydraulic tension system	SUB-PLC	signal				:H	alarm reset at Sub-PLC	Profinet	BUS	pulse 3s; 0-1-0
561-HS01.X03:W	XS	hydraulic tension system	SUB-PLC	signal				:H	start "start-up warning"	Profinet	BUS	"1" = on; "0" = off
561-HS01.X04:R	XS	hydraulic tension system	SUB-PLC	signal				:H	oil supply (group 40) is running	Profinet	BUS	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-HS01.X05:R	XS	hydraulic tension system	SUB-PLC	signal				:H	mill main drive is running	Profinet	BUS	"1" = on; "0" = off
561-HS01.X06:D	XS	hydraulic tension system	SUB-PLC	signal				:H	start "lower the grinding rollers"	Profinet	BUS	pulse 3s; 0-1-0
561-HS01.X07:D	XS	hydraulic tension system	SUB-PLC	signal				:H	start/stop hydraulic tension system (group 50)	Profinet	BUS	"1" = start; "0" = stop
561-HS01.X08:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	watchdog PROFIBUS: cyclic pulses	Profinet	BUS	2s="1", 2s="0"; no pulses = stop of mill main drive
561-HS01.X09:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	fuse of control voltage tripped 24VDC	Profinet	BUS	"1"= OK; "0"=fault; stop of mill main drive
561-HS01.X10:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	fuse of valve voltage tripped at Sub-PLC cabinet	Profinet	BUS	"1"= OK; "0"=fault; stop of mill main drive
561-HS01.X11:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	emergency stop activated	Profinet	BUS	"1"= OK; "0"=fault; stop of mill main drive
561-HS01.X12:W	XS	hydraulic tension system	SUB-PLC	signal				:H	start-up warning running	Profinet	BUS	"1"=on; "0"=off"
561-HS01.X13:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	Sub-PLC in automatic mode	Profinet	BUS	"1"=auto mode
561-HS01.X14:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	Sub-PLC in manual mode	Profinet	BUS	"1"= manually
561-HS01.X15:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	maintenance mode selected	Profinet	BUS	
561-HS01.X16:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	collective alarm at Sub-PLC	Profinet	BUS	"1"= OK; "0"=fault
561-HS01.X17:RDY	XS	hydraulic tension system	SUB-PLC	signal				:H	SUB-PLC ready for operation	Profinet	BUS	"1"= ready
561-HS01.X18:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	grinding rollers are lowered	Profinet	BUS	
561-HS01.X19:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	grinding rollers are lifted	Profinet	BUS	
561-HS01.X20:R	XS	hydraulic tension system	SUB-PLC	signal				:H	group 50 is running	Profinet	BUS	"1"=running; "0"=not running
561-HS01.X21:R	XS	hydraulic tension system	SUB-PLC	signal				:H	lowering the grinding rollers active and mill main drive running	Profinet	BUS	("1"=lowering active); indication
561-HS01.X22:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	tensioning pressure 1+3 P1<MIN while lowering	Profinet	BUS	"1"=OK; "0"=alarm, stop of mill main drive
561-HS01.X23:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	tensioning pressure 2+4 P2<MIN while lowering	Profinet	BUS	"1"=OK; "0"=alarm, stop of mill main drive
561-HS01.X24:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	fuse of control voltage tripped 230VAC	Profinet	BUS	"1"= OK; "0"=fault; stop of mill main drive
561-HS01.X25:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	tensioning pressure 1+3 P1<MIN during grinding operation	Profinet	BUS	"1"=OK; "0"=alarm
561-HS01.X26:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	tensioning pressure 2+4 P2<MIN during grinding operation	Profinet	BUS	"1"=OK; "0"=alarm
561-HS01.X27:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	tensioning pressure 1+3 P1<MIN MIN during grinding operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X28:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	tensioning pressure 2+4 P2<MIN MIN during grinding operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X29:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lifting pressure roller 1 P3>MAX MAX MAX	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X30:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lifting pressure roller 2 P4>MAX MAX MAX	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X31:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lifting pressure roller 3 P5>MAX MAX MAX	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X32:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lifting pressure roller 4 P6>MAX MAX MAX	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X33:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	rollers are lifted longer than 1 hour	Profinet	BUS	
561-HS01.X34:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	plug for normal operation missing -X31B	Profinet	BUS	stop of mill main drive
561-HS01.X35:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	oil level > MIN	Profinet	BUS	"1"=OK; "0"=alarm; alarm
561-HS01.X36:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	oil level > MIN MIN	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-HS01.X37:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	differential pressure filter >= MAX	Profinet	BUS	"1"=OK; "0"=alarm; alarm
561-HS01.X38:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	grinding roller 1: stop lifting; emergency stop	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X39:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	grinding roller 2: stop lifting; emergency stop	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X40:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	grinding roller 3: stop lifting; emergency stop	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X41:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	grinding roller 4: stop lifting; emergency stop	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X42:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X43:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X44:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X45:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X46:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X47:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X48:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X49:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X50:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X51:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X52:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X53:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X54:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X55:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X56:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X57:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4: NOT in position mill operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X58:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X59:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: position service mode (indication limit)	Profinet	BUS	
561-HS01.X60:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X61:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: position service mode (indication limit)	Profinet	BUS	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-HS01.X62:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X63:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: position service mode (indication limit)	Profinet	BUS	
561-HS01.X64:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X65:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: position service mode (indication limit)	Profinet	BUS	
561-HS01.X66:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X67:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: position service mode (indication limit)	Profinet	BUS	
561-HS01.X68:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X69:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: position service mode (indication limit)	Profinet	BUS	
561-HS01.X70:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X71:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: position service mode (indication limit)	Profinet	BUS	
561-HS01.X72:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: position mill operation (indication limit)	Profinet	BUS	
561-HS01.X73:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: position service mode (indication limit)	Profinet	BUS	
561-HS01.X74:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1 (cylinder bottom): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X75:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1 (cylinder bottom): position service mode (indication limit)	Profinet	BUS	
561-HS01.X76:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2 (cylinder bottom): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X77:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2 (cylinder bottom): position service mode (indication limit)	Profinet	BUS	
561-HS01.X78:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3 (cylinder bottom): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X79:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3 (cylinder bottom): position service mode (indication limit)	Profinet	BUS	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-HS01.X80:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4 (cylinder bottom): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X81:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4 (cylinder bottom): position service mode (indication limit)	Profinet	BUS	
561-HS01.X82:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1 (cylinder rod side): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X83:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1 (cylinder rod side): position service mode (indication limit)	Profinet	BUS	
561-HS01.X84:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2 (cylinder rod side): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X85:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2 (cylinder rod side): position service mode (indication limit)	Profinet	BUS	
561-HS01.X86:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3 (cylinder rod side): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X87:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3 (cylinder rod side): position service mode (indication limit)	Profinet	BUS	
561-HS01.X88:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4 (cylinder rod side): position mill operation (indication limit)	Profinet	BUS	
561-HS01.X89:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4 (cylinder rod side): position service mode (indication limit)	Profinet	BUS	
561-HS01.X90:R	XS	hydraulic tension system	SUB-PLC	signal				:H	hydraulic pump running	Profinet	BUS	"1" = on; "0" = off; display
561-HS01.X91:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	fault hydraulic pump	Profinet	BUS	"1"= OK; "0"=fault; stop of mill main drive
561-HS01.X92:R	XS	hydraulic tension system	SUB-PLC	signal				:H	flushing pump running	Profinet	BUS	"1"=on; "0"=off"; display
561-HS01.X93:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	fault flushing pump	Profinet	BUS	
561-HS01.X94:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (140.3)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X96:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (130.2)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X97:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (130.3)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X98:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (130.4)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X99:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (131.1)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X100:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (131.2)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X101:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (140.1)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X102:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (140.2)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X103:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (360.1)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X104:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (360.2)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X105:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (360.3)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X106:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	solenoid valve open (360.4)	Profinet	BUS	"1"=open; "0"=closed
561-HS01.X107:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	maintenance operation: plug is plugged	Profinet	BUS	"1"= plugged
561-HS01.X108:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-HS01.X109:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 1: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X110:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X111:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 2: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X112:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X113:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 3: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X114:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X115:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	lock swing out grinding roller 4: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X116:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X117:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 1: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X118:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X119:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 2: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X120:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X121:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 3: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X122:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X123:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	shut off grinding roller 4: NOT in position maintenance operation	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X124:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	roller 1 maintenance operation: NOT in position "swung out"	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X125:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	roller 2 maintenance operation: NOT in position "swung out"	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X126:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	roller 3 maintenance operation: NOT in position "swung out"	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X127:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	roller 4 maintenance operation: NOT in position "swung out"	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X128:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	rollers unequal during lowering (1+3)	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X129:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	rollers unequal during lowering (2+4)	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X130:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement tensioning pressure - P > MAX MAX grinding rollers 1+3	Profinet	BUS	"1"=OK; "0"=alarm;

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-HS01.X131:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement tensioning pressure - P > MAX MAX grinding rollers 2+4	Profinet	BUS	"1"=OK; "0"=alarm;
561-HS01.X132:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement tensioning pressure - wire-break grinding rollers 1+3	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X133:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement tensioning pressure - wire-break grinding rollers 2+4	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X134:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement lifting pressure - wire-break roller 1	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X135:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement lifting pressure - wire-break roller 2	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X136:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement lifting pressure - wire-break roller 3	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X137:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	pressure measurement lifting pressure - wire-break roller 4	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X138:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	position measurement - wire-break cylinder 1	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X139:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	position measurement - wire-break cylinder 2	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X140:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	position measurement - wire-break cylinder 3	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.X141:PLS	XS	hydraulic tension system	SUB-PLC	signal				:H	position measurement - wire-break cylinder 4	Profinet	BUS	"1"=OK; "0"=alarm; stop of mill main drive
561-HS01.Z01:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 1	limit position				:H	stop lifting grinding roller 1	NO contact	-	evaluation at SUB-PLC
561-HS01.Z02:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 2	limit position				:H	stop lifting grinding roller 2	NO contact	-	evaluation at SUB-PLC
561-HS01.Z03:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 3	limit position				:H	stop lifting grinding roller 3	NO contact	-	evaluation at SUB-PLC
561-HS01.Z04:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 4	limit position				:H	stop lifting grinding roller 4	NO contact	-	evaluation at SUB-PLC
561-HS01.Z05:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 1, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z06:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 1, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z07:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 2, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z08:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 2, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z09:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 3, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z10:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 3, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z11:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 4, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z12:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 4, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z13:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 1, bottom, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z14:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 1, bottom, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z15:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 2, bottom, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z16:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 2, bottom, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z17:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 3, bottom, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z18:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 3, bottom, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z19:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 4, bottom, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z20:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 4, bottom, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span						
						min.	max.					
561-HS01.Z21:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 1, rod side, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z22:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 1, rod side, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z23:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 2, rod side, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z24:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 2, rod side, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z25:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 3, rod side, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z26:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 3, rod side, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z27:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 4, rod side, ball cock	limit position				:H	release grinding operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z28:PLS	ZS	hydraulic tension system	hydraulic tension cylinder 4, rod side, ball cock	limit position				:H	release maintenance operation	NO contact	-	evaluation at SUB-PLC
561-HS01.Z29:PLS	ZS	hydraulic tension system	flushing pump	limit position				:H	open	NO contact	-	evaluation at SUB-PLC
561-HS01.Z30:PLS	ZS	hydraulic tension system	flushing pump	limit position				:H	close	NO contact	-	evaluation at SUB-PLC
561-HS01.Z31:HH	ZISA	hydraulic tension system	roller arm 1	position measurement	mm	-135	240	:HH	stop lifting 1	-	-	evaluation at SUB-PLC
561-HS01.Z31:HHHH	ZISA	hydraulic tension system	roller arm 1	position measurement	mm	-135	240	:HHHH	stop lifting 2	-	-	evaluation at SUB-PLC
561-HS01.Z31:H	ZISA	hydraulic tension system	roller arm 1	position measurement	mm	-135	240	:H	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z31:M	ZISA	hydraulic tension system	roller arm 1	position measurement	mm	-135	240	:HHHHH	grinding roller swung out	-	-	evaluation at SUB-PLC
561-HS01.Z31:L	ZISA	hydraulic tension system	roller arm 1	position measurement	mm	-135	240	:L	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z31:HHH	ZISA	hydraulic tension system	roller arm 1	position measurement	mm	-135	240	:HHH	raised and secured	-	-	evaluation at SUB-PLC
561-HS01.Z32:M	ZISA	hydraulic tension system	roller arm 2	position measurement	mm	-135	240	:HHHHH	grinding roller swung out	-	-	evaluation at SUB-PLC
561-HS01.Z32:HHH	ZISA	hydraulic tension system	roller arm 2	position measurement	mm	-135	240	:HHH	raised and secured	-	-	evaluation at SUB-PLC
561-HS01.Z32:L	ZISA	hydraulic tension system	roller arm 2	position measurement	mm	-135	240	:L	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z32:H	ZISA	hydraulic tension system	roller arm 2	position measurement	mm	-135	240	:H	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z32:HH	ZISA	hydraulic tension system	roller arm 2	position measurement	mm	-135	240	:HH	stop lifting 1	-	-	evaluation at SUB-PLC
561-HS01.Z32:HHHH	ZISA	hydraulic tension system	roller arm 2	position measurement	mm	-135	240	:HHHH	stop lifting 2	-	-	evaluation at SUB-PLC
561-HS01.Z33:HH	ZISA	hydraulic tension system	roller arm 3	position measurement	mm	-135	240	:HH	stop lifting 1	-	-	evaluation at SUB-PLC
561-HS01.Z33:H	ZISA	hydraulic tension system	roller arm 3	position measurement	mm	-135	240	:H	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z33:L	ZISA	hydraulic tension system	roller arm 3	position measurement	mm	-135	240	:L	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z33:HHHH	ZISA	hydraulic tension system	roller arm 3	position measurement	mm	-135	240	:HHHH	stop lifting 2	-	-	evaluation at SUB-PLC
561-HS01.Z33:M	ZISA	hydraulic tension system	roller arm 3	position measurement	mm	-135	240	:HHHHH	grinding roller swung out	-	-	evaluation at SUB-PLC
561-HS01.Z33:HHH	ZISA	hydraulic tension system	roller arm 3	position measurement	mm	-135	240	:HHH	raised and secured	-	-	evaluation at SUB-PLC
561-HS01.Z34:H	ZISA	hydraulic tension system	roller arm 4	position measurement	mm	-135	240	:H	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z34:M	ZISA	hydraulic tension system	roller arm 4	position measurement	mm	-135	240	:HHHHH	grinding roller swung out	-	-	evaluation at SUB-PLC
561-HS01.Z34:L	ZISA	hydraulic tension system	roller arm 4	position measurement	mm	-135	240	:L	alarm	-	-	evaluation at SUB-PLC
561-HS01.Z34:HHHH	ZISA	hydraulic tension system	roller arm 4	position measurement	mm	-135	240	:HHHH	stop lifting 2	-	-	evaluation at SUB-PLC
561-HS01.Z34:HH	ZISA	hydraulic tension system	roller arm 4	position measurement	mm	-135	240	:HH	stop lifting 1	-	-	evaluation at SUB-PLC
561-HS01.Z34:HHH	ZISA	hydraulic tension system	roller arm 4	position measurement	mm	-135	240	:HHH	raised and secured	-	-	evaluation at SUB-PLC
561-IJ01.F01:PV	FICSA	water injection	water ducting	flow measurement	m³/h	0	5		analog value	4…20mA (HART)	AI	
561-IJ01.F01:L	FICSA	water injection	water ducting	flow measurement	m³/h	0	5	0.1 :L	stop of water injection pump	-	value calculated in PLC	
561-IJ01.P01:PLS	PA	water injection	water ducting	pressure measurement	bar	0.6	10	1 :L	alarm	NC contact	DI	
561-IJ01.P02:PLS	PA	water injection	pressed air ducting	pressure measurement	bar	0.6	10	3 :L	alarm	NC contact	DI	
561-IJ01.V01:D	ZS	water injection (water)	solenoid valve	actuator				:H	spray water into the table	NC contact	DO	
561-IJ01.V02:D	ZS	water injection (air)	solenoid valve	actuator				:H	spray water into the table	NC contact	DO	
561-LD01.T01:PLS	TS	damper in recirculating air ducting	winding	temperature measurement	°C	0	...	:H	stop of drive	NC contact	DI	
561-LD01.X01:PLS	XS	damper in recirculating air ducting	motor	torque measurement	Nm			Mmax	stop of drive while opening	NC contact	DI	
561-LD01.X02:PLS	XS	damper in recirculating air ducting	motor	torque measurement	Nm			Mmax :L	stop of drive while closing	NO contact	DI	
561-LD01.X03:X	ZS	damper in recirculating air ducting	damper	limit position				closed	stop of drive while closing	NO contact	DI	
561-LD01.Y01:Y	ZS	damper in recirculating air ducting	damper	limit position				opened	stop of drive while opening	NO contact	DI	
561-LD01.Z01:PLS	ZS	damper in recirculating air ducting	motor	limit position				opened	stop of drive while opening	NC contact	DI	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-LD01.Z02:X	ZS	damper in recirculating air ducting	motor	limit position				closed	stop of drive while closing	NO contact	DI	
561-LD01.Z03:PV	ZIC	damper in recirculating air ducting	motor	position monitoring	%	0	100		analog value	4…20mA	AI	
561-LD02.T01:PLS	TS	damper	winding	temperature measurement	°C	0	...	:H	stop of drive	NC contact	DI	
561-LD02.X01:PLS	XS	damper	motor	torque measurement	Nm			Mmax	stop of drive while opening	NC contact	DI	
561-LD02.X02:PLS	XS	damper	motor	torque measurement	Nm			Mmax :L	stop of drive while closing	NO contact	DI	
561-LD02.X03:X	ZS	damper	damper	limit position				closed	stop of drive while closing	NO contact	DI	
561-LD02.Y01:Y	ZS	damper	damper	limit position				opened	stop of drive while opening	NO contact	DI	
561-LD02.Z01:PLS	ZS	damper	motor	limit position				opened	stop of drive while opening	NC contact	DI	
561-LD02.Z02:X	ZS	damper	motor	limit position				closed	stop of drive while closing	NO contact	DI	
561-LD02.Z03:PV	ZIC	damper	motor	position monitoring	%	0	100		analog value	4…20mA	AI	
561-LQ0A.L01:PLS	LSA	classifier gearbox	oil tank	fill level measurement	mm			:L	stop of classifier drive	NO contact	DI	with 2 relay contacts
561-LQ0A.P01:PLS	PDA	classifier gearbox	filter contamination indication	differential pressure measurement	bar	0	16	2 :H	alarm	NC contact	DI	
561-LQ0A.T01:PV	TISA	classifier gearbox		temperature measurement	°C	-50	150		analog value	4…20mA	AI	
561-LQ0A.T01:M	TISA	classifier gearbox		temperature measurement	°C	-50	150	100	stop of classifier drive	-	value calculated in PLC	
561-LQ0A.T01:HH	TISA	classifier gearbox		temperature measurement	°C	-50	150	90 :HH	alarm	-	value calculated in PLC	
561-LQ0A.T01:H	TISA	classifier gearbox		temperature measurement	°C	-50	150	65 :H	start of oil pump & cooling air fan	-	value calculated in PLC	
561-LQ0A.T01:L	TISA	classifier gearbox		temperature measurement	°C	-50	150	55 :L	stop of oil pump, stop of cooling air fan	-	value calculated in PLC	
561-LQ0A.T01:N	TISA	classifier gearbox		temperature measurement	°C	-50	150	-20 :LL	alarm & classifier drive cannot be started	-	value calculated in PLC	
561-LQ0B.F01:PLS	FISA	central lubrication of classifier shaft	grease flow to classifier shaft	flow measurement	Imp			:L	alarm	NO contact	DI	-
561-LQ0B.L01:PLS	LSA	central lubrication of classifier shaft	grease level in receptacle	fill level measurement	mm	0	300	:L	alarm	NO contact	DI	-
561-LQ01.F01:PLS	FISA	gear oil supply	ducting	flow measurement	l/min	40	350	250 :L	alarm	NO contact	DI	with local display
561-LQ01.F02:PLS	FISA	gear oil supply	ducting	flow measurement	l/min	40	350	220 :LL	stop of mill main drive	NO contact	DI	with local display
561-LQ01.P01:PLS	PDA	gear oil supply	filter contamination indication	differential pressure measurement	bar	0	2.5	2 :H	alarm	NC contact	DI	with local display. Upon alarm, clean filter.
561-LQ01.P02:PLS	PDA	gear oil supply	filter contamination indication	differential pressure measurement	bar	0	2.5	2 :H	alarm	NC contact	DI	with local display. Upon alarm, clean filter.
561-LQ01.P03:PV	PISA	gear oil supply	after cooler	pressure measurement	bar	0	16		analog value	4…20mA	AI	
561-LQ01.P03:N	PISA	gear oil supply	after cooler	pressure measurement	bar	0	16	0.5 :LL	stop of mill main drive	4…20mA	value calculated in PLC	
561-LQ01.P03:L	PISA	gear oil supply	after cooler	pressure measurement	bar	0	16	0.8 :L	alarm	4…20mA	value calculated in PLC	
561-LQ01.T01:L	TIRSA	gear oil supply	after cooler	temperature measurement	°C	0	200	40 :L	stop of cooling air fan (3.3)	-	value calculated in PLC	
561-LQ01.T01:M	TIRSA	gear oil supply	after cooler	temperature measurement	°C	0	200	60 :HHH	alarm	-	value calculated in PLC	
561-LQ01.T01:HH	TIRSA	gear oil supply	after cooler	temperature measurement	°C	0	200	45 :HH	start of cooling air fan (3.3)	-	value calculated in PLC	
561-LQ01.T01:PV	TIRSA	gear oil supply	after cooler	temperature measurement	°C	0	200		analog value	4…20mA	AI	
561-LQ01.T01:M	TIRSA	gear oil supply	after cooler	temperature measurement	°C	0	200	65	stop of mill main drive	-	value calculated in PLC	
561-LQ01.T01:H	TIRSA	gear oil supply	after cooler	temperature measurement	°C	0	200	30 :H	release of filter contamination indication (3.4)	-	value calculated in PLC	
561-LQ02.F01:PV	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 1	flow measurement	l/min	4	36		analog value	4…20mA	AI	with evaluation device and local display
561-LQ02.F01:L	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 1	flow measurement	l/min	4	36	10 :L	alarm	-	value calculated in PLC	-
561-LQ02.F01:N	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 1	flow measurement	l/min	4	36	8.4 :LL	stop of mill main drive	-	value calculated in PLC	-
561-LQ02.F02:N	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 2	flow measurement	l/min	4	36	8.4 :LL	stop of mill main drive	-	value calculated in PLC	-
561-LQ02.F02:L	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 2	flow measurement	l/min	4	36	10 :L	alarm	-	value calculated in PLC	-
561-LQ02.F02:PV	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 2	flow measurement	l/min	4	36		analog value	4…20mA	AI	with evaluation device and local display
561-LQ02.F03:N	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 3	flow measurement	l/min	4	36	8.4 :LL	stop of mill main drive	-	value calculated in PLC	-

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span						
						min.	max.					
561-LQ02.F03:PV	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 3	flow measurement	l/min	4	36		analog value	4…20mA	AI	with evaluation device and local display
561-LQ02.F03:L	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 3	flow measurement	l/min	4	36	10 :L	alarm	-	value calculated in PLC	-
561-LQ02.F04:PV	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 4	flow measurement	l/min	4	36		analog value	4…20mA	AI	with evaluation device and local display
561-LQ02.F04:L	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 4	flow measurement	l/min	4	36	10 :L	alarm	-	value calculated in PLC	-
561-LQ02.F04:N	FIRSA	circulating oil lubrication for grinding rollers	grinding roller 4	flow measurement	l/min	4	36	8.4 :LL	stop of mill main drive	-	value calculated in PLC	-
561-LQ02.L01:N	LISA	circulating oil lubrication for grinding rollers	oil tank	fill level measurement	mm	45	520	410 :LL	stop of mill main drive & oil pump (80)	-	value calculated in PLC	
561-LQ02.L01:PV	LISA	circulating oil lubrication for grinding rollers	oil tank	fill level measurement	mm	45	520		analog value	4…20mA	AI	
561-LQ02.L01:L	LISA	circulating oil lubrication for grinding rollers	oil tank	fill level measurement	mm	45	520	340 :L	alarm	-	value calculated in PLC	
561-LQ02.L01:H	LISA	circulating oil lubrication for grinding rollers	oil tank	fill level measurement	mm	45	520	250 :H	release start of oil pump (80)	-	value calculated in PLC	
561-LQ02.P01:PLS	PDA	circulating oil lubrication for grinding rollers	filter	differential pressure measurement	bar	0	…	:H	alarm	NC contact	DI	
561-LQ02.P02:PV	PSA	circulating oil lubrication for grinding rollers	grinding rollers 1-4	pressure measurement	bar	0	10		analog value	4…20mA	AI	
561-LQ02.P02:L	PSA	circulating oil lubrication for grinding rollers	grinding rollers 1-4	pressure measurement	bar	0	10	1 :L	alarm	-	value calculated in PLC	
561-LQ02.T01:PLS	TS	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	100	70 :H	stop of heating (50)	NC contact	DI	
561-LQ02.T02:H4	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	65 :H4	start of cooler	-	value calculated in PLC	
561-LQ02.T02:H5	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	110 :H5	alarm	-	value calculated in PLC	
561-LQ02.T02:N	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	50 :LL	start of heating (50)	-	value calculated in PLC	
561-LQ02.T02:HH	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	50 :HH	release start mill main drive	-	value calculated in PLC	
561-LQ02.T02:L	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	60 :L	stop of cooler	-	value calculated in PLC	
561-LQ02.T02:HHH	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	55 :HHH	stop of heating (50)	-	value calculated in PLC	
561-LQ02.T02:M	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	120 :H6	stop of mill main drive	-	value calculated in PLC	
561-LQ02.T02:PV	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150		analog value	4…20mA	AI	
561-LQ02.T02:H	TIRSA	circulating oil lubrication for grinding rollers	oil tank	temperature measurement	°C	0	150	40 :H	release start of oil pump (80)	-	value calculated in PLC	
561-LQ02.T03:PV	TISA	circulating oil lubrication for grinding rollers	grinding roller 1	temperature measurement	°C	0	150		analog value	4…20mA	AI	
561-LQ02.T03:H	TISA	circulating oil lubrication for grinding rollers	grinding roller 1	temperature measurement	°C	0	150	25 :H	release fill level monitoring	-	value calculated in PLC	
561-LQ02.T03:HH	TISA	circulating oil lubrication for grinding rollers	grinding roller 1	temperature measurement	°C	0	150	50 :HH	release of flow monitor (370.1)	-	value calculated in PLC	
561-LQ02.T03:M	TISA	circulating oil lubrication for grinding rollers	grinding roller 1	temperature measurement	°C	0	150	110 :HHHH	stop of mill main drive	-	value calculated in PLC	
561-LQ02.T03:HHH	TISA	circulating oil lubrication for grinding rollers	grinding roller 1	temperature measurement	°C	0	150	90 :HHH	alarm	-	value calculated in PLC	

Legend:	Limit values will be confirmed during commissioning											
		Designation			Measurement							
Tag No,	Code	Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.	Limit	Function	I/O PLC	I/O PLC	Comment
561-LQ02.T04:H	TISA	circulating oil lubrication for grinding rollers	grinding roller 2	temperature measurement	°C	0	150	25 :H	release fill level monitoring	-	value calculated in PLC	
561-LQ02.T04:PV	TISA	circulating oil lubrication for grinding rollers	grinding roller 2	temperature measurement	°C	0	150		analog value	4...20mA	AI	
561-LQ02.T04:M	TISA	circulating oil lubrication for grinding rollers	grinding roller 2	temperature measurement	°C	0	150	110 :HHHH	stop of mill main drive	-	value calculated in PLC	
561-LQ02.T04:HH	TISA	circulating oil lubrication for grinding rollers	grinding roller 2	temperature measurement	°C	0	150	50 :HH	release of flow monitor (370.2)	-	value calculated in PLC	
561-LQ02.T04:HHH	TISA	circulating oil lubrication for grinding rollers	grinding roller 2	temperature measurement	°C	0	150	90 :HHH	alarm	-	value calculated in PLC	
561-LQ02.T05:HHH	TISA	circulating oil lubrication for grinding rollers	grinding roller 3	temperature measurement	°C	0	150	90 :HHH	alarm	-	value calculated in PLC	
561-LQ02.T05:PV	TISA	circulating oil lubrication for grinding rollers	grinding roller 3	temperature measurement	°C	0	150		analog value	4...20mA	AI	
561-LQ02.T05:HH	TISA	circulating oil lubrication for grinding rollers	grinding roller 3	temperature measurement	°C	0	150	50 :HH	release of flow monitor (370.3)	-	value calculated in PLC	
561-LQ02.T05:H	TISA	circulating oil lubrication for grinding rollers	grinding roller 3	temperature measurement	°C	0	150	25 :H	release fill level monitoring	-	value calculated in PLC	
561-LQ02.T05:M	TISA	circulating oil lubrication for grinding rollers	grinding roller 3	temperature measurement	°C	0	150	110 :HHHH	stop of mill main drive	-	value calculated in PLC	
561-LQ02.T06:H	TISA	circulating oil lubrication for grinding rollers	grinding roller 4	temperature measurement	°C	0	150	25 :H	release fill level monitoring	-	value calculated in PLC	
561-LQ02.T06:PV	TISA	circulating oil lubrication for grinding rollers	grinding roller 4	temperature measurement	°C	0	150		analog value	4...20mA	AI	
561-LQ02.T06:HHH	TISA	circulating oil lubrication for grinding rollers	grinding roller 4	temperature measurement	°C	0	150	90 :HHH	alarm	-	value calculated in PLC	
561-LQ02.T06:M	TISA	circulating oil lubrication for grinding rollers	grinding roller 4	temperature measurement	°C	0	150	110 :HHHH	stop of mill main drive	-	value calculated in PLC	
561-LQ02.T06:HH	TISA	circulating oil lubrication for grinding rollers	grinding roller 4	temperature measurement	°C	0	150	50 :HH	release of flow monitor (370.4)	-	value calculated in PLC	
561-LQ02.X01:PLS	XS	circulating oil lubrication for grinding rollers	local service operation	switch signal				:H	remote operation	NC contact	DI	
561-LQ02.X02:PLS	XS	circulating oil lubrication for grinding rollers	local service operation	switch signal				:H	flushing	NO contact	DI	
561-LQ02.X03:PLS	XS	circulating oil lubrication for grinding rollers	local service operation	switch signal				:H	fill or empty	NO contact	DI	
561-LQ02.X04:RDY	XS	circulating oil lubrication for grinding rollers	local service operation	switch signal				:H	ready for local operation/start oil pump (80)	NO contact	DI	
561-LQ02.X05:RDY	XS	circulating oil lubrication for grinding rollers	local service operation	return signal				:H	ready for local operation/heating (50) in operation		DO	
561-LQ02.X06:RDY	XS	circulating oil lubrication for grinding rollers	local service operation	return signal				:H	ready for local operation/oil pump (80) ready for operation		DO	
561-LQ02.Z01:PLS	ZSA	circulating oil lubrication for grinding rollers	ball cock	limit position				opened :H	release start of mill main drive & oil pump (80)	NO contact	DI	alarm: when ball cock is not open
561-RF01.S01:PLS	SSA	rotary feeder		standstill monitoring	Imp/min	0.1	1000	:L	alarm & stop of drive	NO contact	DI	
561-RF01.T01:PLS	TS	rotary feeder	winding	temperature measurement	°C	0		:H	stop of drive		-	evaluation in customer's MCC
561-RM01.P01:L	PIRCSA	ducting ahead mill	control loop C	pressure measurement	mbar	-40	5	:L	alarm	-	value calculated in PLC	-
561-RM01.P01:M	PIRCSA	ducting ahead mill	control loop C	pressure measurement	mbar	-40	5	0 :HH	stop of mill main drive	-	value calculated in PLC	-
561-RM01.P01:H	PIRCSA	ducting ahead mill	control loop C	pressure measurement	mbar	-40	5	-2 :H	alarm	-	value calculated in PLC	-
561-RM01.P01:PV	PIRCSA	ducting ahead mill	control loop C	pressure measurement	mbar	-40	5		analog value	4...20mA (HART)	AI	with local display: characteristic curve (measuring): linear

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-RM01.P02:PV	PIRC	after classifier		pressure measurement	mbar	-100	0		analog value	4…20mA (HART)	AI	with local display: characteristic curve (measuring): linear
561-RM01.P03:PV	PIRC	after mill		pressure measurement	mbar	-60	0		analog value	4…20mA (HART)	AI	with local display: characteristic curve (measuring): linear
561-RM01.T01:H	TIRSA	ducting ahead mill	ahead mill	temperature measurement	°C	0	350	:H	alarm	-	value calculated in PLC	
561-RM01.T01:PV	TIRSA	ducting ahead mill	ahead mill	temperature measurement	°C	0	350		analog value	4…20mA (HART)	AI	
561-RM01.T01:M	TIRSA	ducting ahead mill	ahead mill	temperature measurement	°C	0	350	:HH	stop hot gas generator	-	value calculated in PLC	
561-RM01.T02:H	TIRCSA	ducting after mill	control loop A	temperature measurement	°C	0	200	:H	alarm & open fresh air damper	-	value calculated in PLC	
561-RM01.T02:PV	TIRCSA	ducting after mill	control loop A	temperature measurement	°C	0	200		analog value	4…20mA (HART)	AI	
561-RM01.T02:M	TIRCSA	ducting after mill	control loop A	temperature measurement	°C	0	200	:HH	(after 4-20 min, 120°C) stop of mill main drive	-	value calculated in PLC	-
561-RM01.T02:L	TIRCSA	ducting after mill	control loop A	temperature measurement	°C	0	200	:L	no start release for mill main drive	-	value calculated in PLC	
561-SR01.T01:PV	TISA	classifier motor	winding	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T01:H	TISA	classifier motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-SR01.T01:M	TISA	classifier motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T02:M	TISA	classifier motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T02:H	TISA	classifier motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-SR01.T02:PV	TISA	classifier motor	winding	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T03:PV	TISA	classifier motor	winding	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T03:H	TISA	classifier motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-SR01.T03:M	TISA	classifier motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T04:H	TISA	classifier motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-SR01.T04:PV	TISA	classifier motor	winding	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T04:M	TISA	classifier motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T05:M	TISA	classifier motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T05:PV	TISA	classifier motor	winding	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T05:H	TISA	classifier motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-SR01.T06:PV	TISA	classifier motor	winding	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T06:M	TISA	classifier motor	winding	temperature measurement	°C	0	...	160 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T06:H	TISA	classifier motor	winding	temperature measurement	°C	0	...	130 :H	alarm	-	value calculated in PLC	
561-SR01.T07:M	TISA	classifier motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T07:H	TISA	classifier motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-SR01.T07:PV	TISA	classifier motor	bearing	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T08:H	TISA	classifier motor	bearing	temperature measurement	°C	0	...	85 :H	alarm	-	value calculated in PLC	
561-SR01.T08:PV	TISA	classifier motor	bearing	temperature measurement	°C	0	...		analog value	4…20mA	AI	
561-SR01.T08:M	TISA	classifier motor	bearing	temperature measurement	°C	0	...	90 :HH	stop of mill main drive	-	value calculated in PLC	
561-SR01.T09:M	TISA	classifier shaft	top bearing 1	temperature measurement	°C	0	200	90 :HH	alarm & stop of classifier drive	-	value calculated in PLC	
561-SR01.T09:PV	TISA	classifier shaft	top bearing 1	temperature measurement	°C	0	200		analog value	4…20mA	AI	
561-SR01.T09:H	TISA	classifier shaft	top bearing 1	temperature measurement	°C	0	200	80 :H	alarm	-	value calculated in PLC	
561-SR01.T10:H	TISA	classifier shaft	top bearing 2	temperature measurement	°C	0	200	80 :H	alarm	-	value calculated in PLC	
561-SR01.T10:M	TISA	classifier shaft	top bearing 2	temperature measurement	°C	0	200	90 :HH	alarm & stop of classifier drive	-	value calculated in PLC	
561-SR01.T10:PV	TISA	classifier shaft	top bearing 2	temperature measurement	°C	0	200		analog value	4…20mA	AI	
561-SR01.T11:M	TISA	classifier shaft	lower bearing 1	temperature measurement	°C	0	200	130 :HH	alarm & stop of classifier drive	-	value calculated in PLC	
561-SR01.T11:H	TISA	classifier shaft	lower bearing 1	temperature measurement	°C	0	200	110 :H	alarm	-	value calculated in PLC	
561-SR01.T11:PV	TISA	classifier shaft	lower bearing 1	temperature measurement	°C	0	200		analog value	4…20mA	AI	
561-SR01.X01:RDY	XS	classifier drive	frequency converter	signal					ready - relay	Profinet	BUS	
561-SR01.X02:R	XS	classifier drive	frequency converter	signal					running	Profinet	BUS	
561-SR01.X03:F	XS	classifier drive	frequency converter	signal					fault	Profinet	BUS	
561-SR01.X04:PV	XI	classifier drive	frequency converter	signal					reference voltage	Profinet	BUS	
561-SR01.X05:SP	XI	classifier drive	frequency converter	signal					spedd reference	Profinet	BUS	
561-SR01.X06:PV	XI	classifier drive	frequency converter	signal					speed	Profinet	BUS	

Legend:	Limit values will be confirmed during commissioning											
Tag No,	Code	Designation			Measurement			Limit	Function	I/O PLC	I/O PLC	Comment
		Used for Machinery / Equipment	Location	Device (What)	Unit (Phys)	Span min.	Span max.					
561-SR01.X07:PV	XI	classifier drive	frequency converter	signal					current	Profinet	BUS	
561-SR01.X08:D	XS	classifier drive	frequency converter	signal					start / stop	Profinet	BUS	
561-SR01.X09:D	XS	classifier drive	frequency converter	signal					forward / reverse	Profinet	BUS	
561-SR01.X10:D	XS	classifier drive	frequency converter	signal					reset	Profinet	BUS	
561-SR01.X11:D	XS	classifier drive	frequency converter	signal					ACC / DEC time set	Profinet	BUS	
561-SR01.X12:D	XS	classifier drive	frequency converter	signal					constant speed 1	Profinet	BUS	
561-SR01.X13:D	XS	classifier drive	frequency converter	signal					digitalinterlock	Profinet	BUS	
561-SR01.X14:RDY	XS	classifier drive	frequency converter	signal					ready	Profinet	BUS	
561-SR01.X15:R	XS	classifier drive	frequency converter	signal					running	Profinet	BUS	
561-WP01.S01:PV	SIC	water injection, pump	frequency converter	speed measurement	%	0	100		analog value	4…20mA	AI	
561-WP01.S02:SP	SETPOINT	water injection, pump	frequency converter	speed control	%				analog value	4…20mA	AO	input by operator in DCS
561-WP01.T01:PLS	TS	water injection, pump	drive, winding	temperature measurement	°C	0	150	:H	stop of water injection pump		-	evaluation in frequency converter
561-WP01.T02:M	TSA	water injection, pump	stator protector	temperature measurement	°C	0	100	x + 10	stop of water injection pump	-	value calculated in PLC	-
561-WP01.T02:H	TSA	water injection, pump	stator protector	temperature measurement	°C	0	100	x + 5 :H	alarm	-	value calculated in PLC	-
561-WP01.T02:PV	TSA	water injection, pump	stator protector	temperature measurement	°C	0	100		analog value	4…20mA	AI	x: maximum temperature of medium in summer
591-RF01.S01:PLS	SSA	rotary feeder		standstill monitoring	imp/min	0	150	:L	alarm & stop of drive		DI	
591-SC0A.S01:PLS	SSA	screw conveyor		standstill monitoring	imp/min	0	150	:L	alarm & stop of drive		DI	
591-SC0B.S01:PLS	SSA	screw conveyor		standstill monitoring	imp/min	0	150	:L	alarm & stop of drive		DI	
591-SC01.S01:PLS	SSA	screw conveyor		standstill monitoring	imp/min	0	150	:L	alarm & stop of drive		DI	
M31-TK01.L01:H	LISA	water injection	tank	fill level measurement				:H	stop filling	-	value calculated in PLC	
M31-TK01.L01:L	LISA	water injection	tank	fill level measurement				:L	start of filling	-	value calculated in PLC	
M31-TK01.L01:PV	LISA	water injection	tank	fill level measurement					analog value	4…20mA (HART)	AI	
M31-TK01.L01:N	LISA	water injection	tank	fill level measurement				:LL	stop of water injection pump	-	value calculated in PLC	
M31-TK01.V01:D	ZS	water injection, filling of water tank	solenoid valve	actuator				:H	fill the tank with water	NC contact	DO	

DUFFIELD ASSOCIATES
Soil, Water & the Environment

Compressed Air Consumption Data Sheet

	Customer	GEBR. Pfeiffer Inc.		Rev.	0
REDECAMGROUP	Plant	Penn Mag Inc.	COMPRESSED AIR CONSUMPTION	Date	15/06/2018
	Location	Wilmington (USA)		Author	BRL
	Job	C118016		Checked	MEA
	Doc.	1BF1_AC-CC-01		Approved	MEA

Description	Fluid	Flow [Nm3/h]	Operative pressure [bar(g)]	Flow @ Operative Pressure [Am3/h]	Remarks
Cleaning System	Compressed air	174	5,50	32,00	T = 40°C
TOTAL CONSUMPTION		174	5,50	32,00	T = 40°C
DESIGN (20% margin)		**209**	**5,50**	38,00	T = 40°C

COMPRESSOR SIZING		Remarks
Suggested compressor capacity [FAD]	**261 m3/h**	Compressed air delivery @ 7,5 bar(g)
		F.A.D. corrected for T=35°C, Hr=100%, h=340m

Auxiliars: Dryer, Pre/Post-filtration to reach Dew Point -20°C and Dust/Oil Requirements.
Refer to the below "Compressed Air Quality Requirments"

COMPRESSED AIR QUALITY REQUIREMENTS

	Filter CLASS
Particle Content	1
Water Content	2
Oil Content	1

DIN ISO 8573-1:2010

Class	Solid Particles			Water		Oil	
	Maximum number of particles per m^3		(d = particle size in µm)	Pressure Dew Point		(Aerosol, liquid and vapor)	
	0.1<d≤0.5	0.5<d≤1.0	1.0<d≤5.0	°C	°F	mg/m^3	ppm w/w
0	As specified by equipment user or supplier and more stringent than class 1						
1	≤20,000	≤400	≤10	≤ -70	-94	≤ 0.01	≤ 0.008
2	≤400,000	≤6,000	≤100	≤ -40	-40	≤ 0.1	≤ 0.08
3	-	≤90,000	≤1,000	≤ -20	-4	≤ 1	≤ 0.8
4	-	-	≤10,000	≤ +3	38	≤ 5	≤ 4
5	-	-	≤100,000	≤ +7	45	-	-

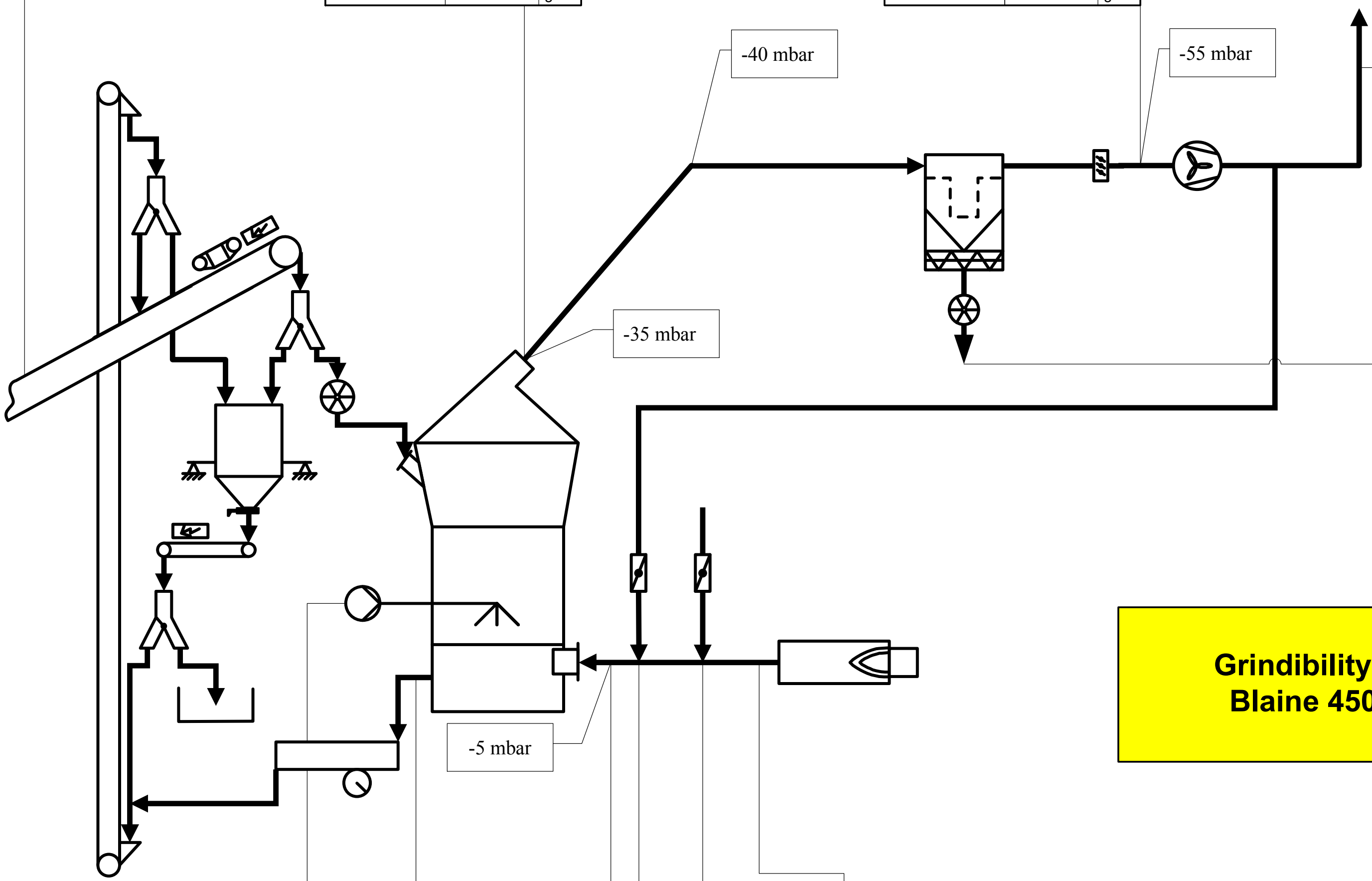
Process Balance Sheet

feed material		
temperature	10	°C
feed rate	31,63	t/h
moisture	6	%

classifier exhaust gas		
temperature	95	°C
gas flow	99573	nm³/h
gas flow	148796	m³/h
dust content	202	g/m³

gas fan inlet		
temperature	95	°C
gas flow	99573	nm³/h
gas flow	152125	m³/h
dust content	0	g/m³

exhaust gas		
temperature	96	°C
gas flow	17776	nm³/h
gas flow	25599	m³/h
heat flow	2,3	GJ/h
dust content	14	mg/m³
water content	70,94	g/m³
dew point	51	°C



finished product		
product	30	t/h
dust	0	t/h
moisture	0,9	%
heat flow	2,3	GJ/h
fineness	5000	cm²/g

Grindibility 28 kWh/t
Blaine 4500 ASTM

water injection		
temperature	5	°C
water rate	0	l/h

rejected material		
feed rate	15	t/h

mill inlet		
temperature	141	°C
gas flow	87862	nm³/h
gas flow	143007	m³/h
heat flow	16,8	GJ/h

recirculated gas		
temperature	96	°C
gas flow	81797	nm³/h
gas flow	117796	m³/h
heat flow	10,5	GJ/h

fresh air		
temperature	5	°C
gas flow	0	nm³/h

hot gas generator		
temperature	700	°C
gas flow	6065	nm³/h
heat flow	6,2	GJ/h
heat power	1733,6	kW

client:
Wilmington, DE, USA

MVR 2500 C-4

material: Hochofenschlacke Granuliert

GEBR. PFEIFFER
Progress is our tradition

file-name: 00119/483460-1503

	date	name
draw	03.04.18	bha
edit		

designation: balance sheet

AQM-4.6
Baghouses (Bin Vents) - Storage Silos

Baghouse Application

If you are using this form electronically, press F1 at any time for help

General Information

1.	Facility Name: **WALAN Specialty Construction Products, LLC**
2.	Equipment ID Number: **Bin Vents on Two Storage Silos**
3.	Manufacturer: **C&W Manufacturing and Sales Company**
4.	Model: **CP-4000S**
5.	Serial Number: **N/A**
6.	Is the Baghouse Insulated? ☐ YES ☒ NO
7.	Design Minimum Operating Temperature: **ambient °F**
8.	Design Maximum Operating Temperature: **ambient °F**
9.	Are Temperature Controls Provided? ☐ YES ☒ NO
If Yes, complete the rest of Question 9. If no, proceed to Question 10.	
9.1.	Describe the Temperature Controls:
10.	Air Flow Through Baghouse: ☐ Forced ☒ Induced ☐ Other (Specify):
11.	Direction of Flow Through Filters: ☐ Inside Out ☒ Outside In
12.	Particulate Removal Efficiency: **99.9+** %

Attach the Manufacturer's Specification Sheet for the Baghouse and Particle Size Removal Efficiency Curve and basis of determination.

Compartment Information

13.	Number of Compartments: **1**
14.	Number of Filters (Bags) Per Compartment: **12 cartridge filters**
15.	Can the Compartments be Isolated for Replacement or Repair? ☐ YES ☒ NO

Gas Stream Information

16.	Maximum Inlet Volumetric Gas Flow Rate: **4000 acfm at ambient °F**
17.	Maximum Outlet Volumetric Gas Flow Rate: **4000 acfm at ambient °F**
18.	Dew Point at Maximum Moisture Content of Gas: **N/A °F**

Gas Stream Information

19. pH of Gas Handled: **N/A**

20. Dust Characteristics: (Check All That Apply)
- ☐ Sticky
- ☐ Wet
- ☐ Corrosive
- ☒ Dry
- ☐ Other (Specify):

Contaminant Information

21. Percent of Each Contaminant in the Waste Gas and Removal Efficiency

If more than five Contaminants are present, attach additional copies of this page as needed.

	Contaminant Name	Contaminant CAS Number	Percent of Waste Gas	Removal Efficiency
21.1.	**GGBFS**	**N/A**	**100 %**	**99.9+** %
21.2.			**%**	%
21.3.			**%**	%
21.4.			**%**	%
21.5.			**%**	%

Fabric Filter (Bag) Information

22. Fabric Type:
- ☐ Felted
- ☐ Woven
- ☐ Felted-Woven
- ☐ Membrane
- ☐ PTFE Membrane
- ☐ Sintered Metal
- ☐ Ceramic Cartridge
- ☒ Other (Specify): **"spunbond"**

23. Fabric Material: **Polyester (Innovative Filtration Technology - FM0105)**

24. Maximum Continuous Filter Operating Temperature: **265 °F**

25. Clean Fabric Permeability: **18-26** scfm/ft^2 at ΔP **0.5** inches of water

26. Fabric Filter (Bag) Diameter or Width: **8 inches**

27. Fabric Filter (Bag) Length: **39 inches**

28. Effective Area Per Filter: **52.5 square inches**

29. Minimum Effective Air to Cloth Ratio: 6.35 **feet/min**

30. Maximum Effective Air to Cloth Ratio: 6.35 **feet/min**

31. Design Pressure Drop Across Baghouse: 6.0 **inches water**

32. Describe Determining Factor Fabric Filter Changing/Replacement: **Follow manufacturer's recommendations**

Attach the Manufacturer's Specification Sheet for the Fabric Filters (Bags).

Filter Cleaning Information

33. Filter Cleaning Method: ☐ Manual Cleaning ☐ Mechanical Shakers ☐ Pneumatic Shakers ☐ Bag Collapse ☐ Sonic Cleaning ☐ Reverse Air Flow ☐ Reverse Air Jet ☒ Pulse Jet ☐ Other (Specify):

If Reverse Air Jet or Pulse Jet is used, complete the rest of Question 33. If not, proceed to Question 34.

33.1. Air Pressure: N/A **psi**

33.2. Describe How Air Is Supplied to System: **WALAN Specialty Construction Products, LLC compressors will supply air with an air pressure regulator group to the air collectors located on the platforms on the filter roof. The connection is made through pneumatic valves to the ramps.**

34. Describe How Filter Cleaning Is Initiated: ☐ Manual ☒ Timer ☐ Pressure Drop ☐ Other (Specify):

Hopper Information

35. Is the Hopper Heated? ☐ YES ☒ NO

36. Is there a Hopper Vibrator? ☐ YES ☒ NO

37. Describe How Collected Material is Treated or Disposed of: **Material is recycled as product back into two stoarage silos.**

Stack Information

38. Emission Point Name: **EP-4 and EP-5**

38.1. Stack Height Above Grade: **approx. 80 feet**

38.2. Stack Exit Diameter: **1.02 feet**
(Provide Stack Dimensions If Rectangular Stack)

38.3. Is a Stack Cap Present? ☐ YES ☒ NO

38.4. Stack Configuration: ☐ Vertical ☒ Horizontal ☐ Downward-Venting ☐ Other (Specify):
(check all that apply)

38.5. Stack Exit Gas Temperature: **ambient °F**

38.6. Stack Exit Gas Flow Rate: **4000 ACFM**

38.7. Distance to Nearest Property Line: **about 50 feet**

38.8. Describe Nearest Obstruction: **Large 150' x 675' building to the west**

38.9. Height of Nearest Obstruction: **about 50 feet**

38.10. Distance to Nearest Obstruction: **about 325 feet**

Stack Information

38.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO

Monitoring and Alarm Information

39. Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit? ☐ YES ☒ NO

If YES, complete the rest of Question 39. If NO, proceed to Question 40.

39.1. Describe the System Alarm(s):

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	Describe Alarm Trigger	Monitoring Device or Alarm Type	Does the Alarm Initiate an Automated Response?
39.1.1.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.2.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.3.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.4.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.5.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Additional Information

40. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 40.

40.1. Describe:

AQM-4.6
Baghouses (Bin Vents)
Supporting Information

C&W Manufacturing and Sales Company - Cartridge Plus CP-Series Silo Dust Collectors Information

Silo Collectors

Central Collectors

Silo Saver Systems

Transfer Packages

Slump Master 3

Cartridge Pulse

CP- Series Silo Dust Collectors

Sampling of Silo Collectors: CP-1335S, CP-2000S, CP-2665S, CP-3335S CP-4000S

Weigh Batcher - CP-35

Interior of CP-2665S (formerly called CP-305)

C&W Manufacturing and Sales Co.
1-800-880-DUST
www.cwmfg.com

C&W
Manufacturing and Sales
1 (800) 880-3878

C&W Manufacturing and Sales

CP-Series
Silo Dust Collectors

General Information

C&W's CP-Series of Silo Dust Collectors offer you Pulse-Jet Technology combined with our cartridge filters to provide a highly effective, yet inexpensive solution for dust control. Our CP Silo Collectors are engineered by dust control specialists with careful attention to efficiency and user-friendliness. Also, available are weigh batcher collectors and round silo collectors.

Benefits	Features:
Easy to Maintain	Tool-less Exchange of Filter Media
	Top Entry for Clean Side Filter Exchange
Efficiency	99.99% Filtration Efficiency*
Efficiency, Compact	Vertical, Wide-Pleat Cartridges
Performance	Inlet Air Regulator and Moisture Separator
	Test Ports for Monitoring Filter Media
Reliable, Easy to Operate	Solid State Adjustable Timers w/ LED Display
Long-Lasting, Durable	12 Gauge, Heavy Duty Steel Construction

Options

- Flow Sensor Switch
- Pressure Switch for Automatic Cleaning
- Mini-helic Gauge
- Custom Designs and Sizes
- Silo Anti-Overfill System
- Special Mounting Flange for Adapting to Existing Flange
- Blower Packages, Standard or Custom-Built
- Special Filter Media
- Pressure Relief Valves and Bin Indicators

Most Popular add-on:

Flow switch: Detects the flow of air through the silo and turns the cleaning cycle on while silo is being filled. When the flow of material into the silo stops, unit automatically turns the cleaning cycle off.

Specs

Specifications	CP-35	CP-70	CP-88	CP-1335S	CP-2000S	CP-2665S
Total Filtration Area (sq. ft.)	45	90	90	210	315	420
Number of Cartridges	2	4	4	4	6	8
Ait to Cloth Ratio	4.78	4.78	4.78	6.36	6.35	6.35
Cartridge Size	8" x 19"	8"x19"	8" x 19"	8" x 39"	8" x 39"	8" x 39
Static Pressure Drop	6" W.C.	6" W.C.	6" W.C.	6" W.C.	6" W.C.	6" W.C.
Compressed Air Req.	2	2	2	2	2	3
CFM Recommended	216	432	432	1335	2000	2665
Min. Design Efficiency*	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
Cleaning Mechanism	Pulse Jet	Pulse Jet	Pulse Jet	Pulse Jet	Pulse Jet	Pulse Jet

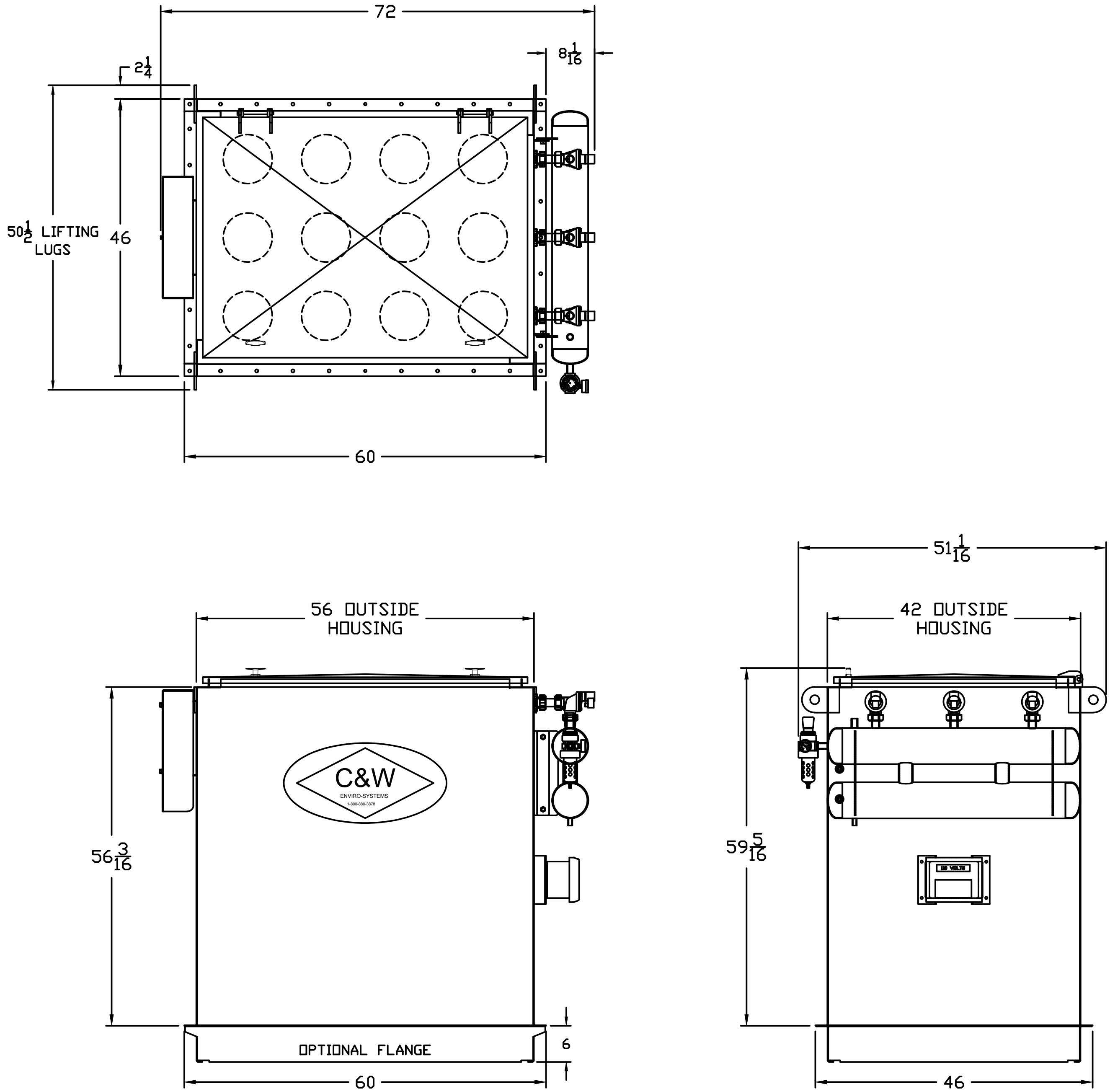
Specifications	CP-3335S	CP-4000S	CP-5000S
Total Filtration Area (sq. ft.)	525	630	787.5
Number of Cartridges	10	12	15
Air to Cloth Ratio	6.35	6.35	6.35
Cartridge Size	8" x 39"	8" x 39"	8" x 39"
Static Pressure Drop	6" W.C.	6" W.C.	6" W.C.
Compressed Air Required	4	5	5
CFM Recommended	3335	4000	5000
Min. Design Efficiency*	99.99%	99.99%	99.99%
Cleaning Mechanism	Pulse Jet	Pulse Jet	Pulse Jet

* At Standard Test Conditions

Galvanized or Stainless Steel units are available for specialized applications.

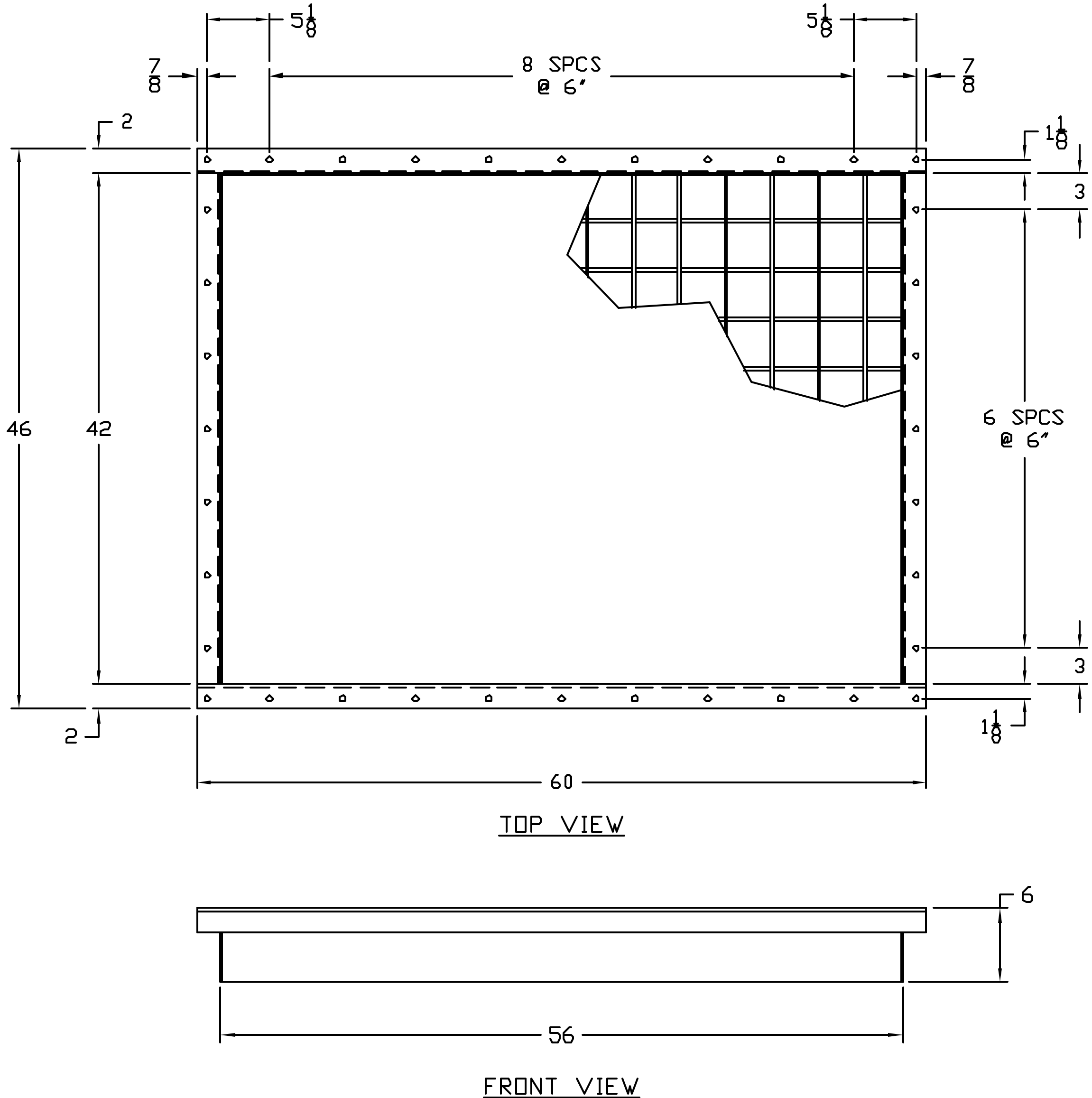
C&W Manufacturing
P.O. Box 908
Crowley, Texas 76036
1-800-880-DUST
www.cwmfg.com

DRAW/NEWEST/GA/CP-4000S



CP-4000 SILO CARTRIDGE PULSE JET COLLECTOR
GENERAL ARRANGEMENT

C & W MFG. & SALES CO.
6933 SHELMOR RD.
ALVARADO, TX 76009 (817)790-5000



CP-300, CP-450-1239, CP-760 MOUNT FLANGE ASSY

C & W MFG. & SALES CO.
6933 SHELMOR RD.
ALVARADO, TX 76009 (817)790-5000

iFIL USA, LLC
USA Manufacturing & Sales Division

1801 W Vine Street
Harrisonville, MO 64701
USA

Main: 816-380-8066
Fax: 888-849-1362

Technical Data Sheet

Filter media:	**FM0103**
Construction:	100% Polyester spunbond media with point bond finish
Color:	White
Weight:	7.7 oz/yd^2 (260 g/m^2)
Thickness:	0.024 inch (0.66 mm)
Permeability:	18 – 26 ft^3/ft^2/min @ 1/2" H_2O – ASTM D 737 9.1 – 13.2 cm^3/cm^2/sec @ 125 Pa – ASTM D 737 86 – 125 l/dm^2/min @ 200 Pa – DIN 53887
Max. Operating Temperature:	265°F (130°C)
Tensile Strength:	200 lbs/2-in. strip (91 kg/5 cm strip) – MD 125 lbs/2-in. strip (57 kg/5 cm strip) – CMD
Mullen Strength:	350 lbs/in^2 (24.6 kg/cm^2)
Dust Release Properties:	Very good
Filtration Efficiency:	$>$ 99.9 % for particle size range between 0.2 μ- 2.0 μ
BGIA-Filter Class:	“M” – per Test Method: DIN EN 60335–2–69
FDA conformity:	FDA - 21 CFR 177.1630 30.31 LFGB

This data is to be considered as typical, and for information purposes only. All specifications are subject to change.

DUFFIELD ASSOCIATES
Soil, Water & the Environment

AQM-4.6
Cartridge Filters - Dustless Loadout Chutes for Truck Loading

Baghouse Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **WALAN Specialty Construction Products, LLC**
2. Equipment ID Number: **Cartridge Filters for Two Dustless Loadout Chutes**
3. Manufacturer: **DCL, Inc.**
4. Model: **Compact Filter Module (CFM) - Model CFM330**
5. Serial Number: **N/A**
6. Is the Baghouse Insulated? ☐ YES ☒ NO
7. Design Minimum Operating Temperature: **ambient °F**
8. Design Maximum Operating Temperature: **ambient °F**
9. Are Temperature Controls Provided? ☐ YES ☒ NO

If Yes, complete the rest of Question 9. If no, proceed to Question 10.

9.1. Describe the Temperature Controls:

10. Air Flow Through Baghouse: ☐ Forced
☒ Induced
☐ Other (Specify):
11. Direction of Flow Through Filters: ☐ Inside Out
☒ Outside In
12. Particulate Removal Efficiency: **99.9+** %

Attach the Manufacturer's Specification Sheet for the Baghouse and Particle Size Removal Efficiency Curve and basis of determination.

Compartment Information

13. Number of Compartments: **1**
14. Number of Filters (Bags) Per Compartment: **Seven (model TL-DCL) cartridge filters**
15. Can the Compartments be Isolated for Replacement or Repair? ☐ YES ☒ NO

Gas Stream Information

16. Maximum Inlet Volumetric Gas Flow Rate: **1400 acfm at ambient °F**
17. Maximum Outlet Volumetric Gas Flow Rate: **1400 acfm at ambient °F**
18. Dew Point at Maximum Moisture Content of Gas: **N/A °F**

Gas Stream Information

19. pH of Gas Handled: **N/A**

20. Dust Characteristics: (Check All That Apply)
- ☐ Sticky
- ☐ Wet
- ☐ Corrosive
- ☒ Dry
- ☐ Other (Specify):

Contaminant Information

21. Percent of Each Contaminant in the Waste Gas and Removal Efficiency

If more than five Contaminants are present, attach additional copies of this page as needed.

	Contaminant Name	Contaminant CAS Number	Percent of Waste Gas	Removal Efficiency
21.1.	**GGBFS**	**N/A**	**100 %**	**99.9+** %
21.2.			%	%
21.3.			%	%
21.4.			%	%
21.5.			%	%

Fabric Filter (Bag) Information

22. Fabric Type:
- ☐ Felted
- ☐ Woven
- ☐ Felted-Woven
- ☐ Membrane
- ☐ PTFE Membrane
- ☐ Sintered Metal
- ☐ Ceramic Cartridge
- ☒ Other (Specify): **"spunbond" polyester**

23. Fabric Material: **Polyester**

24. Maximum Continuous Filter Operating Temperature: **180 °F**

25. Clean Fabric Permeability: **15-30** scfm/ft^2 at ΔP **0.5** inches of water

26. Fabric Filter (Bag) Diameter or Width: **8 inches**

27. Fabric Filter (Bag) Length: **22 inches**

28. Effective Area Per Filter: **48.4 square feet**

29. Minimum Effective Air to Cloth Ratio: 4.3:1 **feet/min**

30. Maximum Effective Air to Cloth Ratio: 4.3:1 **feet/min**

31. Design Pressure Drop Across Baghouse: NA **inches water**

32. Describe Determining Factor Fabric Filter Changing/Replacement: **Follow manufactuers recommendations**

Attach the Manufacturer's Specification Sheet for the Fabric Filters (Bags).

Filter Cleaning Information

33. Filter Cleaning Method: ☐ Manual Cleaning ☐ Mechanical Shakers ☐ Pneumatic Shakers ☐ Bag Collapse ☐ Sonic Cleaning ☐ Reverse Air Flow ☐ Reverse Air Jet ☒ Pulse Jet ☐ Other (Specify):

If Reverse Air Jet or Pulse Jet is used, complete the rest of Question 33. If not, proceed to Question 34.

33.1. Air Pressure: 80-100 **psi**

33.2. Describe How Air Is Supplied to System: **WALAN Specialty Construction Products, LLC compressors will supply air with an air pressure regulator group to the air collectors located on the platforms on the filter roof. The connection is made through pneumatic valves to the ramps.**

34. Describe How Filter Cleaning Is Initiated: ☐ Manual ☒ Timer ☐ Pressure Drop ☐ Other (Specify):

Hopper Information

35. Is the Hopper Heated? ☐ YES ☒ NO

36. Is there a Hopper Vibrator? ☐ YES ☒ NO

37. Describe How Collected Material is Treated or Disposed of: **Material is recycled into loadout chute as product.**

Stack Information

38. Emission Point Name: **EP-6 and EP-7**

38.1. Stack Height Above Grade: **22 feet**

38.2. Stack Exit Diameter: **0.667 feet**
(Provide Stack Dimensions If Rectangular Stack)

38.3. Is a Stack Cap Present? ☐ YES ☒ NO

38.4. Stack Configuration: ☐ Vertical ☒ Horizontal ☐ Downward-Venting ☐ Other (Specify):
(check all that apply)

38.5. Stack Exit Gas Temperature: **ambient °F**

38.6. Stack Exit Gas Flow Rate: **1400 ACFM**

38.7. Distance to Nearest Property Line: **about 50 feet**

38.8. Describe Nearest Obstruction: **Large 150' x 675' building to the west**

38.9. Height of Nearest Obstruction: **about 50 feet**

38.10. Distance to Nearest Obstruction: **about 325 feet**

Stack Information

38.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO

Monitoring and Alarm Information

39. Are There Any Alarms You Would Like the Department to Consider When Drafting the Permit? ☐ YES ☒ NO

If YES, complete the rest of Question 39. If NO, proceed to Question 40.

39.1. Describe the System Alarm(s):

If there are more than five alarms, attach additional copies of this page as needed.

	Operating Parameter Monitored	**Describe Alarm Trigger**	**Monitoring Device or Alarm Type**	**Does the Alarm Initiate an Automated Response?**
39.1.1.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.2.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.3.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.4.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:
39.1.5.			☐ Visual ☐ Auditory ☐ Automatic (Remote Monitoring) ☐ Other	☐ NO ☐ YES Describe:

Additional Information

40. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 40.

40.1. Describe:

DUFFIELD ASSOCIATES
Soil, Water & the Environment

AQM-4.6
Cartridge Filters
Supporting Information

DUFFIELD ASSOCIATES
Soil, Water & the Environment

DCL, Inc. - Model CFM330 Dustless Loadout Chute Manifold with TL-DCL Pleated Cartridge Filters Information

Dust Control and Loading Systems Inc

Leaders in Innovative Bulk Loading Systems Design

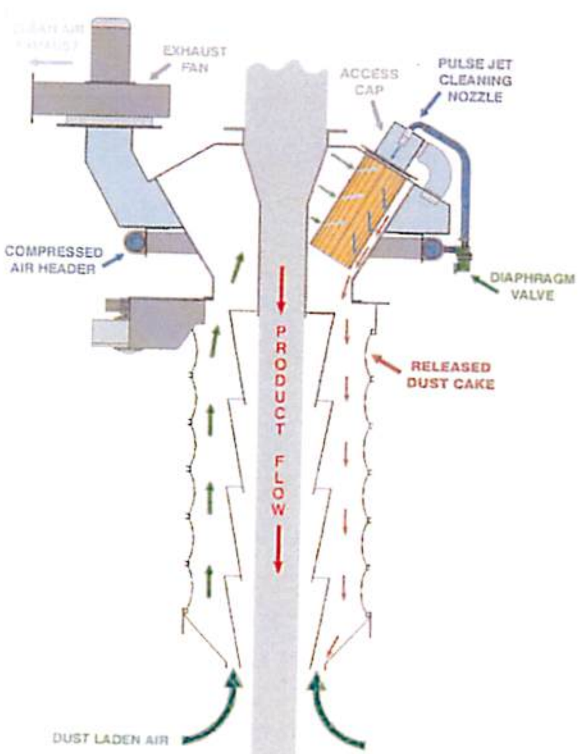
Loading Spouts

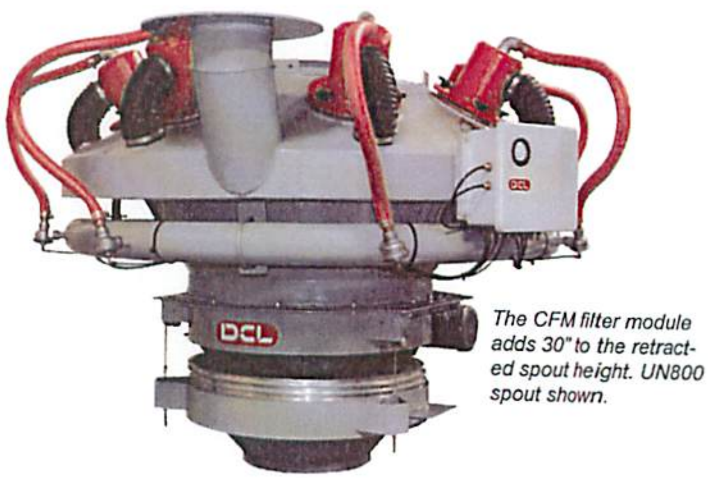
LOADING SPOUTS

EV enclosed vehicle or OV open vehicle spouts provide excellent dust free loading performance for trucks and railcars. DCL has incoporated 20 years of experience in bulk loading of dry materials into this new service friendly retractable spout design. The low profile feature makes this spout the best choice when faced with limited space conditions.

Model EV24 loading spout shown in retracted position.

- Easy access to drive components.
- Three cable hoist system providing maximum spout stability.
- Shipped completely assembled and tested.
- Slack cable and drive limits factory set.
- Internal stacking product flow control cones are constructed from urethane, AR steel or optional stainless steel.
- Wide selection of flexible outer spout sleeve materials for high and low temperature applications provided with heavy duty aluminum stacking type support rings.
- EV enclosed vehicle or OV open vehicle discharge configuration.
- Vertical travels up to 18 feet.
- Loading capacities of up to 450 cu ft/min of fine aerated materials.
- Collar style dust outlet for connection to a free standing dust collector or vent through frame configuration for connection to an inline filter module.





The CFM filter module adds 30" to the retracted spout height. UN800 spout shown.

SPOUT / CFM COMBINATION

DCL's new Compact Filter Module provides the industries lowest profile filter/loading spout combination. The CFM filter module can be used inline with loading spouts for dust control during the loading of dry, dusty materials into open or enclosed vehicles. The dust collected is re-entrained with the material being loaded which makes the CFM Filter Module an ideal and cost effective package. When comparing the new design of the CFM filter module to free standing units, the savings in space and money become apparent with the elimination of expensive duct work, discharge air locks and hopper discharge systems. For detailed CFM specifications see flier PUBc-0609-DCFM.

3660 Ance Road
Charlevoix, Michigan 49720

Dust Control and Loading Systems Inc
www.dclinc.com or sales@dclinc.com

Tele: 800-748-0563
231-547-5600

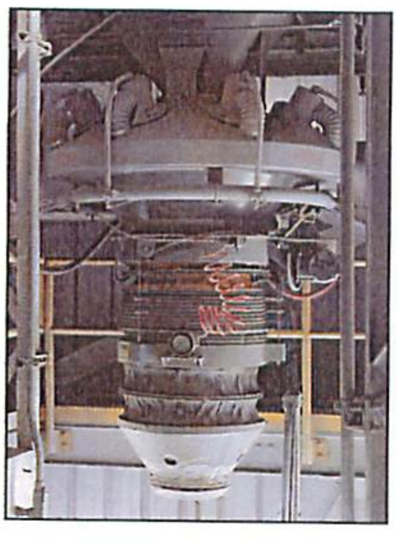
Dust Control and Loading Systems Inc

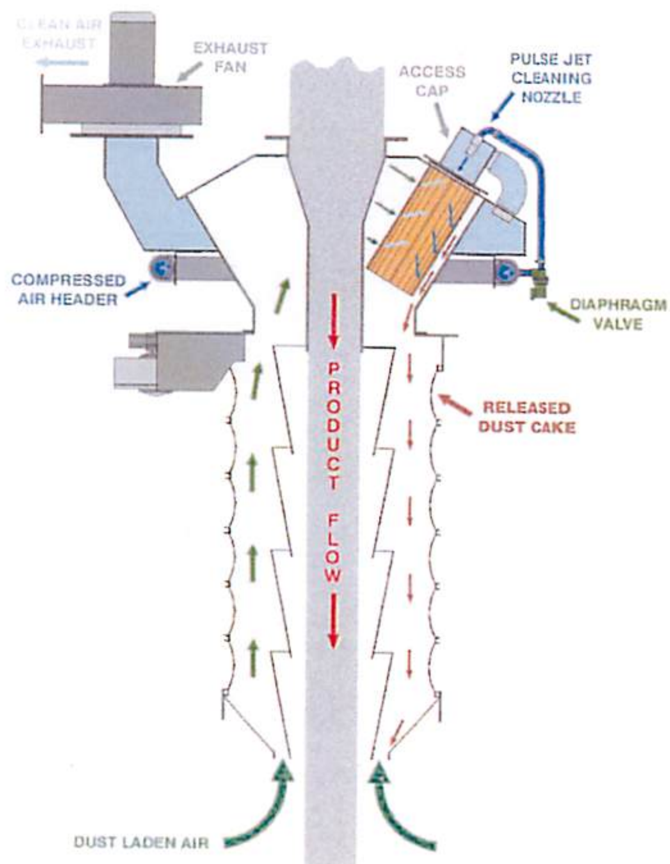
Compact Filter Module

APPLICATION

The Compact Filter Module is ideal for use inline at any bulk material transfer point requiring dust control. It's low profile configuration also makes the CFM the best choice for inline filteration when intergraded with a DCL Loading Spout. The flow tube can be eliminated making this unit suitable as a bin vent for any tight headroom conditions.

When used as an inline filter, product flows through a central flow tube while isolated from the upward dust entrained airflow. The collected dust is deposited back to the material being handled making the Compact Filter Module an ideal cost effective package especially when compared to a free standing dust collector utilizing duct work, discharge air lock, and often a means to convey the dust back to the system.





FEATURES

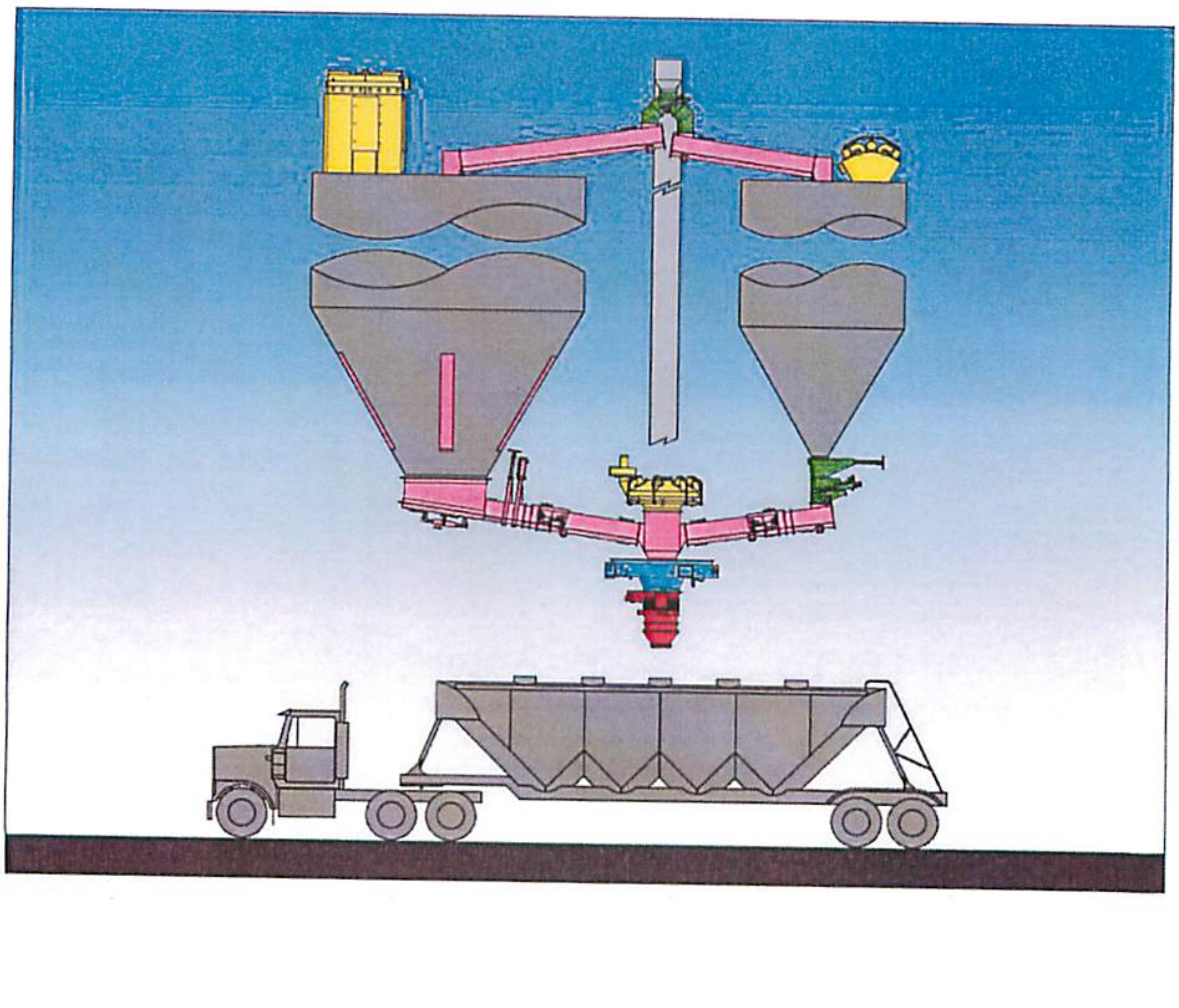
The exhaust fan can be directly mounted to the assembly eliminating the need for a remote fan placement. The unique design provides internal velocities that are lower than what is normally expected from conventional designs resulting in less load on the filtration media. The filter elements are automatically cleaned during operation with a conventional 80 PSI pulse jet system. The unit can be provided with a final clean feature that is activated at the end of each loading cycle fully cleaning all elements, eliminating residuals.

08660 Ance Road
Charlevoix, Michigan 49720

Dust Control and Loading Systems Inc
www.dclinc.com or sales@dclinc.com

Tele: 800-748-0563
231-547-5600

DUST CONTROL AND LOADING SYSTEMS
(https://www.dclinc.com/)

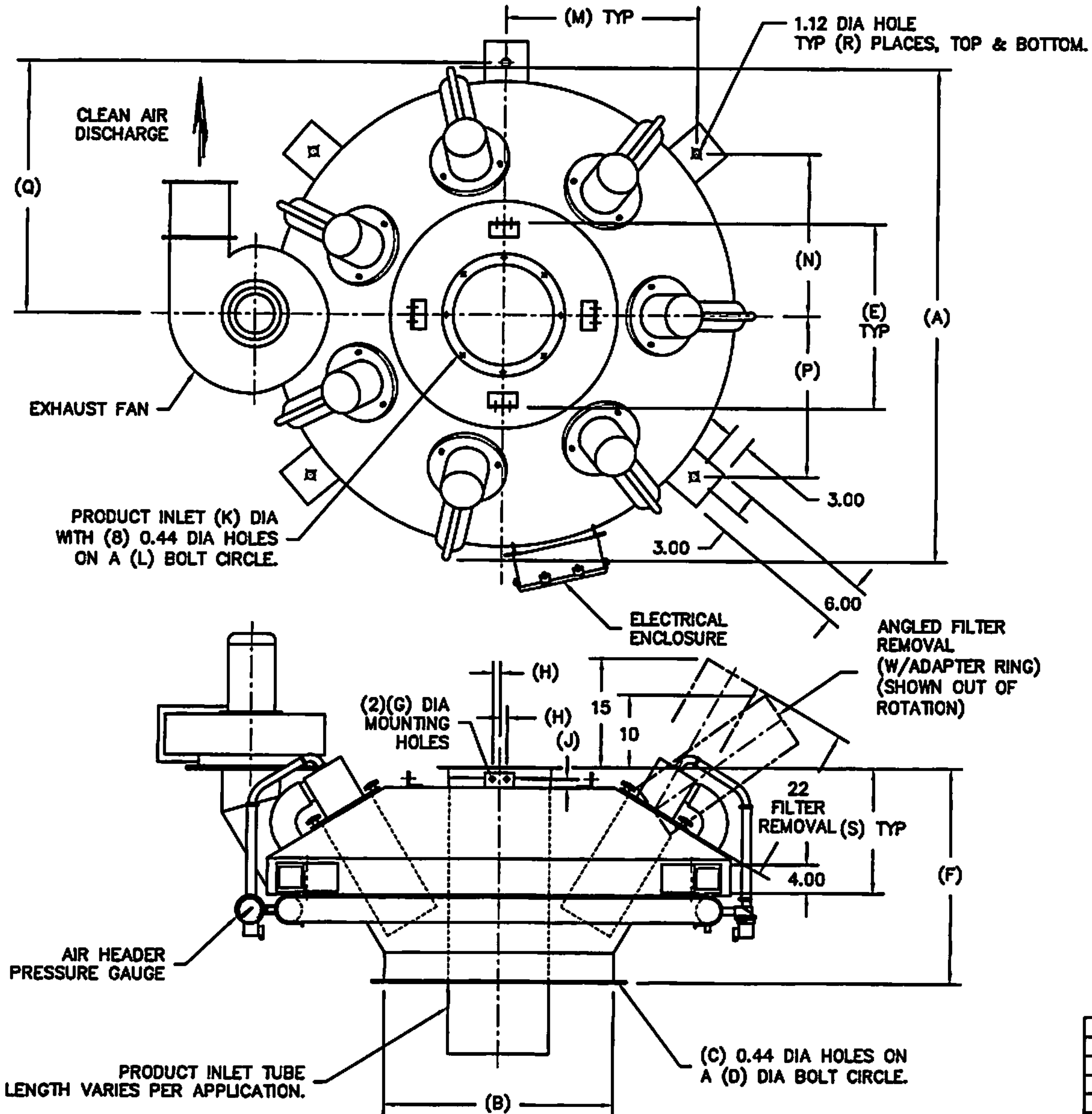


TRUCK LOADING

There are two major variables to truck loading, open and enclosed. The choice between the two is determined by what product you're loading and what type of truck. For example loading a tanker truck with cement varies from loading aggregates into a gravel train truck. The enclosed tanker already has a contained area and it's a matter of removing air inside the tanker that is displaced by the product being loaded. With an open style truck the Loading Spout must create its own containment. This is done by using a barrier skirt at the discharge of the Loading Spout. You must still remove the displaced air but the discharge skirt is a much smaller area than the inside of a tanker.

Providing a loading system to meet your needs encompasses moving product from your storage area (silo, dome, flat bottom storage) to the truck. A series of flow aids for your storage can be provided by DCL with our Fluidized Bin bottom or Fluidized Air Pads. The next critical component is the control valves. Whether it is maintenance, complete on/off, or portioning flow control we offer the complete line. Should you need to divert flow we also offer diverters and triverters. Actual conveying of material can be done with Air gravity conveyors (airslide) for powders or drag, screw or belt conveyors for other materials. DCL manufactures the Air Gravity conveyors but for other choices we have close partnerships with manufactures in the industry. Loading systems require dust control. Achieved by In-line collectors (CFM – compact filter modules) or bag house style collectors. Both offered and produced by DCL. Loading Spout Positioners provide flexibility and efficiency to your load out system. The Positioner moves the Loading Spout into the operators' desired location. This works well to improve the speed of the operation by eliminating the need to re-spot the truck under the spout. The final component is the Loading Spout. This component bridges the distance between the conveyor discharge and the vehicle being loaded. The Loading Spout is where DCL expertise really shines. As the largest supplier of Loading Spouts in North America we have created a reputation of knowing application and designing systems to accommodate the toughest challenges. Each terminal is unique in its layout, functionality, and product being loaded. Low height, multiple sizes of vehicles, and hatch location of vehicles require a supplier that understands what it takes to meet you goals. Remember DCL offers full controls of load out systems and can offer any degree of automation you desire. Ask about our SmartLoader and learn ways you can outperform your competitors.

MODEL	EST WGT	# FILTER	CLOTH AREA	FILTER LGTH	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
CFM155	520 LB*	4	156 SQ FT	18.00	64.00	24.00	12	25.88	22.13	30.00	0.56	1.00	1.13	14.00	16.00	19.94	–	23.75	31.06	3	17.31
CFM195	520 LB*	5	195 SQ FT	18.00	64.00	24.00	12	25.88	22.13	30.00	0.56	1.00	1.13	14.00	16.00	19.94	–	23.75	31.06	3	17.31
~~CFM270~~	~~700 LB*~~	~~7~~	~~273 SQ FT~~	~~18.00~~	~~68.00~~	~~32.00~~	~~12~~	~~34.00~~	~~30.00~~	~~30.00~~	~~0.56~~	~~1.00~~	~~1.13~~	~~14.00~~	~~16.00~~	~~26.81~~	~~22.50~~	~~22.50~~	~~–~~	~~4~~	~~17.38~~
CFM330	700 LB*	7	329 SQ FT	22.00	68.00	32.00	12	34.00	30.00	30.00	0.56	1.00	1.13	14.00	16.00	26.81	22.50	22.50	–	4	17.38
CFM470	1600 LB*	10	470 SQ FT	22.00	90.00	38.00	16	40.00	45.00	43.00	0.69	3.00	2.00	16.00	18.00	31.81	31.81	31.81	–	4	22.75
CFM660	1600 LB*	14	658 SQ FT	22.00	100.00	C/F	C/F	C/F	50.00	54.50	0.75	7.00	2.00	C/F	C/F	C/F	C/F	C/F	C/F	C/F	C/F



GENERAL NOTES:

ALL INDUSTRIAL VOLTAGES AVAILABLE FOR ELECTRICAL COMPONENTS.

PREWIRING OF ELECTRICAL COMPONENTS TO CFM HOUSING JUNCTION BOX OPTIONAL.

ELECTRICAL ENCLOSURES NEMA 4 STANDARD. NEMA 4X, 7, AND 9 OPTIONAL.

METAL SURFACES ARE POWER TOOL CLEANED, PRIMED, AND FINISHED WITH INDUSTRIAL ENAMEL.

AIR REQUIREMENTS FOR COMPRESSED AIR HEADER ARE (16) CFM @ (80–100) PSI.

SPECIFICATIONS AND/OR DIMENSIONAL DATA ARE SUBJECT TO CHANGE. CONSULT DCL FOR CERTIFIED DRAWINGS.

C/F = CONSULT FACTORY

*ESTIMATED WEIGHTS DO NOT INCLUDE EXHAUST FAN, OPTIONAL EQUIPMENT OR ELECTRICAL COMPONENTS.

REV	DATE	BY
D	02-20-12	TLC
C	04-23-02	JNM
B	09-28-00	JNM
A	10-16-97	JNM

DCL SPECIALISTS IN ADVANCED DESIGN LOADING SYSTEMS

DRAWN BY: JNM SCALE: NONE
CHECKED BY: ENG DATE: 03-04-97

TITLE: CFM COMPACT FILTER MODULE

DWG No: CFM-10001

DATA SHEET

TL-DCL – Pleated Filter Element

Top load style pleated filter element (PFE).*
Unique, aerodynamically designed high-flow orifice develops 30% more cleaning energy.**
Fits DCL Compact Filter Module (CFM) and Ventilation Module (VMV & VML) designs.

Standard Configuration

- Molded top boot and bottom puck made from bright white soft polyurethane eliminates metal end caps, making the filter intrinsically safe, with no possibility of isolated metal components.
- Molded top features a unique molded in place gasket design that eliminates separate glued-in-place gaskets.
- Polyurethane, polypropylene core and polyester components are safe for food contact (Per FDA 21 CFR 177).
- 3.89" (99-mm) inner core diameter
- 1.89" (48-mm) nominal pleat depth
- Standard Pleat Count – 90 Pleats
- Polypropylene Inner Core
- Standard design rated to 180°F operating temperature.

Configuration Options

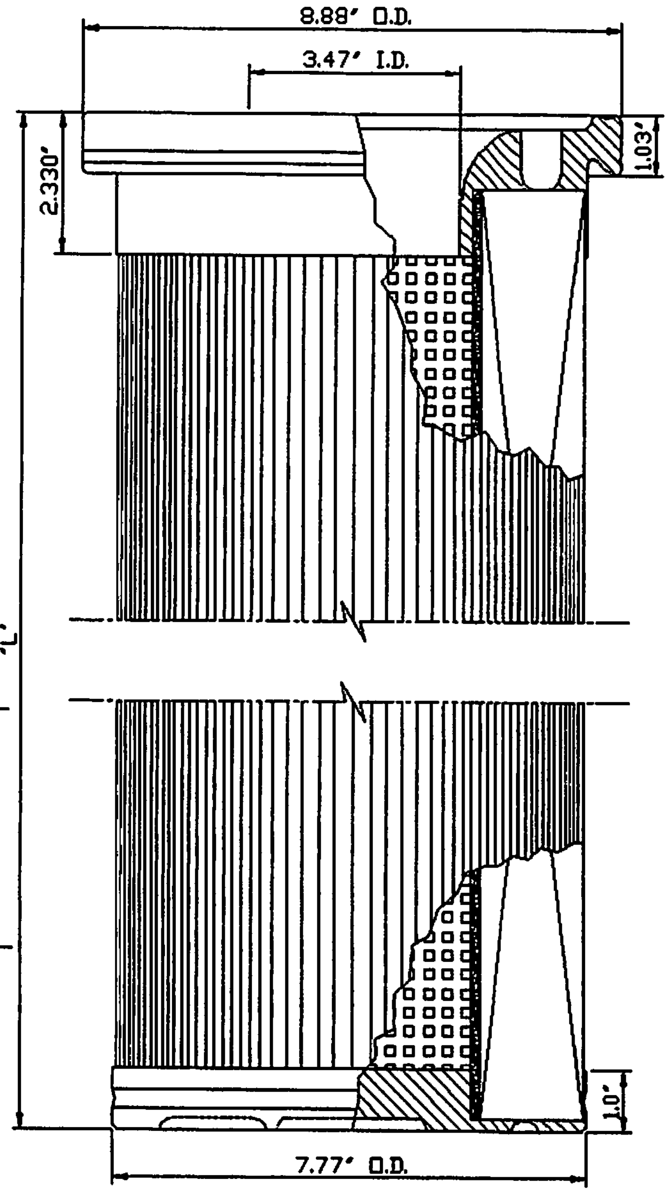
- ***Free Flow bottom design*** available in 45 pleat count
- Galvanized and SS Perforated Metal (Spiral Formed) – For temperatures >180°F and for high pressure / vacuum applications.
- Grounded designs (with conductive media, metal core and stainless steel ground wire).

Filter Media

- Base filter media: 100% spunbond polyester (SBPE)
- Filtration Efficiency: > 99.9 % for particle size range between 0.2 μ- 2.0 μ - BGIA Dust Class "M" rating
- Weight: 8.0 oz/yd2 (260 g/m2)
- Permeability: 15-30 acfm Frazier permeability at 0.5" w.g. dP
- Mullenburst Stength: 350 psi

Media Designation	Media Description
FM0103	100% spunbond polyester (SBPE)
FM0105	100% SBPE with hydrophobic & oliophobic finish
FM0109	100% SBPE with conductive grid
FM0203	100% SBPE with ePTFE membrane
FM0209	100% SBPE with conductive grid & ePTFE membrane

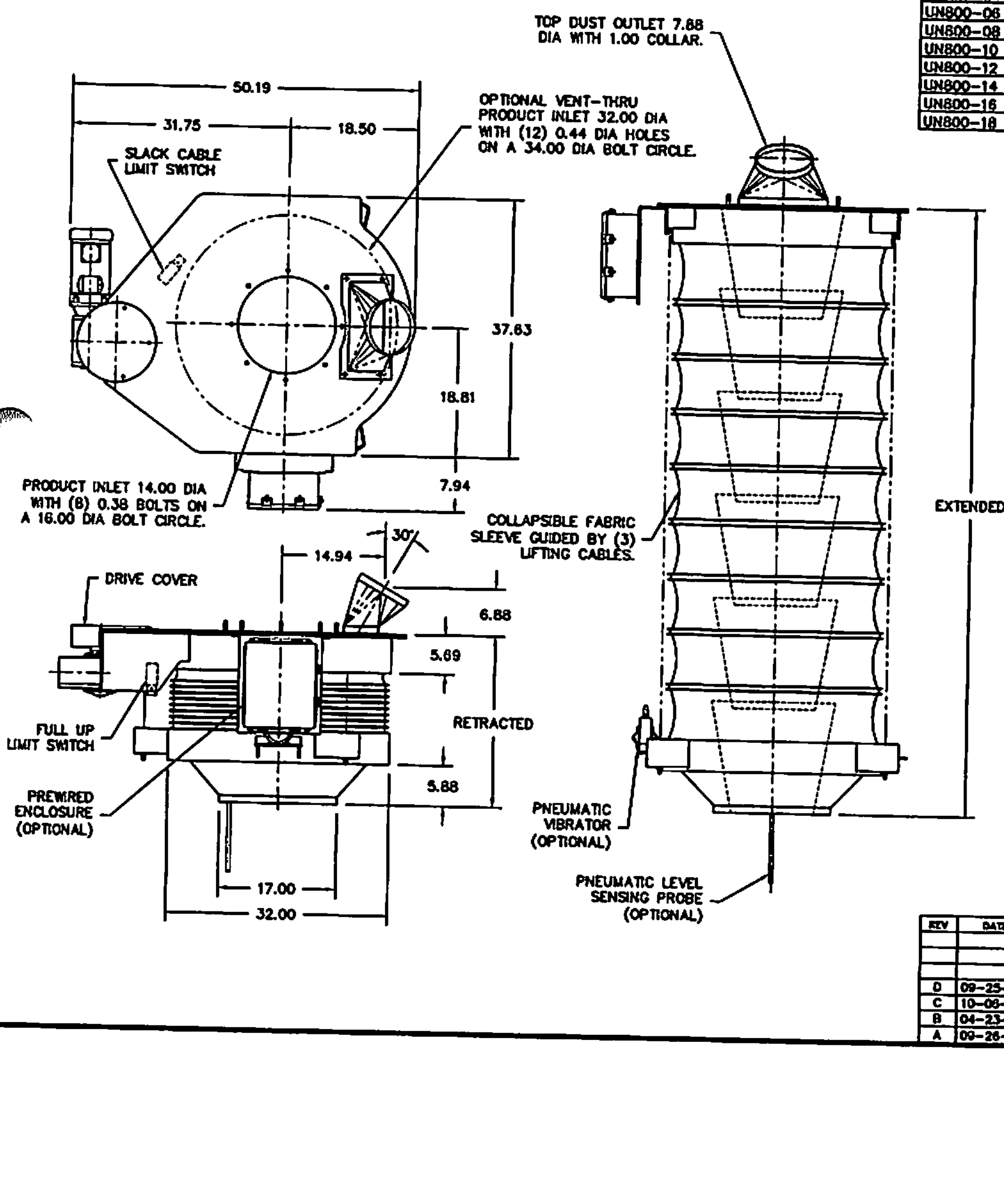
Overall Length "L"	Filter Area (sf) @ 90 pleats	No. of Straps
18.0"	39.0	1
22.0"	48.4	1
26.0"	57.8	1



*U.S. Patent No. D 626,208 & Patent Pending
**Confirmed by Independent 3rd party testing

DCL, Inc. • 08660 Ance Road Charlevoix, Michigan 49720 • United States
(800) 748-0563 • (231) 547-5600
http://www.dclinc.com/

MODEL	TRAVEL	RETR	EXTD	URE WGT	STL WGT	URE HP	STL HP
UN800-02	24.00	18.75	42.75	543 LB	588 LB	1 HP/B	1 HP/B
UN800-04	48.00	21.50	69.50	576 LB	662 LB	1 HP/B	1 HP/B
UN800-06	72.00	24.50	96.50	609 LB	738 LB	1 HP/B	1 HP/B
UN800-08	96.00	27.00	123.00	646 LB	817 LB	1 HP/B	1 HP/B
UN800-10	120.00	28.38	148.38	673 LB	867 LB	1 HP/B	1.5 HP/B
UN800-12	144.00	31.13	175.13	706 LB	943 LB	1 HP/B	1.5 HP/B
UN800-14	168.00	33.88	201.88	743 LB	1022 LB	1 HP/B	2 HP/B
UN800-16	192.00	36.63	228.63	777 LB	1099 LB	1 HP/B	1.5 HP/D
UN800-18	216.00	38.00	254.00	804 LB	1147 LB	1.5 HP/B	1.5 HP/D



GENERAL NOTES:

LOADING CAPACITY: 450 CFM
AVERAGE AIR WITHDRAWAL: 1400 TO 1800 CFM
LIFTING SPEED: 16 FPM AVG

ALL INDUSTRIAL VOLTAGES ARE AVAILABLE FOR ELECTRICAL COMPONENTS.

PREWIRING OF ELECTRICAL COMPONENTS TO SPOUT FRAME JUNCTION BOX OPTIONAL.

ELECTRICAL ENCLOSURES NEMA 4 STANDARD. NEMA 4X, 7, AND 9 OPTIONAL.

COLLAPSIBLE FABRIC SLEEVE CAN BE CONSTRUCTED OF URETHANE/NYLON, HYPALON/NYLON, OR A NUMBER OF OTHER FABRICS. SLEEVES COME STANDARD WITH ALUMINUM OUTER AND INNER RINGS.

METAL SURFACES ARE POWER TOOL CLEANED, PRIMED, AND FINISHED WITH INDUSTRIAL ENAMEL.

LOADING CAPACITY LISTED IS APPROXIMATE AND BASED ON FREE FLOWING PRODUCTS. CONSULT DCL FOR ACTUAL REQUIREMENTS.

AIR WITHDRAWAL REQUIREMENTS ARE AVERAGE. CONSULT DCL FOR FINAL RECOMMENDATIONS.

CONE CONSTRUCTION NOTES: CONTAINED INNER DESIGN STANDARD WITH 0.13 AR STEEL AND 0.13 304 OR 316 STAINLESS STEEL. OTHER MATERIALS AVAILABLE TO SUIT APPLICATION.

SPECIFICATIONS AND/OR DIMENSIONAL DATA ARE SUBJECT TO CHANGE. CONSULT DCL FOR CERTIFIED DRAWINGS.

OPTIONS:

150# INLET FLANGE. ADDS 3.00 TO RETRACTED HEIGHT.

LEVEL SENSORS: TILT PROBE, RF PROBE, CAPACITANCE PROBE, PNEUMATIC PROBE.

PNEUMATIC VIBRATOR KIT REQUIRES (40) CFM @ (80) PSI.

REV	DATE	BY
D	09-25-07	JNM
C	10-08-03	JNM
B	04-23-02	JNM
A	09-26-00	JNM

DCL — SPECIALISTS IN ADVANCED DESIGN LOADING SYSTEMS

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL 1/16" DECIMALS ANGULAR 1/2

DRAWN BY: JNM | SCALE: NONE
CHECKED BY: ENG | DATE: 01-04-99

TITLE: UN800 LOADING SPOUT (EV STYLE)

DRAWING No.: UN800-10001

DUFFIELD ASSOCIATES
Soil, Water & the Environment

AQM-5

EMISSIONS INFORMATION

INTRODUCTION TO AQM-5: EMISSIONS CALCULATIONS

Form AQM-5 of the air permitting application is designed to summarize the pollutants that will be emitted from facility operations and the rates at which they will be emitted. All calculations used to present the amount of pollutants emitted from each emissions point within the process are provided following the AQM-5 form. All calculations of emissions were based on emission factors published in the Environmental Protection Agency (EPA) AP-42: Compilation of Air Emissions Factors. These emissions factors are provided in tables which are attached with the emission calculations tables. A glossary of DNREC-provided definitions for terms used in this section is provided below.

carbon dioxide - (CO2) gas which is naturally present in the atmosphere as part of Earth's carbon cycle; primary greenhouse gas emitted through human activities, such as fossil fuel combustion.

carbon monoxide - (CO) a colorless, odorless gas that can be harmful when inhaled in large amounts; may be created by vehicles or machinery that burn fossil fuels.

ground level ozone - (O3) main ingredient in "smog" created by chemical reactions between nitrogen oxides and volatile organic compounds in the presence of sunlight; may come from reactions of pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, etc.

lead - (Pb) a naturally-occurring element found in the earth's crust; can be toxic to humans and animals; most exposure to lead is from human activities including the use of fossil fuels, industrial facilities, and past use of lead paint in homes.

nitrogen dioxide - (NO2) a group of highly reactive gases caused primarily by the burning of fuel from vehicles, power plants, and off-road equipment; component of acid rain; contributes to haze; contributes to nutrient pollution in water.

particulate matter - a mixture of solid particles and liquid droplets found in the air; measured as PM10: particles with diameters of 10 micrometers and smaller, or PM2.5: fine particles with diameters of 2.5 micrometers and smaller; may contribute to health effects when inhaled.

sulfur dioxide - (SO2) a group of gases caused largely by fossil fuel combustion at power plants and other industrial facilities; may be caused naturally by volcanic eruptions.

volatile organic compound – (VOC) gases emitted from certain solids or liquids; include a variety of chemicals made up of organic compounds from paints, wood preservatives, aerosols, cleaners, fuels, pesticides, etc.

Source of definitions: DNREC: Environmental Perspectives Air Quality Glossary

COMPARISON OF EMISSIONS WITH NAAQS AND WILMINGTON AIR QUALITY

As a result of the Clean Air Act, the EPA created the National Ambient Air Quality Standards (NAAQS) which set standard levels for pollutants considered harmful to public health and the environment. These standards levels have two categories. Primary standards are set to protect public health which includes sensitive populations such as asthmatics, children, and the elderly. The secondary standards provide protection to the wellbeing of the public and environment which includes the prevention of damage to animals, crops, buildings, and vegetation. There are six principal pollutants that the NAAQS provide standards for, which are known as "criteria air pollutants". The six criteria air pollutants are Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO_2), Ozone (O_3), Particle Pollution (PM), and Sulfur Dioxide (SO_2). The following is a table summarizing the NAAQS.

National Ambient Air Quality Standards

	Primary Standards		Secondary Standards		
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**	**Form**
Carbon Monoxide (CO)	9 ppm (10 mg/m3)	8 hours	None		Not to be exceeded more than once per year
	35 ppm (40 mg/m3)	1 hour			
Lead (Pb)	0.15 µg/m3	Rolling 3-Month Average	Same as Primary		Not to be exceeded
	1.5 µg/m3	Quarter average	Same as Primary		
Nitrogen Dioxide (NO2)	53 ppb	1 year	Same as Primary		Annual mean
	100 ppb	1 hour	None		98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
Particulate Matter (PM10)	150 µg/m3	24 hours	Same as Primary		Not to be exceeded more than once per year on average over 3 years
Particulate Matter (PM2.5)	12.0 µg/m3	1 year	15.0 µg/m3	1 year	Annual mean, averaged over 3 years
	35 µg/m3	24 hours	Same as Primary		98th percentile, averaged over 3 years
Ozone (O3)	75 ppb (2008 std)	8 hours	Same as Primary		
	70 ppb	8 hours	Same as Primary		Annual 4th - highest daily maximum 8-hour concentration, averaged over 3 years
Sulfur Dioxide (SO2)	75 ppb	1 hour	0.5 ppm	3 hours	Primary : 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
					Secondary : Not to be exceeded more than once per year

Source: EPA Criteria Air Pollutants NAAQS Table

The SCREEN3 air dispersion model was used to create a simple dispersion model of substance concentrations emitted from the GGBFS grinding facility. The results of the SCREEN3 dispersion model for each emission are provided in AQM-5 Emissions Calculations. The model calculates the maximum concentrations in micrograms per cubic meter at a certain distance from the point source, with the point source being the stack exhausts. Input data for the model, including emissions rates, stack parameters, and exhaust gas flow rates, is detailed in the air permit application. The annual air quality monitoring results from the MLK monitoring station in Wilmington, Delaware, published by DNREC in 2016, and are also used for comparison with the facility's emissions. The Total Pollutant Concentrations are the additions of the 2016 air quality monitoring results in Wilmington with the modeled emitted pollutant concentrations from the facility. The table comparing the facility's emissions, NAAQS, and MLK air quality results is provided below.

WALAN Specialty Construction Products, LLC
Emissions Comparison Table

Substance	Emission Point	Calculated total substance concentration (ug/m3) (a)	Wilmington MLK 2016 Air Quality Monitoring Results (ug/m3) (c)	Total Substance Concentration (ug/m3)	NAAQS Primary Standards (ug/m3) (b)	NAAQS Secondary Standards (ug/m3)
PM10	EP-3 - Grinding Baghouse	5.469	14.2	20.81	150	Same as primary
	EP-4 & EP-5 - Silo Bin Vents	0.1149				
	EP-6 and EP-7 - Loadout Chutes	1.029				
PM2.5	EP-3 - Grinding Baghouse	1.953	9.2	11.16	12	15
	EP-3 - Drying Emissions	0.0055			35	
SOx (SO2)	EP-3 - Drying Emissions	0.0073	13.1	13.11	196.5	1310
NOx (NO2)	EP-3 - Drying Emissions	1.329	22.56	23.89	188	None
CO	EP-3 - Drying Emissions	1.111	1832	1833.11	40000	None
					10000	

Notes:

a) Total substance concentration in micrograms per cubic meter (ug/m3) were calculated using the Screen3 dispersion modeling program.

Models were created for each emissions stack.

The maximum 1-hour concentrations from the model were used in the comparison.

b) Refer to the NAAQS summary table. Averaging times vary for both Primary and Secondary standards.

c) NO2 Results reported in annual arithmetic means in ppb and converted to ug/m3

CO Results reported in maximum ppm and converted to ug/m3

PM2.5 Results reported in a 3-year average of annual averages ug/m3

PM10 Results reported as an annual average in ug/m3

SO2 Results reported as the annual 99th percentile 1-hour average in ppb and converted to ug/m3

d) Lead (Pb) and Ozone (O3) are criteria air pollutants that are not included in comparison.

Total Particulate Matter (PM) and volatile organic compounds (VOC) are modeled for dispersion, but are not included in the comparison.

Emissions Information Application

If you are using this form electronically, press F1 at any time for help

Process Information

1.	Number of Individual Pieces of Process Equipment in Process:	**Six: Feed hopper, two bucket elevators, grinder/dryer, two silos**
2.	Number of Individual Control Devices in Process:	**Five dust collectors: grinding, two silos, two dustless loadouts**

Emissions Information for First Emission Point/Stack

3. Emission Point Name: **EP-1 & EP-2 - Fugitive GBFS Handling**

4. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:

5. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 5.10 through 5.18)	CAS Number (Not required for 5.1 through 5.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
5.1.	Particulate Matter (PM)		**0.047 lbs/hour**	**0.047 lbs/hour**	**0.207** tons/year	**0.207** tons/year
5.2.	PM_{10}		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.3.	$PM_{2.5}$		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.4.	Sulfur Oxides (SO_X)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.5.	Nitrogen Oxides (NO_X)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.6.	Carbon Monoxide (CO)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.7.	Total Volatile Organic Compounds (VOCs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.8.	Total Hazardous Air Pollutants (HAPs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year

Emissions Information for First Emission Point/Stack

5.9.	CO_2		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.10.	CO_{2e}		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
5.11.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
5.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

6. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Second Emission Point/Stack

7. Emission Point Name: **EP-3 - GBFS Drying**

8. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: **2**

9. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 9.10 through 9.18)	CAS Number (Not required for 9.1 through 9.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
9.1.	Particulate Matter (PM)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
9.2.	PM_{10}		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
9.3.	$PM_{2.5}$		**0.055 lbs/hour**	**0.0003 lbs/hour**	**0.0012** tons/year	**0.0012** tons/year

Emissions Information for Second Emission Point/Stack

9.4.	Sulfur Oxides (SO_X)		**0.004 lbs/hour**	**0.004 lbs/hour**	**0.019** tons/year	**0.019** tons/year
9.5.	Nitrogen Oxides (NO_X)		**0.724 lbs/hour**	**0.724 lbs/hour**	**3.171** tons/year	**3.171** tons/year
9.6.	Carbon Monoxide (CO)		**0.608 lbs/hour**	**0.608 lbs/hour**	**2.664** tons/year	**2.664** tons/year
9.7.	Total Volatile Organic Compounds (VOCs)		**0.040 lbs/hour**	**0.040 lbs/hour**	**0.174** tons/year	**0.174** tons/year
9.8.	Total Hazardous Air Pollutants (HAPs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
9.9.	CO_2		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
9.10.	CO_{2e}		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
9.11.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
9.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

10. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Third Emission Point/Stack

11. Emission Point Name: **EP-3 - GBFS Grinding**

12. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: **2**

13. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

Emissions Information for Third Emission Point/Stack

	Pollutant Name (Specify VOCs and HAPs Individually in 13.10 through 13.18)	CAS Number (Not required for 13.1 through 13.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
13.1.	Particulate Matter (PM)		**242.4 lbs/hour**	**1.212 lbs/hour**	**5.309** tons/year	**5.309** tons/year
13.2.	PM_{10}		**203.4 lbs/hour**	**1.017 lbs/hour**	**4.454** tons/year	**4.454** tons/year
13.3.	$PM_{2.5}$		**72.6 lbs/hour**	**0.363 lbs/hour**	**1.590** tons/year	**1.590** tons/year
13.4.	Sulfur Oxides (SO_X)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
13.5.	Nitrogen Oxides (NO_X)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
13.6.	Carbon Monoxide (CO)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
13.7.	Total Volatile Organic Compounds (VOCs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
13.8.	Total Hazardous Air Pollutants (HAPs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
13.9.	CO_2		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
13.10.	CO_{2e}		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
13.11.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
13.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

14. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Emissions Information for Fourth Emission Point/Stack

15. Emission Point Name: **EP-4, EP-5, EP-6, & EP-7 - GGBFS Storage and Loadout**

16. Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack:

17. Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 17.10 through 17.18)	CAS Number (Not required for 17.1 through 17.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
17.1.	Particulate Matter (PM)		**43.8 lbs/hour**	**0.059 lbs/hour**	**0.260** tons/year	**0.260** tons/year
17.2.	PM_{10}		**28.2 lbs/hour**	**0.020 lbs/hour**	**0.089** tons/year	**0.089** tons/year
17.3.	$PM_{2.5}$		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.4.	Sulfur Oxides (SO_X)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.5.	Nitrogen Oxides (NO_X)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.6.	Carbon Monoxide (CO)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.7.	Volatile Organic Compounds (VOCs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.8.	Total Hazardous Air Pollutants (HAPs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.9.	CO_2		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.10.	CO_{2e}		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
17.11.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.13.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.14.			**lbs/hour**	**lbs/hour**	tons/year	tons/year
17.15.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

Emissions Information for Fourth Emission Point/Stack

18. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

If there are more than four Emission Points/Stacks, attach additional copies of this form as needed.

Overall Process Emissions

19. Pollutant Emissions

If more than 15 pollutants are emitted from this Process, attach additional copies of this page as needed.

	Pollutant Name (Specify VOCs and HAPs Individually in 19.10 through 19.18)	CAS Number (Not required for 19.1 through 19.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
19.1.	Particulate Matter (PM)		**286.247 lbs/hour**	**1.318 lbs/hour**	**5.776** tons/year	**5.776** tons/year
19.2.	PM_{10}		**231.600 lbs/hour**	**1.037 lbs/hour**	**4.543** tons/year	**4.543** tons/year
19.3.	$PM_{2.5}$		**72.655 lbs/hour**	**0.366 lbs/hour**	**1.591** tons/year	**1.591** tons/year
19.4.	Sulfur Oxides (SO_X)		**0.004 lbs/hour**	**0.004 lbs/hour**	**0.019** tons/year	**0.019** tons/year
19.5.	Nitrogen Oxides (NO_X)		**0.724 lbs/hour**	**0.724 lbs/hour**	**3.171** tons/year	**3.171** tons/year
19.6.	Carbon Monoxide (CO)		**0.608 lbs/hour**	**0.608 lbs/hour**	**2.664** tons/year	**2.664** tons/year
19.7.	Total Volatile Organic Compounds (VOCs)		**0.040 lbs/hour**	**0.040 lbs/hour**	**0.174** tons/year	**0.174** tons/year
19.8.	Total Hazardous Air Pollutants (HAPs)		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
19.9.	CO_2		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
19.10.	CO_{2e}		**N/A lbs/hour**	**N/A lbs/hour**	**N/A** tons/year	**N/A** tons/year
19.12.			**lbs/hour**	**lbs/hour**	tons/year	tons/year

Overall Process Emissions

19.13.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.14.		**lbs/hour**	**lbs/hour**	tons/year	tons/year
19.15.		**lbs/hour**	**lbs/hour**	tons/year	tons/year

20. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above:

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Minor New Source Review Information

21. Does the Process Have the Potential to Emit More Than Five Tons Per Year of Any Pollutant? ☒ YES ☐ NO

22. Is the Source New or Existing? ☒ NEW ☐ EXISTING
See Question 11 of AQM-1

If the Process has the Potential to Emit more than five tons per year of any pollutant, and is a New Source, a Control Technology Analysis pursuant to Regulation No. 1125 Section 4 must be conducted and attached to this application.

Major New Source Review Information

23. Does the Process Have the Potential to Emit More Than the Significance Level for Any Pollutant? *(Check All That Apply)*

- ☐ Greater Than 25 Tons Per Year of Particulate Matter (PM)
- ☐ Greater Than 15 Tons Per Year of PM_{10}
- ☐ Greater Than 10 Tons Per Year of $PM_{2.5}$
- ☐ Greater Than 40 Tons Per Year of Sulfur Dioxide(SO_2)
- ☐ Greater Than 25 Tons Per Year of Nitrogen Oxides (NO_X) in New Castle and Kent County
- ☐ Greater Than 100 Tons Per Year of Nitrogen Oxides (NO_X) in Sussex County
- ☐ Greater Than 100 Tons Per Year of Carbon Monoxide (CO)
- ☐ Greater Than 25 Tons Per Year of Total Volatile Organic Compounds (VOCs) in New Castle and Kent County
- ☐ Greater Than 50 Tons Per Year of Total Volatile Organic Compounds (VOCs) in Sussex County
- ☐ Greater Than 75,000 Tons Per Year of Equivalent Carbon Dioxide (CO_{2e})

If the Process has the Potential to Emit greater than any of the amounts listed above 7 DE Admin. Code 1125 Sections 2 and/or 3 apply. Contact the Department at (302) 323-4542 or (302) 739-9402 for additional information

Additional Information

24. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 24.

24.1. Describe:

AQM-5
Emissions Calculations

WALAN Specialty Construction Products, LLC
501 Christina Avenue, Wilmington, DE 19801
Emission Points Summary Table

<table>
<tr><th>Emission Point (1)</th><th>Description</th><th>Process</th><th>Maximum Annual GGBFS Throughput (Tons) (2)</th><th>Pollutants Emitted (3)</th></tr>
<tr><td>EP-1</td><td>Dust drop from trucks to stockpile (fugitive dust emissions)</td><td>Handling</td><td rowspan="6">262,800</td><td>PM</td></tr>
<tr><td>EP-2</td><td>Dust drop from front end loader into feed hopper (fugitive dust emissions)</td><td>Handling</td><td>PM</td></tr>
<tr><td rowspan="2">EP-3</td><td>Grinding mill (stack emissions)</td><td>Grinding</td><td>PM, PM10, PM2.5</td></tr>
<tr><td>Integral Dryer (stack emissions)</td><td>Drying</td><td>PM2.5, NOx, SOx, CO, VOC</td></tr>
<tr><td>EP-4 and EP-5</td><td>Baghouses on two storage silos (stack emissions)</td><td>Storage</td><td>PM10, PM2.5</td></tr>
<tr><td>EP-6 and EP-7</td><td>Baghouses on two dustless loadout chutes (stack emissions)</td><td>Loadout</td><td>PM10, PM2.5</td></tr>
</table>

Notes:
(1) See process flow diagram
(2) The maximum GBFS throughput rate is 30 tons/hour. The facility has the potential to process GBFS three shifts per day, 365 days per year for a total of 8760 operational hours per year.
(3) Estimated particle sizes for GBFS range from 200 - 4750 microns. Emissions from material handling operations are expressed as PM only.

WALAN Specialty Construction Products, LLC
Handling Operations PM Emissions

EP-1 - Dust drops from trucks to stockpile								
Substance	**Moisture Content (%) *(a)***	**k *(b)***	**U (mph) *(c)***	**E (lb/ton) *(d)***	**Maximum Hourly Throughput (ton/hr) *(e)***	**Uncontrolled Hourly Emissions (lb/hr)**	**Controlled Hourly Emissions (lb/hr)**	**PTE (tons/year) *(f)***
PM	9	0.74	10.84	7.884E-04	30	2.365E-02	2.365E-02	1.036E-01

EP-2 - Dust drops from stockpile to feed hopper								
Substance	**Moisture Content *(a)***	**k *(b)***	**U (mph) *(c)***	**E (lb/ton) *(d)***	**Maximum Hourly Throughput (ton/hr) *(e)***	**Uncontrolled Hourly Emissions (lb/hr)**	**Controlled Hourly Emissions (lb/hr)**	**PTE (tons/year) *(f)***
PM	9	0.74	10.84	7.884E-04	30	2.365E-02	2.365E-02	1.036E-01

	Uncontrolled Hourly Emissions (lb/hr)	**Controlled Hourly Emissions (lb/hr)**	**PTE (tons/year) *(f)***
Total Emissions =	**0.047**	**0.047**	**0.207**

(a) Estimated moisture content of salt used for calculation.

(b) k = particle size multiplier for average particle diameter for PM < 30 microns

(c) U = Mean wind speed for Wilmington, DE (Source: www.usa.com/wilmington-de.htm)

(d) E = Emission factor. Equation provided below detailed in USEPA AP-42 Section 13.2.4 (Revised 11/06)

(e) Estimated GBFS throughput rate

(f) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

Operational flexibility allows the facility to operatre anytime during the week's two shifts. Actual operation schedule will likely be less.

Emission Factor Equation:

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

Where:
E = Emission Factor (lb/ton)
k = particle size multiplier
U = mean wind speed (mph)
M = GBFS moisture content (%)

WALAN Specialty Construction Products, LLC
EP-3 - Emissions from GBFS Grinding

Substance	Uncontrolled Emissions: Emission Factor (lb/ton) *(a)*	Uncontrolled Emissions: Emissions Rate (lb/hr) *(b)*	Controlled Emissions: Emission Factor (lb/ton) *(c)*	Controlled Emissions: Emissions Rate (lb/hr) *(b)*	Controlled Emissions: PTE (tons/year) *(d)*
PM	8.08	242.4	0.0404	1.212	5.309
PM10	6.78	203.4	0.0339	1.017	4.454
PM2.5	2.42	72.6	0.0121	0.363	1.590

Notes:

(a) Uncontrolled emission factors were calculated using the controlled emissions factors and a baghouse removal efficiency of 99.5%

(b) Emission rates calculated using a maximum hourly GBFS throughput of 30 tons/hour

(c) Emission factors provided in AP-42, Table 11.19.2-4

(d) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

WALAN Specialty Construction Products, LLC
Emissions from Natural Gas Combustion

EP-3 - Natural gas-firing Air Heating Unit				
Substance	**Emission Factor (lb/10^6 scf)** *(a)*	**Uncontrolled Hourly Emissions (lb/hr)** *(b)*	**Controlled Hourly Emissions (lb/hr)** *(b)*	**PTE (tons/year)** *(c)*
PM2.5	7.6	0.055	0.0003	0.0012
CO	84	0.608	NA	2.664
NOx	100	0.724		3.171
SOx	0.6	0.004		0.019
VOC	5.5	0.040		0.174

Notes:

(a) Emissions factors taken from AP-42, Tables 1.4-1 and 1.4-2

(b) A maximum firing rate of 7,240 scf/ft2 for the natural gas fired burner was used in the calculation

A 99.5% removal efficiency of PM2.5 by the baghouse is assumed for calculations

(c) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

WALAN Specialty Construction Products, LLC
Storage Silos and Loadout PM Emissions

	EP-4 & EP-5 - Loading of GGBFS into Two Storage Silos (Baghouse)				
	Uncontrolled Emissions		Controlled Emissions		
Substance	Emission Factor (lb/ton) *(a)*	Emissions Rate (lb/hr) *(b)*	Emission Factor (lb/ton) *(a)*	Emissions Rate (lb/hr) *(b)*	PTE (tons/year) *(c)*
PM	0.73	21.9	0.00099	0.0297	0.130
PM10	0.47	14.1	0.00034	0.0102	0.045

	EP-6 & EP-7 - Loading of GGBFS into Enclosed Trucks (Cartridge Filter)				
	Uncontrolled Emissions		Controlled Emissions		
Substance	Emission Factor (lb/ton) *(a)*	Emissions Rate (lb/hr) *(b)*	Emission Factor (lb/ton) *(a)*	Emissions Rate (lb/hr) *(b)*	PTE (tons/year) *(c)*
PM	0.73	21.9	0.00099	0.0297	0.130
PM10	0.47	14.1	0.00034	0.0102	0.045

Total Emissions			
Substance	Uncontrolled Hourly Emissions (lb/hr)	Controlled Hourly Emissions (lb/hr)	PTE (tons/year) *(f)*
PM	**43.8**	**0.059**	**0.260**
PM10	**28.2**	**0.020**	**0.089**

Notes:

(a) Emission rates calculated using a maximum hourly GBFS throughput of 30 tons/hour

(b) Emission factors for concrete batching - cement silo loading were used and are provided in AP-42, Table 11.19.2-4

The same emission factors were used for enclosed truck loading because it is a similar process

and any dust captured during loadout is vented through similar baghouses.

(c) Potential To Emit was calculated assuming facility operates for 8760 hours/year at a maximum throughput of 262,800 tons/year

WALAN Specialty Construction Products, LLC
Summary of Emissions

Emission Point	PM			PM10			PM2.5		
	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)
EP-1, EP-2 - Material Handling	0.047	0.047	0.207						
EP-3 - Grinding	242.4	1.212	5.309	203.4	1.017	4.454	72.6	0.363	1.59
EP-3 - Drying							0.055	0.003	0.0012
EP-4, EP-5, EP-6, EP-7 - GGBFS Storage and Loadout	43.8	0.059	0.26	28.2	0.02	0.089			
Total Emissions	286.247	1.318	5.776	231.600	1.037	4.543	72.655	0.366	1.591

WALAN Specialty Construction Products, LLC
Summary of Emissions

Emission Point	SOx			NOx		
	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)
EP-1, EP-2 - Material Handling						
EP-3 - Grinding						
EP-3 - Drying	0.004	0.004	0.019	0.724	0.724	3.171
EP-4, EP-5, EP-6, EP-7 - GGBFS Storage and Loadout						
Total Emissions	0.004	0.004	0.019	0.724	0.724	3.171

Emission Point	CO			VOC		
	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)	Uncontrolled (lb/hr)	Controlled (lb/hr)	PTE (tons/year)
EP-1, EP-2 - Material Handling						
EP-3 - Grinding						
EP-3 - Drying	0.608	0.608	2.664	0.04	0.04	0.174
EP-4, EP-5, EP-6, EP-7 - GGBFS Storage and Loadout						
Total Emissions	0.608	0.608	2.664	0.040	0.040	0.174

Table 11.19.2-3 (Metric Units). EMISSION FACTORS FOR PULVERIZED MINERAL PROCESSING OPERATIONS [a]

Source [b]	Total Particulate Matter	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Grinding (Dry) with Fabric Filter Control (SCC 3-05-038-11)	0.0202	D	0.0169	B	0.0060	B
Classifiers (Dry) with Fabric Filter Control (SCC 3-05-038-12)	0.0112	E	0.0052	E	0.0020	E
Flash Drying with Fabric Filter Control (SCC 3-05-038-35)	0.0134	C	0.0073	C	0.0042	C
Product Storage with Fabric Filter Control (SCC 3-05-38-13)	0.0055	E	0.0008	E	0.0003	E

a. Emission factors represent controlled emissions unless noted. Emission factors are in kg/Mg of material throughput.

b. Date from references 16 through 23

Table 11.19.2-4 (English Units). EMISSION FACTORS FOR PULVERIZED MINERAL PROCESSING OPERATIONS [a]

Source [b]	Total Particulate Matter	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Grinding (Dry) with Fabric Filter Control (SCC 3-05-038-11)	0.0404	D	0.0339	B	0.0121	B
Classifiers (Dry) with Fabric Filter Control (SCC 3-05-038-12)	0.0225	E	0.0104	E	0.0041	E
Flash Drying with Fabric Filter Control (SCC 3-05-038-35)	0.0268	C	0.0146	C	0.0083	C
Product Storage with Fabric Filter Control (SCC 3-05-038-13)	0.0099	E	0.0016	E	0.0006	E

a. Emission factors represent controlled emissions unless noted. Emission factors are in lb/Ton of material throughput.

b. Data from references 16 through 23

TABLE 11.12-2 (ENGLISH UNITS)
EMISSION FACTORS FOR CONCRETE BATCHING [a]

Source (SCC)	Uncontrolled				Controlled			
	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating
Aggregate transfer [b] (3-05-011-04,-21,23)	0.0069	D	0.0033	D	ND		ND	
Sand transfer [b] (3-05-011-05,22,24)	0.0021	D	0.00099	D	ND		ND	
Cement unloading to elevated storage silo (pneumatic)[c] (3-05-011-07)	0.73	E	0.47	E	0.00099	D	0.00034	D
Cement supplement unloading to elevated storage silo (pneumatic)[d] (3-05-011-17)	3.14	E	1.10	E	0.0089	D	0.0049	E
Weigh hopper loading [e] (3-05-011-08)	0.0048	D	0.0028	D	ND		ND	
Mixer loading (central mix)[f] (3-05-011-09)	0.572 or Eqn. 11.12-1	B	0.156 or Eqn. 11.12-1	B	0.0184 or Eqn. 11.12-1	B	0.0055 or Eqn. 11.12-1	B
Truck loading (truck mix)[g] (3-05-011-10)	1.118	B	0.310	B	0.098 or Eqn. 11.12-1	B	0.0263 or Eqn. 11.12-1	B
Vehicle traffic (paved roads)	See AP-42 Section 13.2.1, Paved Roads							
Vehicle traffic (unpaved roads)	See AP-42 Section 13.2.2, Unpaved Roads							
Wind erosion from aggregate and sand storage piles	See AP-42 Section 13.2.5, Industrial Wind Erosion							

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO_x) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION[a]

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO_x[b]		CO	
	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS)[c]	280	A	84	B
Uncontrolled (Post-NSPS)[c]	190	A	84	B
Controlled - Low NO_x burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO_x burners	50	D	84	B
Controlled - Low NO_x burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

[b] Expressed as NO_2. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO_x emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO_x emission factor.

[c] NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6\ m^3$, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6\ scf] = (3.67)\ (CON)\ (C)(D)$, where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, $4.2x10^4\ lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2.
Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

SCREEN3 Dispersion Modeling Results

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

EP3 grinding PM

SIMPLE TERRAIN INPUTS:

```
   SOURCE TYPE              =        POINT
   EMISSION RATE (G/S)      =     0.152700
   STACK HEIGHT (M)         =      25.2980
   STK INSIDE DIAM (M)      =       0.9144
   STK EXIT VELOCITY (M/S)=         7.5195
   STK GAS EXIT TEMP (K)    =     369.1500
   AMBIENT AIR TEMP (K)     =     293.0000
   RECEPTOR HEIGHT (M)      =       0.0000
   URBAN/RURAL OPTION       =        URBAN
   BUILDING HEIGHT (M)      =       0.0000
   MIN HORIZ BLDG DIM (M) =         0.0000
   MAX HORIZ BLDG DIM (M) =         0.0000
```

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE =   10463.000   (ACFM)

BUOY. FLUX =   3.180 M**4/S**3; MOM. FLUX =   9.381 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	5.081	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	6.469	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	6.041	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	5.626	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	4.808	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	4.595	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	4.650	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	4.510	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	4.282	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	4.023	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	3.761	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	3.511	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	3.279	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	3.065	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	2.871	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	2.695	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	2.535	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	2.390	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	2.259	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	2.139	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	2.030	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	1.930	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

2300.	1.839	6	1.0	1.3	10000.0	58.35	182.83	87.73	NO
2400.	1.755	6	1.0	1.3	10000.0	58.35	188.81	90.02	NO
2500.	1.677	6	1.0	1.3	10000.0	58.35	194.68	92.25	NO
2600.	1.606	6	1.0	1.3	10000.0	58.35	200.46	94.44	NO
2700.	1.540	6	1.0	1.3	10000.0	58.35	206.15	96.58	NO
2800.	1.478	6	1.0	1.3	10000.0	58.35	211.75	98.68	NO
2900.	1.421	6	1.0	1.3	10000.0	58.35	217.26	100.75	NO
3000.	1.368	6	1.0	1.3	10000.0	58.35	222.69	102.77	NO
3500.	1.150	6	1.0	1.3	10000.0	58.35	248.70	112.40	NO
4000.	0.9894	6	1.0	1.3	10000.0	58.35	273.04	121.32	NO
4500.	0.8664	6	1.0	1.3	10000.0	58.35	295.97	129.66	NO
5000.	0.7697	6	1.0	1.3	10000.0	58.35	317.68	137.52	NO
5500.	0.6917	6	1.0	1.3	10000.0	58.35	338.34	144.98	NO
6000.	0.6277	6	1.0	1.3	10000.0	58.35	358.06	152.08	NO
6500.	0.5743	6	1.0	1.3	10000.0	58.35	376.96	158.88	NO
7000.	0.5290	6	1.0	1.3	10000.0	58.35	395.11	165.40	NO
7500.	0.4902	6	1.0	1.3	10000.0	58.35	412.61	171.69	NO
8000.	0.4566	6	1.0	1.3	10000.0	58.35	429.50	177.76	NO
8500.	0.4273	6	1.0	1.3	10000.0	58.35	445.84	183.63	NO
9000.	0.4014	6	1.0	1.3	10000.0	58.35	461.69	189.32	NO
9500.	0.3785	6	1.0	1.3	10000.0	58.35	477.07	194.85	NO
10000.	0.3579	6	1.0	1.3	10000.0	58.35	492.03	200.22	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

186.	6.524	3	1.5	1.8	480.0	53.55	40.50	38.26	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	6.524	186.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 13043 ***

EP3 grinding PM2.5

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =     0.457000E-01
   STACK HEIGHT (M)       =      25.2980
   STK INSIDE DIAM (M)    =       0.9144
   STK EXIT VELOCITY (M/S)=       7.5195
   STK GAS EXIT TEMP (K)  =     369.1500
   AMBIENT AIR TEMP (K)   =     293.0000
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        URBAN
   BUILDING HEIGHT (M)    =       0.0000
   MIN HORIZ BLDG DIM (M) =       0.0000
   MAX HORIZ BLDG DIM (M) =       0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =   10463.000     (ACFM)

BUOY. FLUX =    3.180 M**4/S**3;  MOM. FLUX =    9.381 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	1.521	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	1.936	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	1.808	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	1.684	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	1.439	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	1.375	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	1.392	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	1.350	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	1.282	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	1.204	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	1.126	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	1.051	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	0.9813	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	0.9174	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	0.8593	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	0.8065	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	0.7587	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	0.7154	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	0.6760	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	0.6402	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	0.6075	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	0.5776	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

2300.	0.5503	6	1.0	1.3	10000.0	58.35	182.83	87.73	NO
2400.	0.5251	6	1.0	1.3	10000.0	58.35	188.81	90.02	NO
2500.	0.5020	6	1.0	1.3	10000.0	58.35	194.68	92.25	NO
2600.	0.4806	6	1.0	1.3	10000.0	58.35	200.46	94.44	NO
2700.	0.4608	6	1.0	1.3	10000.0	58.35	206.15	96.58	NO
2800.	0.4424	6	1.0	1.3	10000.0	58.35	211.75	98.68	NO
2900.	0.4254	6	1.0	1.3	10000.0	58.35	217.26	100.75	NO
3000.	0.4095	6	1.0	1.3	10000.0	58.35	222.69	102.77	NO
3500.	0.3443	6	1.0	1.3	10000.0	58.35	248.70	112.40	NO
4000.	0.2961	6	1.0	1.3	10000.0	58.35	273.04	121.32	NO
4500.	0.2593	6	1.0	1.3	10000.0	58.35	295.97	129.66	NO
5000.	0.2303	6	1.0	1.3	10000.0	58.35	317.68	137.52	NO
5500.	0.2070	6	1.0	1.3	10000.0	58.35	338.34	144.98	NO
6000.	0.1879	6	1.0	1.3	10000.0	58.35	358.06	152.08	NO
6500.	0.1719	6	1.0	1.3	10000.0	58.35	376.96	158.88	NO
7000.	0.1583	6	1.0	1.3	10000.0	58.35	395.11	165.40	NO
7500.	0.1467	6	1.0	1.3	10000.0	58.35	412.61	171.69	NO
8000.	0.1367	6	1.0	1.3	10000.0	58.35	429.50	177.76	NO
8500.	0.1279	6	1.0	1.3	10000.0	58.35	445.84	183.63	NO
9000.	0.1201	6	1.0	1.3	10000.0	58.35	461.69	189.32	NO
9500.	0.1133	6	1.0	1.3	10000.0	58.35	477.07	194.85	NO
10000.	0.1071	6	1.0	1.3	10000.0	58.35	492.03	200.22	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

186.	1.953	3	1.5	1.8	480.0	53.55	40.50	38.26	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1.953	186.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

EP3 grinding PM10

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.128000
STACK HEIGHT (M)	=	25.2980
STK INSIDE DIAM (M)	=	0.9144
STK EXIT VELOCITY (M/S)	=	7.5195
STK GAS EXIT TEMP (K)	=	369.1500
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 10463.000 (ACFM)

BUOY. FLUX = 3.180 M**4/S**3; MOM. FLUX = 9.381 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	4.259	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	5.423	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	5.064	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	4.716	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	4.030	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	3.852	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	3.898	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	3.781	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	3.590	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	3.372	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	3.153	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	2.943	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	2.748	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	2.570	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	2.407	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	2.259	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	2.125	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	2.004	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	1.893	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	1.793	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	1.702	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	1.618	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

2300.	1.541	6	1.0	1.3	10000.0	58.35	182.83	87.73	NO
2400.	1.471	6	1.0	1.3	10000.0	58.35	188.81	90.02	NO
2500.	1.406	6	1.0	1.3	10000.0	58.35	194.68	92.25	NO
2600.	1.346	6	1.0	1.3	10000.0	58.35	200.46	94.44	NO
2700.	1.291	6	1.0	1.3	10000.0	58.35	206.15	96.58	NO
2800.	1.239	6	1.0	1.3	10000.0	58.35	211.75	98.68	NO
2900.	1.191	6	1.0	1.3	10000.0	58.35	217.26	100.75	NO
3000.	1.147	6	1.0	1.3	10000.0	58.35	222.69	102.77	NO
3500.	0.9642	6	1.0	1.3	10000.0	58.35	248.70	112.40	NO
4000.	0.8294	6	1.0	1.3	10000.0	58.35	273.04	121.32	NO
4500.	0.7263	6	1.0	1.3	10000.0	58.35	295.97	129.66	NO
5000.	0.6452	6	1.0	1.3	10000.0	58.35	317.68	137.52	NO
5500.	0.5798	6	1.0	1.3	10000.0	58.35	338.34	144.98	NO
6000.	0.5262	6	1.0	1.3	10000.0	58.35	358.06	152.08	NO
6500.	0.4814	6	1.0	1.3	10000.0	58.35	376.96	158.88	NO
7000.	0.4434	6	1.0	1.3	10000.0	58.35	395.11	165.40	NO
7500.	0.4109	6	1.0	1.3	10000.0	58.35	412.61	171.69	NO
8000.	0.3828	6	1.0	1.3	10000.0	58.35	429.50	177.76	NO
8500.	0.3582	6	1.0	1.3	10000.0	58.35	445.84	183.63	NO
9000.	0.3365	6	1.0	1.3	10000.0	58.35	461.69	189.32	NO
9500.	0.3172	6	1.0	1.3	10000.0	58.35	477.07	194.85	NO
10000.	0.3000	6	1.0	1.3	10000.0	58.35	492.03	200.22	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

186.	5.469	3	1.5	1.8	480.0	53.55	40.50	38.26	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	5.469	186.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

EP3 drying PM2.5

10/10/18
15:21:41

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 13043 ***

EP drying PM2.5

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =     0.128500E-03
   STACK HEIGHT (M)       =      25.2980
   STK INSIDE DIAM (M)    =       0.9144
   STK EXIT VELOCITY (M/S)=       7.5195
   STK GAS EXIT TEMP (K)  =     369.1500
   AMBIENT AIR TEMP (K)   =     293.0000
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        URBAN
   BUILDING HEIGHT (M)    =       0.0000
   MIN HORIZ BLDG DIM (M) =       0.0000
   MAX HORIZ BLDG DIM (M) =       0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =   10463.000     (ACFM)

BUOY. FLUX =    3.180 M**4/S**3;  MOM. FLUX =    9.381 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	0.4276E-02	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	0.5444E-02	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	0.5084E-02	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	0.4735E-02	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	0.4046E-02	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	0.3867E-02	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	0.3913E-02	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	0.3795E-02	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	0.3604E-02	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	0.3385E-02	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	0.3165E-02	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	0.2955E-02	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	0.2759E-02	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	0.2580E-02	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	0.2416E-02	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	0.2268E-02	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	0.2133E-02	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	0.2012E-02	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	0.1901E-02	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	0.1800E-02	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	0.1708E-02	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	0.1624E-02	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

2300.	0.1547E-02	6	1.0	1.3	10000.0	58.35	182.83	87.73	NO
2400.	0.1477E-02	6	1.0	1.3	10000.0	58.35	188.81	90.02	NO
2500.	0.1411E-02	6	1.0	1.3	10000.0	58.35	194.68	92.25	NO
2600.	0.1351E-02	6	1.0	1.3	10000.0	58.35	200.46	94.44	NO
2700.	0.1296E-02	6	1.0	1.3	10000.0	58.35	206.15	96.58	NO
2800.	0.1244E-02	6	1.0	1.3	10000.0	58.35	211.75	98.68	NO
2900.	0.1196E-02	6	1.0	1.3	10000.0	58.35	217.26	100.75	NO
3000.	0.1151E-02	6	1.0	1.3	10000.0	58.35	222.69	102.77	NO
3500.	0.9680E-03	6	1.0	1.3	10000.0	58.35	248.70	112.40	NO
4000.	0.8326E-03	6	1.0	1.3	10000.0	58.35	273.04	121.32	NO
4500.	0.7291E-03	6	1.0	1.3	10000.0	58.35	295.97	129.66	NO
5000.	0.6477E-03	6	1.0	1.3	10000.0	58.35	317.68	137.52	NO
5500.	0.5821E-03	6	1.0	1.3	10000.0	58.35	338.34	144.98	NO
6000.	0.5282E-03	6	1.0	1.3	10000.0	58.35	358.06	152.08	NO
6500.	0.4833E-03	6	1.0	1.3	10000.0	58.35	376.96	158.88	NO
7000.	0.4452E-03	6	1.0	1.3	10000.0	58.35	395.11	165.40	NO
7500.	0.4125E-03	6	1.0	1.3	10000.0	58.35	412.61	171.69	NO
8000.	0.3843E-03	6	1.0	1.3	10000.0	58.35	429.50	177.76	NO
8500.	0.3596E-03	6	1.0	1.3	10000.0	58.35	445.84	183.63	NO
9000.	0.3378E-03	6	1.0	1.3	10000.0	58.35	461.69	189.32	NO
9500.	0.3185E-03	6	1.0	1.3	10000.0	58.35	477.07	194.85	NO
10000.	0.3012E-03	6	1.0	1.3	10000.0	58.35	492.03	200.22	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

186.	0.5490E-02	3	1.5	1.8	480.0	53.55	40.50	38.26	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	0.5490E-02	186.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 13043 ***

EP3 drying SOx

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =     0.171360E-03
   STACK HEIGHT (M)       =      25.2980
   STK INSIDE DIAM (M)    =       0.9144
   STK EXIT VELOCITY (M/S)=       7.5195
   STK GAS EXIT TEMP (K)  =     369.1500
   AMBIENT AIR TEMP (K)   =     293.0000
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        URBAN
   BUILDING HEIGHT (M)    =       0.0000
   MIN HORIZ BLDG DIM (M) =       0.0000
   MAX HORIZ BLDG DIM (M) =       0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =   10463.000     (ACFM)

BUOY. FLUX =    3.180 M**4/S**3;  MOM. FLUX =    9.381 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
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*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
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DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	0.5702E-02	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	0.7260E-02	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	0.6779E-02	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	0.6314E-02	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	0.5396E-02	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	0.5156E-02	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	0.5218E-02	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	0.5061E-02	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	0.4806E-02	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	0.4515E-02	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	0.4221E-02	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	0.3940E-02	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	0.3679E-02	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	0.3440E-02	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	0.3222E-02	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	0.3024E-02	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	0.2845E-02	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	0.2682E-02	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	0.2535E-02	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	0.2400E-02	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	0.2278E-02	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	0.2166E-02	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

2300.	0.2063E-02	6	1.0	1.3	10000.0	58.35	182.83	87.73	NO
2400.	0.1969E-02	6	1.0	1.3	10000.0	58.35	188.81	90.02	NO
2500.	0.1882E-02	6	1.0	1.3	10000.0	58.35	194.68	92.25	NO
2600.	0.1802E-02	6	1.0	1.3	10000.0	58.35	200.46	94.44	NO
2700.	0.1728E-02	6	1.0	1.3	10000.0	58.35	206.15	96.58	NO
2800.	0.1659E-02	6	1.0	1.3	10000.0	58.35	211.75	98.68	NO
2900.	0.1595E-02	6	1.0	1.3	10000.0	58.35	217.26	100.75	NO
3000.	0.1536E-02	6	1.0	1.3	10000.0	58.35	222.69	102.77	NO
3500.	0.1291E-02	6	1.0	1.3	10000.0	58.35	248.70	112.40	NO
4000.	0.1110E-02	6	1.0	1.3	10000.0	58.35	273.04	121.32	NO
4500.	0.9723E-03	6	1.0	1.3	10000.0	58.35	295.97	129.66	NO
5000.	0.8637E-03	6	1.0	1.3	10000.0	58.35	317.68	137.52	NO
5500.	0.7763E-03	6	1.0	1.3	10000.0	58.35	338.34	144.98	NO
6000.	0.7044E-03	6	1.0	1.3	10000.0	58.35	358.06	152.08	NO
6500.	0.6444E-03	6	1.0	1.3	10000.0	58.35	376.96	158.88	NO
7000.	0.5937E-03	6	1.0	1.3	10000.0	58.35	395.11	165.40	NO
7500.	0.5501E-03	6	1.0	1.3	10000.0	58.35	412.61	171.69	NO
8000.	0.5124E-03	6	1.0	1.3	10000.0	58.35	429.50	177.76	NO
8500.	0.4795E-03	6	1.0	1.3	10000.0	58.35	445.84	183.63	NO
9000.	0.4505E-03	6	1.0	1.3	10000.0	58.35	461.69	189.32	NO
9500.	0.4247E-03	6	1.0	1.3	10000.0	58.35	477.07	194.85	NO
10000.	0.4017E-03	6	1.0	1.3	10000.0	58.35	492.03	200.22	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

186.	0.7321E-02	3	1.5	1.8	480.0	53.55	40.50	38.26	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	0.7321E-02	186.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

10/10/18
15:24:40

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

EP3 drying NOx

SIMPLE TERRAIN INPUTS:

```
   SOURCE TYPE             =        POINT
   EMISSION RATE (G/S)     =     0.311000E-01
   STACK HEIGHT (M)        =      25.2980
   STK INSIDE DIAM (M)     =       0.9144
   STK EXIT VELOCITY (M/S)=        7.5195
   STK GAS EXIT TEMP (K)   =     369.1500
   AMBIENT AIR TEMP (K)    =     293.0000
   RECEPTOR HEIGHT (M)     =       0.0000
   URBAN/RURAL OPTION      =        URBAN
   BUILDING HEIGHT (M)     =       0.0000
   MIN HORIZ BLDG DIM (M) =        0.0000
   MAX HORIZ BLDG DIM (M) =        0.0000
```

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 10463.000 (ACFM)

BUOY. FLUX = 3.180 M**4/S**3; MOM. FLUX = 9.381 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	1.035	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	1.318	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	1.230	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	1.146	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	0.9793	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	0.9358	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	0.9470	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	0.9186	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	0.8722	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	0.8194	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	0.7661	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	0.7151	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	0.6678	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	0.6243	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	0.5848	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	0.5489	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	0.5163	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	0.4868	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	0.4600	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	0.4357	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	0.4134	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	0.3931	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

2300.	0.3745	6	1.0	1.3	10000.0	58.35	182.83	87.73	NO
2400.	0.3574	6	1.0	1.3	10000.0	58.35	188.81	90.02	NO
2500.	0.3416	6	1.0	1.3	10000.0	58.35	194.68	92.25	NO
2600.	0.3270	6	1.0	1.3	10000.0	58.35	200.46	94.44	NO
2700.	0.3136	6	1.0	1.3	10000.0	58.35	206.15	96.58	NO
2800.	0.3011	6	1.0	1.3	10000.0	58.35	211.75	98.68	NO
2900.	0.2895	6	1.0	1.3	10000.0	58.35	217.26	100.75	NO
3000.	0.2787	6	1.0	1.3	10000.0	58.35	222.69	102.77	NO
3500.	0.2343	6	1.0	1.3	10000.0	58.35	248.70	112.40	NO
4000.	0.2015	6	1.0	1.3	10000.0	58.35	273.04	121.32	NO
4500.	0.1765	6	1.0	1.3	10000.0	58.35	295.97	129.66	NO
5000.	0.1568	6	1.0	1.3	10000.0	58.35	317.68	137.52	NO
5500.	0.1409	6	1.0	1.3	10000.0	58.35	338.34	144.98	NO
6000.	0.1278	6	1.0	1.3	10000.0	58.35	358.06	152.08	NO
6500.	0.1170	6	1.0	1.3	10000.0	58.35	376.96	158.88	NO
7000.	0.1077	6	1.0	1.3	10000.0	58.35	395.11	165.40	NO
7500.	0.9984E-01	6	1.0	1.3	10000.0	58.35	412.61	171.69	NO
8000.	0.9300E-01	6	1.0	1.3	10000.0	58.35	429.50	177.76	NO
8500.	0.8702E-01	6	1.0	1.3	10000.0	58.35	445.84	183.63	NO
9000.	0.8176E-01	6	1.0	1.3	10000.0	58.35	461.69	189.32	NO
9500.	0.7708E-01	6	1.0	1.3	10000.0	58.35	477.07	194.85	NO
10000.	0.7290E-01	6	1.0	1.3	10000.0	58.35	492.03	200.22	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

186.	1.329	3	1.5	1.8	480.0	53.55	40.50	38.26	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1.329	186.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 13043 ***

EP3 drying CO

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =     0.260000E-01
   STACK HEIGHT (M)       =      25.2980
   STK INSIDE DIAM (M)    =       0.9144
   STK EXIT VELOCITY (M/S)=       7.5195
   STK GAS EXIT TEMP (K)  =     369.1500
   AMBIENT AIR TEMP (K)   =     293.0000
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        URBAN
   BUILDING HEIGHT (M)    =       0.0000
   MIN HORIZ BLDG DIM (M) =       0.0000
   MAX HORIZ BLDG DIM (M) =       0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =   10463.000     (ACFM)

BUOY. FLUX =    3.180 M**4/S**3;  MOM. FLUX =    9.381 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	0.8651	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	1.102	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	1.029	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	0.9580	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	0.8187	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	0.7823	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	0.7917	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	0.7679	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	0.7291	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	0.6850	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	0.6405	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	0.5979	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	0.5583	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	0.5219	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	0.4889	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	0.4589	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	0.4317	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	0.4070	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	0.3846	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	0.3642	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	0.3456	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	0.3286	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

2300.	0.3131	6	1.0	1.3	10000.0	58.35	182.83	87.73	NO
2400.	0.2987	6	1.0	1.3	10000.0	58.35	188.81	90.02	NO
2500.	0.2856	6	1.0	1.3	10000.0	58.35	194.68	92.25	NO
2600.	0.2734	6	1.0	1.3	10000.0	58.35	200.46	94.44	NO
2700.	0.2622	6	1.0	1.3	10000.0	58.35	206.15	96.58	NO
2800.	0.2517	6	1.0	1.3	10000.0	58.35	211.75	98.68	NO
2900.	0.2420	6	1.0	1.3	10000.0	58.35	217.26	100.75	NO
3000.	0.2330	6	1.0	1.3	10000.0	58.35	222.69	102.77	NO
3500.	0.1959	6	1.0	1.3	10000.0	58.35	248.70	112.40	NO
4000.	0.1685	6	1.0	1.3	10000.0	58.35	273.04	121.32	NO
4500.	0.1475	6	1.0	1.3	10000.0	58.35	295.97	129.66	NO
5000.	0.1310	6	1.0	1.3	10000.0	58.35	317.68	137.52	NO
5500.	0.1178	6	1.0	1.3	10000.0	58.35	338.34	144.98	NO
6000.	0.1069	6	1.0	1.3	10000.0	58.35	358.06	152.08	NO
6500.	0.9778E-01	6	1.0	1.3	10000.0	58.35	376.96	158.88	NO
7000.	0.9007E-01	6	1.0	1.3	10000.0	58.35	395.11	165.40	NO
7500.	0.8347E-01	6	1.0	1.3	10000.0	58.35	412.61	171.69	NO
8000.	0.7775E-01	6	1.0	1.3	10000.0	58.35	429.50	177.76	NO
8500.	0.7275E-01	6	1.0	1.3	10000.0	58.35	445.84	183.63	NO
9000.	0.6835E-01	6	1.0	1.3	10000.0	58.35	461.69	189.32	NO
9500.	0.6444E-01	6	1.0	1.3	10000.0	58.35	477.07	194.85	NO
10000.	0.6095E-01	6	1.0	1.3	10000.0	58.35	492.03	200.22	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

186.	1.111	3	1.5	1.8	480.0	53.55	40.50	38.26	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1.111	186.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 13043 ***

EP3 drying VOCs

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =     0.171360E-02
   STACK HEIGHT (M)       =      25.2980
   STK INSIDE DIAM (M)    =       0.9144
   STK EXIT VELOCITY (M/S)=       7.5195
   STK GAS EXIT TEMP (K)  =     369.1500
   AMBIENT AIR TEMP (K)   =     293.0000
   RECEPTOR HEIGHT (M)    =       0.0000
   URBAN/RURAL OPTION     =        URBAN
   BUILDING HEIGHT (M)    =       0.0000
   MIN HORIZ BLDG DIM (M) =       0.0000
   MAX HORIZ BLDG DIM (M) =       0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =   10463.000     (ACFM)

BUOY. FLUX =    3.180 M**4/S**3;  MOM. FLUX =    9.381 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.1	320.0	69.68	1.32	1.30	NO
100.	0.5702E-01	1	2.5	2.9	800.0	43.05	31.78	25.67	NO
200.	0.7260E-01	3	1.5	1.8	480.0	53.55	43.10	40.81	NO
300.	0.6779E-01	4	1.5	1.9	480.0	52.26	46.01	40.96	NO
400.	0.6314E-01	4	1.0	1.3	320.0	65.75	60.54	54.16	NO
500.	0.5396E-01	4	1.0	1.3	320.0	65.75	73.94	66.29	NO
600.	0.5156E-01	6	1.0	1.3	10000.0	58.35	60.02	36.08	NO
700.	0.5218E-01	6	1.0	1.3	10000.0	58.35	68.71	40.24	NO
800.	0.5061E-01	6	1.0	1.3	10000.0	58.35	77.17	44.17	NO
900.	0.4806E-01	6	1.0	1.3	10000.0	58.35	85.42	47.91	NO
1000.	0.4515E-01	6	1.0	1.3	10000.0	58.35	93.45	51.47	NO
1100.	0.4221E-01	6	1.0	1.3	10000.0	58.35	101.27	54.88	NO
1200.	0.3940E-01	6	1.0	1.3	10000.0	58.35	108.91	58.14	NO
1300.	0.3679E-01	6	1.0	1.3	10000.0	58.35	116.37	61.28	NO
1400.	0.3440E-01	6	1.0	1.3	10000.0	58.35	123.66	64.31	NO
1500.	0.3222E-01	6	1.0	1.3	10000.0	58.35	130.79	67.23	NO
1600.	0.3024E-01	6	1.0	1.3	10000.0	58.35	137.76	70.06	NO
1700.	0.2845E-01	6	1.0	1.3	10000.0	58.35	144.58	72.80	NO
1800.	0.2682E-01	6	1.0	1.3	10000.0	58.35	151.27	75.46	NO
1900.	0.2535E-01	6	1.0	1.3	10000.0	58.35	157.82	78.04	NO
2000.	0.2400E-01	6	1.0	1.3	10000.0	58.35	164.25	80.56	NO
2100.	0.2278E-01	6	1.0	1.3	10000.0	58.35	170.56	83.01	NO
2200.	0.2166E-01	6	1.0	1.3	10000.0	58.35	176.75	85.40	NO

```
  2300.   0.2063E-01    6     1.0    1.3 10000.0   58.35  182.83   87.73    NO
  2400.   0.1969E-01    6     1.0    1.3 10000.0   58.35  188.81   90.02    NO
  2500.   0.1882E-01    6     1.0    1.3 10000.0   58.35  194.68   92.25    NO
  2600.   0.1802E-01    6     1.0    1.3 10000.0   58.35  200.46   94.44    NO
  2700.   0.1728E-01    6     1.0    1.3 10000.0   58.35  206.15   96.58    NO
  2800.   0.1659E-01    6     1.0    1.3 10000.0   58.35  211.75   98.68    NO
  2900.   0.1595E-01    6     1.0    1.3 10000.0   58.35  217.26  100.75    NO
  3000.   0.1536E-01    6     1.0    1.3 10000.0   58.35  222.69  102.77    NO
  3500.   0.1291E-01    6     1.0    1.3 10000.0   58.35  248.70  112.40    NO
  4000.   0.1110E-01    6     1.0    1.3 10000.0   58.35  273.04  121.32    NO
  4500.   0.9723E-02    6     1.0    1.3 10000.0   58.35  295.97  129.66    NO
  5000.   0.8637E-02    6     1.0    1.3 10000.0   58.35  317.68  137.52    NO
  5500.   0.7763E-02    6     1.0    1.3 10000.0   58.35  338.34  144.98    NO
  6000.   0.7044E-02    6     1.0    1.3 10000.0   58.35  358.06  152.08    NO
  6500.   0.6444E-02    6     1.0    1.3 10000.0   58.35  376.96  158.88    NO
  7000.   0.5937E-02    6     1.0    1.3 10000.0   58.35  395.11  165.40    NO
  7500.   0.5501E-02    6     1.0    1.3 10000.0   58.35  412.61  171.69    NO
  8000.   0.5124E-02    6     1.0    1.3 10000.0   58.35  429.50  177.76    NO
  8500.   0.4795E-02    6     1.0    1.3 10000.0   58.35  445.84  183.63    NO
  9000.   0.4505E-02    6     1.0    1.3 10000.0   58.35  461.69  189.32    NO
  9500.   0.4247E-02    6     1.0    1.3 10000.0   58.35  477.07  194.85    NO
 10000.   0.4017E-02    6     1.0    1.3 10000.0   58.35  492.03  200.22    NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     1. M:
   186.   0.7321E-01    3     1.5    1.8   480.0   53.55   40.50   38.26    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   ---------   -------
SIMPLE TERRAIN      0.7321E-01      186.        0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

10/10/18
15:56:02

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

EP4 & EP5 storage silos PM

SIMPLE TERRAIN INPUTS:

```
   SOURCE TYPE              =        POINT
   EMISSION RATE (G/S)      =     0.374200E-02
   STACK HEIGHT (M)         =      25.9080
   STK INSIDE DIAM (M)      =       0.3109
   STK EXIT VELOCITY (M/S)=        24.8676
   STK GAS EXIT TEMP (K)    =     293.0000
   AMBIENT AIR TEMP (K)     =     293.0000
   RECEPTOR HEIGHT (M)      =       0.0000
   URBAN/RURAL OPTION       =        URBAN
   BUILDING HEIGHT (M)      =       0.0000
   MIN HORIZ BLDG DIM (M) =         0.0000
   MAX HORIZ BLDG DIM (M) =         0.0000
```

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 4000.0000 (ACFM)

BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 14.943 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.2	320.0	46.02	1.79	1.78	NO
100.	0.2597	1	1.5	1.7	480.0	39.31	31.61	25.46	NO
200.	0.3063	3	1.0	1.2	320.0	45.08	42.69	40.37	NO
300.	0.2811	6	1.0	1.3	10000.0	36.25	31.32	20.15	NO
400.	0.3116	6	1.0	1.3	10000.0	36.25	40.96	25.47	NO
500.	0.2875	6	1.0	1.3	10000.0	36.25	50.29	30.38	NO
600.	0.2520	6	1.0	1.3	10000.0	36.25	59.34	34.95	NO
700.	0.2186	6	1.0	1.3	10000.0	36.25	68.12	39.22	NO
800.	0.1900	6	1.0	1.3	10000.0	36.25	76.65	43.25	NO
900.	0.1664	6	1.0	1.3	10000.0	36.25	84.94	47.06	NO
1000.	0.1470	6	1.0	1.3	10000.0	36.25	93.01	50.68	NO
1100.	0.1310	6	1.0	1.3	10000.0	36.25	100.88	54.14	NO
1200.	0.1176	6	1.0	1.3	10000.0	36.25	108.54	57.45	NO
1300.	0.1064	6	1.0	1.3	10000.0	36.25	116.03	60.62	NO
1400.	0.9693E-01	6	1.0	1.3	10000.0	36.25	123.33	63.68	NO
1500.	0.8880E-01	6	1.0	1.3	10000.0	36.25	130.48	66.63	NO
1600.	0.8180E-01	6	1.0	1.3	10000.0	36.25	137.46	69.48	NO
1700.	0.7571E-01	6	1.0	1.3	10000.0	36.25	144.30	72.24	NO
1800.	0.7039E-01	6	1.0	1.3	10000.0	36.25	151.00	74.92	NO
1900.	0.6570E-01	6	1.0	1.3	10000.0	36.25	157.57	77.52	NO
2000.	0.6154E-01	6	1.0	1.3	10000.0	36.25	164.00	80.05	NO
2100.	0.5783E-01	6	1.0	1.3	10000.0	36.25	170.32	82.52	NO
2200.	0.5451E-01	6	1.0	1.3	10000.0	36.25	176.52	84.93	NO

2300.	0.5153E-01	6	1.0	1.3	10000.0	36.25	182.61	87.27	NO
2400.	0.4883E-01	6	1.0	1.3	10000.0	36.25	188.59	89.57	NO
2500.	0.4638E-01	6	1.0	1.3	10000.0	36.25	194.48	91.81	NO
2600.	0.4414E-01	6	1.0	1.3	10000.0	36.25	200.26	94.01	NO
2700.	0.4210E-01	6	1.0	1.3	10000.0	36.25	205.95	96.16	NO
2800.	0.4023E-01	6	1.0	1.3	10000.0	36.25	211.56	98.27	NO
2900.	0.3850E-01	6	1.0	1.3	10000.0	36.25	217.07	100.35	NO
3000.	0.3691E-01	6	1.0	1.3	10000.0	36.25	222.51	102.38	NO
3500.	0.3051E-01	6	1.0	1.3	10000.0	36.25	248.53	112.04	NO
4000.	0.2592E-01	6	1.0	1.3	10000.0	36.25	272.89	120.98	NO
4500.	0.2249E-01	6	1.0	1.3	10000.0	36.25	295.83	129.35	NO
5000.	0.1984E-01	6	1.0	1.3	10000.0	36.25	317.56	137.23	NO
5500.	0.1773E-01	6	1.0	1.3	10000.0	36.25	338.22	144.70	NO
6000.	0.1601E-01	6	1.0	1.3	10000.0	36.25	357.95	151.82	NO
6500.	0.1459E-01	6	1.0	1.3	10000.0	36.25	376.85	158.63	NO
7000.	0.1339E-01	6	1.0	1.3	10000.0	36.25	395.01	165.16	NO
7500.	0.1238E-01	6	1.0	1.3	10000.0	36.25	412.51	171.45	NO
8000.	0.1150E-01	6	1.0	1.3	10000.0	36.25	429.41	177.53	NO
8500.	0.1074E-01	6	1.0	1.3	10000.0	36.25	445.75	183.41	NO
9000.	0.1007E-01	6	1.0	1.3	10000.0	36.25	461.60	189.10	NO
9500.	0.9477E-02	6	1.0	1.3	10000.0	36.25	476.98	194.64	NO
10000.	0.8949E-02	6	1.0	1.3	10000.0	36.25	491.94	200.02	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

158.	0.3347	3	1.0	1.2	320.0	45.08	34.36	32.27	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	0.3347	158.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

EP4 & EP5 GGBFS storage PM10

SIMPLE TERRAIN INPUTS:

```
   SOURCE TYPE              =        POINT
   EMISSION RATE (G/S)      =     0.128500E-02
   STACK HEIGHT (M)         =      25.9080
   STK INSIDE DIAM (M)      =       0.3109
   STK EXIT VELOCITY (M/S)=        24.8676
   STK GAS EXIT TEMP (K)    =     293.0000
   AMBIENT AIR TEMP (K)     =     293.0000
   RECEPTOR HEIGHT (M)      =       0.0000
   URBAN/RURAL OPTION       =        URBAN
   BUILDING HEIGHT (M)      =       0.0000
   MIN HORIZ BLDG DIM (M) =         0.0000
   MAX HORIZ BLDG DIM (M) =         0.0000
```

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 4000.0000 (ACFM)

BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 14.943 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.2	320.0	46.02	1.79	1.78	NO
100.	0.8917E-01	1	1.5	1.7	480.0	39.31	31.61	25.46	NO
200.	0.1052	3	1.0	1.2	320.0	45.08	42.69	40.37	NO
300.	0.9652E-01	6	1.0	1.3	10000.0	36.25	31.32	20.15	NO
400.	0.1070	6	1.0	1.3	10000.0	36.25	40.96	25.47	NO
500.	0.9871E-01	6	1.0	1.3	10000.0	36.25	50.29	30.38	NO
600.	0.8655E-01	6	1.0	1.3	10000.0	36.25	59.34	34.95	NO
700.	0.7505E-01	6	1.0	1.3	10000.0	36.25	68.12	39.22	NO
800.	0.6526E-01	6	1.0	1.3	10000.0	36.25	76.65	43.25	NO
900.	0.5716E-01	6	1.0	1.3	10000.0	36.25	84.94	47.06	NO
1000.	0.5049E-01	6	1.0	1.3	10000.0	36.25	93.01	50.68	NO
1100.	0.4498E-01	6	1.0	1.3	10000.0	36.25	100.88	54.14	NO
1200.	0.4040E-01	6	1.0	1.3	10000.0	36.25	108.54	57.45	NO
1300.	0.3655E-01	6	1.0	1.3	10000.0	36.25	116.03	60.62	NO
1400.	0.3329E-01	6	1.0	1.3	10000.0	36.25	123.33	63.68	NO
1500.	0.3050E-01	6	1.0	1.3	10000.0	36.25	130.48	66.63	NO
1600.	0.2809E-01	6	1.0	1.3	10000.0	36.25	137.46	69.48	NO
1700.	0.2600E-01	6	1.0	1.3	10000.0	36.25	144.30	72.24	NO
1800.	0.2417E-01	6	1.0	1.3	10000.0	36.25	151.00	74.92	NO
1900.	0.2256E-01	6	1.0	1.3	10000.0	36.25	157.57	77.52	NO
2000.	0.2113E-01	6	1.0	1.3	10000.0	36.25	164.00	80.05	NO
2100.	0.1986E-01	6	1.0	1.3	10000.0	36.25	170.32	82.52	NO
2200.	0.1872E-01	6	1.0	1.3	10000.0	36.25	176.52	84.93	NO

2300.	0.1769E-01	6	1.0	1.3	10000.0	36.25	182.61	87.27	NO
2400.	0.1677E-01	6	1.0	1.3	10000.0	36.25	188.59	89.57	NO
2500.	0.1593E-01	6	1.0	1.3	10000.0	36.25	194.48	91.81	NO
2600.	0.1516E-01	6	1.0	1.3	10000.0	36.25	200.26	94.01	NO
2700.	0.1446E-01	6	1.0	1.3	10000.0	36.25	205.95	96.16	NO
2800.	0.1381E-01	6	1.0	1.3	10000.0	36.25	211.56	98.27	NO
2900.	0.1322E-01	6	1.0	1.3	10000.0	36.25	217.07	100.35	NO
3000.	0.1267E-01	6	1.0	1.3	10000.0	36.25	222.51	102.38	NO
3500.	0.1048E-01	6	1.0	1.3	10000.0	36.25	248.53	112.04	NO
4000.	0.8902E-02	6	1.0	1.3	10000.0	36.25	272.89	120.98	NO
4500.	0.7724E-02	6	1.0	1.3	10000.0	36.25	295.83	129.35	NO
5000.	0.6812E-02	6	1.0	1.3	10000.0	36.25	317.56	137.23	NO
5500.	0.6087E-02	6	1.0	1.3	10000.0	36.25	338.22	144.70	NO
6000.	0.5498E-02	6	1.0	1.3	10000.0	36.25	357.95	151.82	NO
6500.	0.5010E-02	6	1.0	1.3	10000.0	36.25	376.85	158.63	NO
7000.	0.4600E-02	6	1.0	1.3	10000.0	36.25	395.01	165.16	NO
7500.	0.4250E-02	6	1.0	1.3	10000.0	36.25	412.51	171.45	NO
8000.	0.3949E-02	6	1.0	1.3	10000.0	36.25	429.41	177.53	NO
8500.	0.3687E-02	6	1.0	1.3	10000.0	36.25	445.75	183.41	NO
9000.	0.3458E-02	6	1.0	1.3	10000.0	36.25	461.60	189.10	NO
9500.	0.3254E-02	6	1.0	1.3	10000.0	36.25	476.98	194.64	NO
10000.	0.3073E-02	6	1.0	1.3	10000.0	36.25	491.94	200.02	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

158.	0.1149	3	1.0	1.2	320.0	45.08	34.36	32.27	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	0.1149	158.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

10/10/18
15:57:28

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

EP6 & EP7 loadout chutes PM

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.374200E-02
STACK HEIGHT (M)	=	6.7056
STK INSIDE DIAM (M)	=	0.2033
STK EXIT VELOCITY (M/S)	=	20.3543
STK GAS EXIT TEMP (K)	=	293.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 1400.0000 (ACFM)

BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 4.281 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.0	320.0	19.12	1.31	1.29	NO
100.	2.613	6	1.0	1.0	10000.0	14.21	11.00	7.76	NO
200.	2.390	6	1.0	1.0	10000.0	14.21	21.28	14.20	NO
300.	1.479	6	1.0	1.0	10000.0	14.21	31.26	20.05	NO
400.	0.9806	6	1.0	1.0	10000.0	14.21	40.91	25.39	NO
500.	0.7006	6	1.0	1.0	10000.0	14.21	50.25	30.31	NO
600.	0.5298	6	1.0	1.0	10000.0	14.21	59.31	34.89	NO
700.	0.4181	6	1.0	1.0	10000.0	14.21	68.09	39.17	NO
800.	0.3409	6	1.0	1.0	10000.0	14.21	76.62	43.20	NO
900.	0.2850	6	1.0	1.0	10000.0	14.21	84.92	47.02	NO
1000.	0.2432	6	1.0	1.0	10000.0	14.21	92.99	50.64	NO
1100.	0.2109	6	1.0	1.0	10000.0	14.21	100.86	54.10	NO
1200.	0.1854	6	1.0	1.0	10000.0	14.21	108.52	57.41	NO
1300.	0.1649	6	1.0	1.0	10000.0	14.21	116.01	60.59	NO
1400.	0.1480	6	1.0	1.0	10000.0	14.21	123.32	63.65	NO
1500.	0.1340	6	1.0	1.0	10000.0	14.21	130.46	66.60	NO
1600.	0.1222	6	1.0	1.0	10000.0	14.21	137.45	69.45	NO
1700.	0.1121	6	1.0	1.0	10000.0	14.21	144.29	72.21	NO
1800.	0.1035	6	1.0	1.0	10000.0	14.21	150.99	74.89	NO
1900.	0.9593E-01	6	1.0	1.0	10000.0	14.21	157.55	77.50	NO
2000.	0.8934E-01	6	1.0	1.0	10000.0	14.21	163.99	80.03	NO
2100.	0.8353E-01	6	1.0	1.0	10000.0	14.21	170.31	82.50	NO
2200.	0.7838E-01	6	1.0	1.0	10000.0	14.21	176.51	84.90	NO

2300.	0.7378E-01	6	1.0	1.0	10000.0	14.21	182.60	87.25	NO
2400.	0.6965E-01	6	1.0	1.0	10000.0	14.21	188.58	89.55	NO
2500.	0.6593E-01	6	1.0	1.0	10000.0	14.21	194.47	91.79	NO
2600.	0.6257E-01	6	1.0	1.0	10000.0	14.21	200.25	93.99	NO
2700.	0.5950E-01	6	1.0	1.0	10000.0	14.21	205.94	96.14	NO
2800.	0.5671E-01	6	1.0	1.0	10000.0	14.21	211.55	98.25	NO
2900.	0.5415E-01	6	1.0	1.0	10000.0	14.21	217.06	100.33	NO
3000.	0.5180E-01	6	1.0	1.0	10000.0	14.21	222.50	102.36	NO
3500.	0.4244E-01	6	1.0	1.0	10000.0	14.21	248.53	112.02	NO
4000.	0.3584E-01	6	1.0	1.0	10000.0	14.21	272.88	120.97	NO
4500.	0.3094E-01	6	1.0	1.0	10000.0	14.21	295.83	129.33	NO
5000.	0.2719E-01	6	1.0	1.0	10000.0	14.21	317.55	137.22	NO
5500.	0.2422E-01	6	1.0	1.0	10000.0	14.21	338.21	144.69	NO
6000.	0.2183E-01	6	1.0	1.0	10000.0	14.21	357.94	151.80	NO
6500.	0.1985E-01	6	1.0	1.0	10000.0	14.21	376.84	158.61	NO
7000.	0.1819E-01	6	1.0	1.0	10000.0	14.21	395.01	165.15	NO
7500.	0.1678E-01	6	1.0	1.0	10000.0	14.21	412.51	171.44	NO
8000.	0.1558E-01	6	1.0	1.0	10000.0	14.21	429.40	177.52	NO
8500.	0.1453E-01	6	1.0	1.0	10000.0	14.21	445.75	183.39	NO
9000.	0.1361E-01	6	1.0	1.0	10000.0	14.21	461.59	189.09	NO
9500.	0.1280E-01	6	1.0	1.0	10000.0	14.21	476.98	194.63	NO
10000.	0.1208E-01	6	1.0	1.0	10000.0	14.21	491.94	200.01	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

131.	2.997	6	1.0	1.0	10000.0	14.21	14.31	9.88	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	2.997	131.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

10/10/18
15:38:16

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 13043 ***

EP6 & EP7 GGBFS loadout chutes PM10

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.128500E-02
STACK HEIGHT (M)	=	6.7056
STK INSIDE DIAM (M)	=	0.2033
STK EXIT VELOCITY (M/S)	=	20.3543
STK GAS EXIT TEMP (K)	=	293.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 1400.0000 (ACFM)

BUOY. FLUX = 0.000 M**4/S**3; MOM. FLUX = 4.281 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
1.	0.000	1	1.0	1.0	320.0	19.12	1.31	1.29	NO
100.	0.8974	6	1.0	1.0	10000.0	14.21	11.00	7.76	NO
200.	0.8207	6	1.0	1.0	10000.0	14.21	21.28	14.20	NO
300.	0.5078	6	1.0	1.0	10000.0	14.21	31.26	20.05	NO
400.	0.3367	6	1.0	1.0	10000.0	14.21	40.91	25.39	NO
500.	0.2406	6	1.0	1.0	10000.0	14.21	50.25	30.31	NO
600.	0.1819	6	1.0	1.0	10000.0	14.21	59.31	34.89	NO
700.	0.1436	6	1.0	1.0	10000.0	14.21	68.09	39.17	NO
800.	0.1171	6	1.0	1.0	10000.0	14.21	76.62	43.20	NO
900.	0.9787E-01	6	1.0	1.0	10000.0	14.21	84.92	47.02	NO
1000.	0.8350E-01	6	1.0	1.0	10000.0	14.21	92.99	50.64	NO
1100.	0.7242E-01	6	1.0	1.0	10000.0	14.21	100.86	54.10	NO
1200.	0.6367E-01	6	1.0	1.0	10000.0	14.21	108.52	57.41	NO
1300.	0.5661E-01	6	1.0	1.0	10000.0	14.21	116.01	60.59	NO
1400.	0.5083E-01	6	1.0	1.0	10000.0	14.21	123.32	63.65	NO
1500.	0.4602E-01	6	1.0	1.0	10000.0	14.21	130.46	66.60	NO
1600.	0.4196E-01	6	1.0	1.0	10000.0	14.21	137.45	69.45	NO
1700.	0.3850E-01	6	1.0	1.0	10000.0	14.21	144.29	72.21	NO
1800.	0.3553E-01	6	1.0	1.0	10000.0	14.21	150.99	74.89	NO
1900.	0.3294E-01	6	1.0	1.0	10000.0	14.21	157.55	77.50	NO
2000.	0.3068E-01	6	1.0	1.0	10000.0	14.21	163.99	80.03	NO
2100.	0.2868E-01	6	1.0	1.0	10000.0	14.21	170.31	82.50	NO
2200.	0.2691E-01	6	1.0	1.0	10000.0	14.21	176.51	84.90	NO

2300.	0.2534E-01	6	1.0	1.0	10000.0	14.21	182.60	87.25	NO
2400.	0.2392E-01	6	1.0	1.0	10000.0	14.21	188.58	89.55	NO
2500.	0.2264E-01	6	1.0	1.0	10000.0	14.21	194.47	91.79	NO
2600.	0.2149E-01	6	1.0	1.0	10000.0	14.21	200.25	93.99	NO
2700.	0.2043E-01	6	1.0	1.0	10000.0	14.21	205.94	96.14	NO
2800.	0.1947E-01	6	1.0	1.0	10000.0	14.21	211.55	98.25	NO
2900.	0.1860E-01	6	1.0	1.0	10000.0	14.21	217.06	100.33	NO
3000.	0.1779E-01	6	1.0	1.0	10000.0	14.21	222.50	102.36	NO
3500.	0.1457E-01	6	1.0	1.0	10000.0	14.21	248.53	112.02	NO
4000.	0.1231E-01	6	1.0	1.0	10000.0	14.21	272.88	120.97	NO
4500.	0.1063E-01	6	1.0	1.0	10000.0	14.21	295.83	129.33	NO
5000.	0.9337E-02	6	1.0	1.0	10000.0	14.21	317.55	137.22	NO
5500.	0.8318E-02	6	1.0	1.0	10000.0	14.21	338.21	144.69	NO
6000.	0.7495E-02	6	1.0	1.0	10000.0	14.21	357.94	151.80	NO
6500.	0.6816E-02	6	1.0	1.0	10000.0	14.21	376.84	158.61	NO
7000.	0.6247E-02	6	1.0	1.0	10000.0	14.21	395.01	165.15	NO
7500.	0.5764E-02	6	1.0	1.0	10000.0	14.21	412.51	171.44	NO
8000.	0.5349E-02	6	1.0	1.0	10000.0	14.21	429.40	177.52	NO
8500.	0.4989E-02	6	1.0	1.0	10000.0	14.21	445.75	183.39	NO
9000.	0.4673E-02	6	1.0	1.0	10000.0	14.21	461.59	189.09	NO
9500.	0.4394E-02	6	1.0	1.0	10000.0	14.21	476.98	194.63	NO
10000.	0.4147E-02	6	1.0	1.0	10000.0	14.21	491.94	200.01	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

131.	1.029	6	1.0	1.0	10000.0	14.21	14.31	9.88	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1.029	131.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

DUFFIELD ASSOCIATES
Soil, Water & the Environment

Fugitive Dust Control Plan

FUGITIVE DUST CONTROL PLAN

Walan Specialty Construction Products, LLC.

Granulated Blast Furnace Slag Grinding Facility
501 Christina Avenue
Wilmington, DE 19801

October 2018

Prepared by:

Duffield Associates, Inc.
5400 Limestone Road
Wilmington, Delaware 19808

Project No. 8850.ED

DUFFIELD ASSOCIATES
Soil, Water & the Environment

TABLE OF CONTENTS

1.0 INTRODUCTION

This Fugitive Dust Control Plan (the "Plan") has been prepared for use at the WALAN Specialty Construction Products, LLC. (WALAN) Granulated Blast Furnace Slag Grinding Facility (GBFS Grinding Facility or Facility), to be located at 501 Christina Avenue Wilmington, Delaware 19801. A few outdoor activities at the Facility will have potential to generate fugitive dust emissions, since most of the operations at the Facility are enclosed and dust (particulate matter) is controlled by air pollution control devices. The Plan describes the GBFS Grinding Facility operations and the associated dust management practices that will be implemented to prevent and/or control potential fugitive particulate emissions.

The Plan includes the following:

- Potential sources of fugitive dust,
- management procedures that are used to minimize fugitive dust emissions,
- Use of a visual inspection program to monitor material handling areas and process equipment,
- Procedures for the implementation of corrective action measures to be taken in the event of excessive fugitive dust emissions, and
- A list of sources and areas to be monitored for visible emissions and accumulation of material in open areas.

2.0 GENERAL OVERVIEW OF OPERATIONS

Provided below is a general overview of the GBFS Grinding Facility operations as well as onsite features and equipment that are relevant to this Fugitive Dust Control Plan.

2.1 Facility Description

The GBFS Grinding Facility will be located at 501 Christina Avenue, Wilmington, Delaware. The Facility will be constructed and will be operated at the rear of the property, behind an existing warehouse and adjacent to Christina River. The Facility is located in area zoned for waterfront manufacturing, which is appropriate for the intended use. The Facility will be approximately 0.7 miles north of the Port of Wilmington, where GBFS will be imported for delivery to the Facility. Access to Interstate 495 is close by, which initially will be the principal transportation route taken by trucks delivering finished product to customers. The Facility is also located adjacent to a freight railroad, which may be utilized in the future for finished product delivery to customers.

A Site Location Map is included as Figure 1 that shows the general area where the Facility is located. In addition, a Facility Site Plan is included as Figure 2. The Facility Site Plan depicts the location of Facility operating areas including the GBFS stockpiles, feed hopper, grinding operation, storage silos and loadout area.

The onsite roadways shown on the Facility Site Plan are utilized for truck traffic.

2.2 Description of Operations

Trucks will transport GBFS material to the Facility from ships unloaded at the Port of Wilmington. The GBFS is anticipated to arrive with moisture contents ranging from approximately 8 to10 percent (%). The GBFS received will be stockpiled and then placed in the feed hopper servicing the grinding operation. The GBFS will be conveyed to a bucket elevator and then fed to the grinder which will grind and dry the GBFS.

Once processed through the grinder, the ground GBFS (GGBFS) will be conveyed via a bucket elevator to two 1,100 ton silos for storage and eventual loading into enclosed hopper trucks via loadout chutes. PM emissions will be controlled by cartridge filters which are used to capture dust displaced from the enclosed trucks. The truck loadout area under the silos will be enclosed to help prevent any fugitive dust from escaping to the atmosphere.

As shown in Figure 2, truck traffic will enter the Facility on the northern end of the property. The delivery trucks will proceed to the stockpile areas and deposit GBFS. Trucks arriving at the site to receive finished product will also enter at the northern end and proceed to the silo storage area for loadout. All trucks will exit the property from the northern end.

The level of production at the Facility operation will be seasonal, with more demand for product occurring during spring, summer and fall than during the winter months, leading to an anticipated lower level of operation in the winter months. The Facility is expected to increase production over years of operation and is anticipated to process up to 150,000 tons of GBFS per year at full operation. A process flow diagram that summarizes the process and highlights points of emissions is shown in Figure 3.

3.0 DUST EMISSIONS SOURCES/FACTORS

Potential dust emission sources and the factors that can influence dust emissions at the Facility are presented in this section. Sources of dust primarily are limited to outdoor emissions. Outdoor fugitive dust emissions are defined as those emissions occurring outside the buildings and not associated with a stack (point) discharge. The potential dust emission sources and factors that are addressed for this Facility include:

- On-site roadways (when vehicles are moving on them),
- Unloading of delivery trucks
- GBFS Stockpiles (drying of material and wind)
- GBFS transfers from stockpiles to feed hopper (height of drop and dry material)

3.1 On-site Roadways

The on-site roadways will consist of both paved and unpaved areas. Paved and unpaved roadways can generate fugitive dust from vehicle traffic that disturbs fine particulate matter deposited on the paved surface, causing the particles to become airborne. Sources of potential dust from paved and unpaved surfaces at the Facility include: (1) tracking of mud and dirt from unpaved surfaces; (2) spillage of GBFS onto the road surfaces; and (3) deposition of dust from other sources, on- and off-site. Sources of dust from paved and unpaved surfaces are mainly due to truck traffic and equipment movement. Dust generation will be influenced by the number of trucks entering and exiting the Facility and the truck travel speed.

Due to the highly industrialized location of the Facility and paved public roads at the entrance to the Facility, it is expected that the trucks entering the Facility will not be tracking soil onto the site. Additionally, the GBFS Grinding Facility's interior traffic management controls are intended to minimize the truck and equipment cross traffic and avoid drag-out from areas where GBFS is stored and loaded.

3.2 Unloading of Transport Trucks

As mentioned above, GBFS will be transported from the Port of Wilmington to the GBFS stockpile areas. There is a potential for the creation of fugitive dust when the trucks dump the GBFS onto the stockpiles. The amount of fugitive dust that may be generated depends upon the particle sizes of the delivered GBFS, the moisture content of the GBFS, and weather conditions.

3.3 GBFS Stockpiles

Windblown dust can be generated from stockpiled material which is dependent upon the particle size of the stockpiled GBFS and moisture content of the material. The amount of time when the stockpile is being disturbed, either during loading or unloading, will also influence windblown dust generation.

3.4 Feed Hopper/Conveyor/Transfer System

Dust may be generated when a front end loader is used to load GBFS into a hopper that feeds the grinding/drying mill because the material is being dropped a short distance. The conveyor and bucket elevator used to feed the material to the grinding/drying mill will be enclosed and will not generate fugitive dust.

3.5 Weather Conditions

Variables that influence dust emissions include, but may not be limited to, weather conditions. Dry, windy conditions would tend to increase the potential for dust emissions from potential fugitive emission sources.

3.6 Moisture Content of the GBFS and Particle Size

The moisture content of the GBFS is a significant factor that could affect fugitive dust emissions at the Facility. The lower the moisture content of the GBFS, the more likely it will be to generate dust. To minimize the potential for fugitive dust emissions, GBFS will be received at the Facility with a moisture content of 8% to 10%. The moisture in the GBFS creates surface tension between particles causing them to attract to one another, essentially "clumping up". This condition reduces the potential for fugitive dust generation. Due to the moisture content being 8% to 10% and the particle size of the GBFS being greater than 200 microns, there is a limited potential for the creation of fugitive dust during the handling and stockpiling.

4.0 FUGITIVE DUST CONTROL MEASURES

The GBFS Grinding Facility will employ various fugitive dust control measures to control the generation and dispersion of fugitive dust from the Facility. Facility personnel will monitor weather conditions and site operations for conditions that could lead to fugitive dust generation. The potential for fugitive dust emissions can vary based on humidity, air and ground temperatures, and wind direction and speed while site operations, as discussed above, have the potential to increase the risk of fugitive dust emissions by disturbing materials on road surfaces or disturbing the GBFS stockpile.

The following practices will be employed by the GBFS Grinding Facility to minimize dust emissions:

4.1 Unloading of Transport Trucks

Fugitive dust emissions will be controlled during the unloading and stockpiling of GBFS. The material will have a moisture content of approximately 8% to 10% which will reduce the potential for fugitive dust emissions. The unloading and stockpiles will be visually monitored daily for any signs of drying and dust release. If necessary to inhibit visible dust emissions, site personnel will add water to the stockpiled material to reduce the potential for fugitive emissions.

4.2 Feed Hopper and Conveying System

The movement and deposition of stockpiled GBFS in the feed hopper could be a source of fugitive emissions. To mitigate fugitive dust generation, the moisture content of the GBFS will be kept moist. Keeping the moist reduces the potential for fugitive dust emissions. Facility personnel will monitor the loading and conveying process. If visible dust generation is apparent, the water will be added to the stockpile to moisten the GBFS. In addition, the drop height when GBFS is deposited into the feed hopper will be kept to a minimum to minimize spillage of material and decrease the potential for dust release due to physical disturbances.

4.3 Roadway Emissions

The following measures will be employed to control the fugitive dust from Facility roadways:

- The beds of all delivery trucks entering and exiting the Facility will be tarped to reduce the generation of fugitive dust from the trucks and to limit the potential for unintended spillage of material on public and Facility roads.
- Truck traffic will be limited to paved road surfaces. A typical traffic pattern is illustrated in Figure 2.
- The Facility roadways will be cleaned on an as needed basis, using a street sweeper to remove materials that might become fugitive dust.
- Facility-wide vehicle speed limits will be enforced to reduce the potential for fugitive dust generation.

4.4 Preventative Maintenance Program

All equipment will be inspected and maintained to ensure proper system performance. Facility operations and equipment will be inspected visually on a daily basis.

4.5 Best Management Practices

Best management practices will be followed as a preventive measure to minimize the potential for creating fugitive dust. These practices includes good housekeeping. Good housekeeping is essentially the maintenance of a clean and orderly work environment which reduces the possibility of accidents and dust emissions.

Elements of good housekeeping practices include:

- Maintaining neat and orderly work areas, both indoors and outdoors;
- Maintaining neat and orderly storage of materials;
- Cleaning-up spilled GBFS promptly;

- Using a street sweeper on an as needed basis to remove materials that may become dust from paved roads; and
- Providing training to employees about good housekeeping practices.

4.6 Employee Training

Employee training will be provided to all GBFS Grinding Facility operations personnel. Training will consist of a review of Facility procedures and operations, including review of this Plan, instruction on the proper use of fugitive dust control measures at the site, and a review of the relevant procedures following adoption of any new control measures, when needed. Training will be conducted on an annual basis and as needed when Facility procedures and operations are changed. If problematic incidents occur, or occur with increasing frequency, training will be provided more frequently to better inform and prepare Facility personnel.

The objective of the training is to ensure that the Facility is under constant observation by knowledgeable personnel. Employees will be trained to inspect and identify conditions that could lead to fugitive dust emissions and be able to implement correct procedures to mitigate those conditions when necessary.

4.7 Routine Inspection Programs

Daily inspections will be conducted to identify conditions that could lead to fugitive dust emissions and potential dust generating activities as part of the regular inspection program for the Facility on operating days. Results of the inspections will be documented on a daily record keeping report form and will be made available to the Delaware Department of Natural Resources and Environmental Control (DNREC) upon request.

5.0 RECORDKEEPING

A copy of this Fugitive Dust Control Plan will be maintained at the Facility at all times. Completed daily record keeping report forms will be maintained at the Facility for a minimum of five years and will be made available to DNREC personnel upon request as discussed above.

6.0 PLAN REVIEW

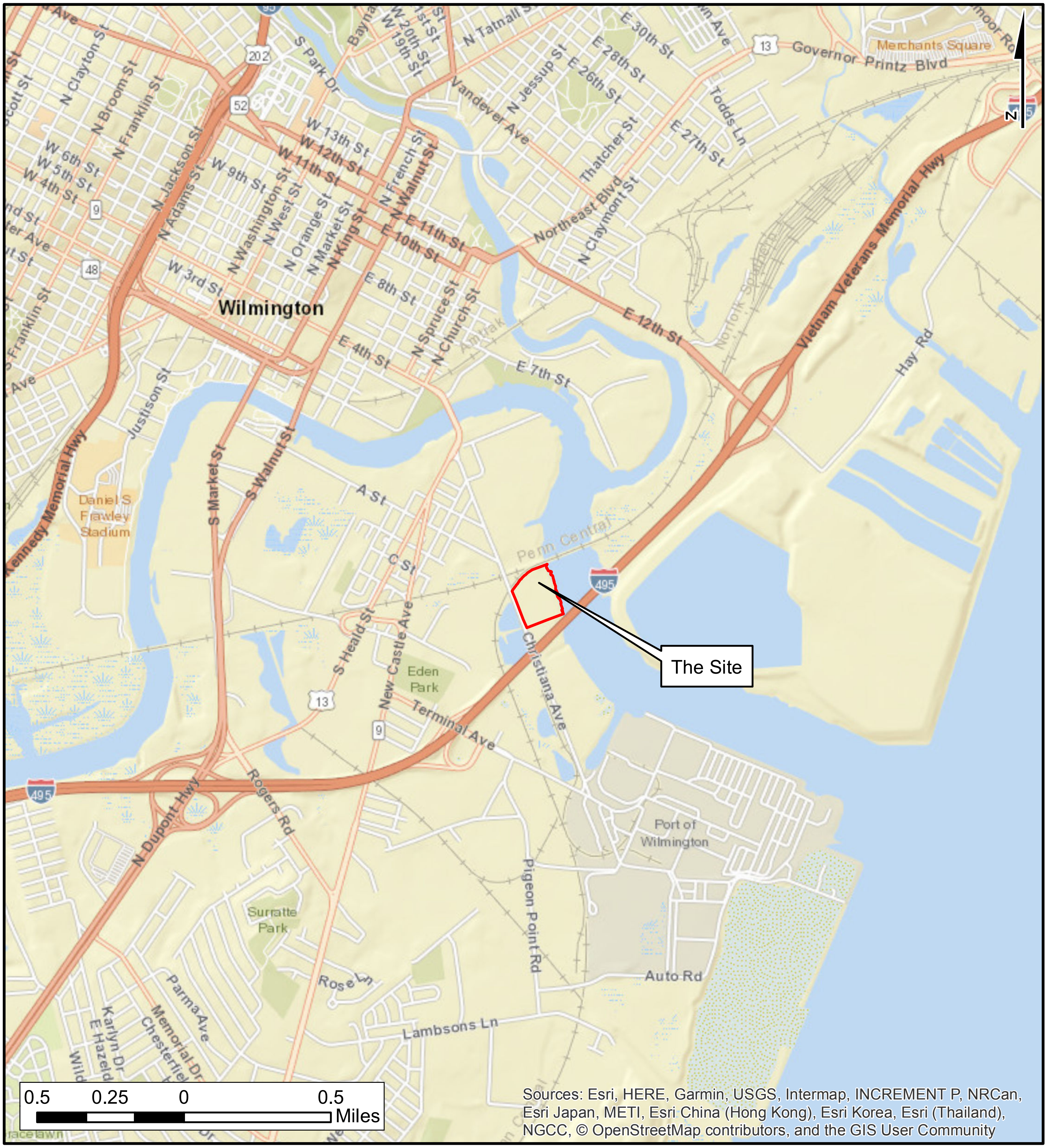
The Plan will be reviewed periodically and updated as needed. Updates will occur at a minimum, when: controls identified in this Plan do not adequately control fugitive dust generation, potential sources of fugitive dust change, fugitive dust control measures change, or Facility operating procedures are modified or revised.

7.0 FACILITY CONTACT INFORMATION

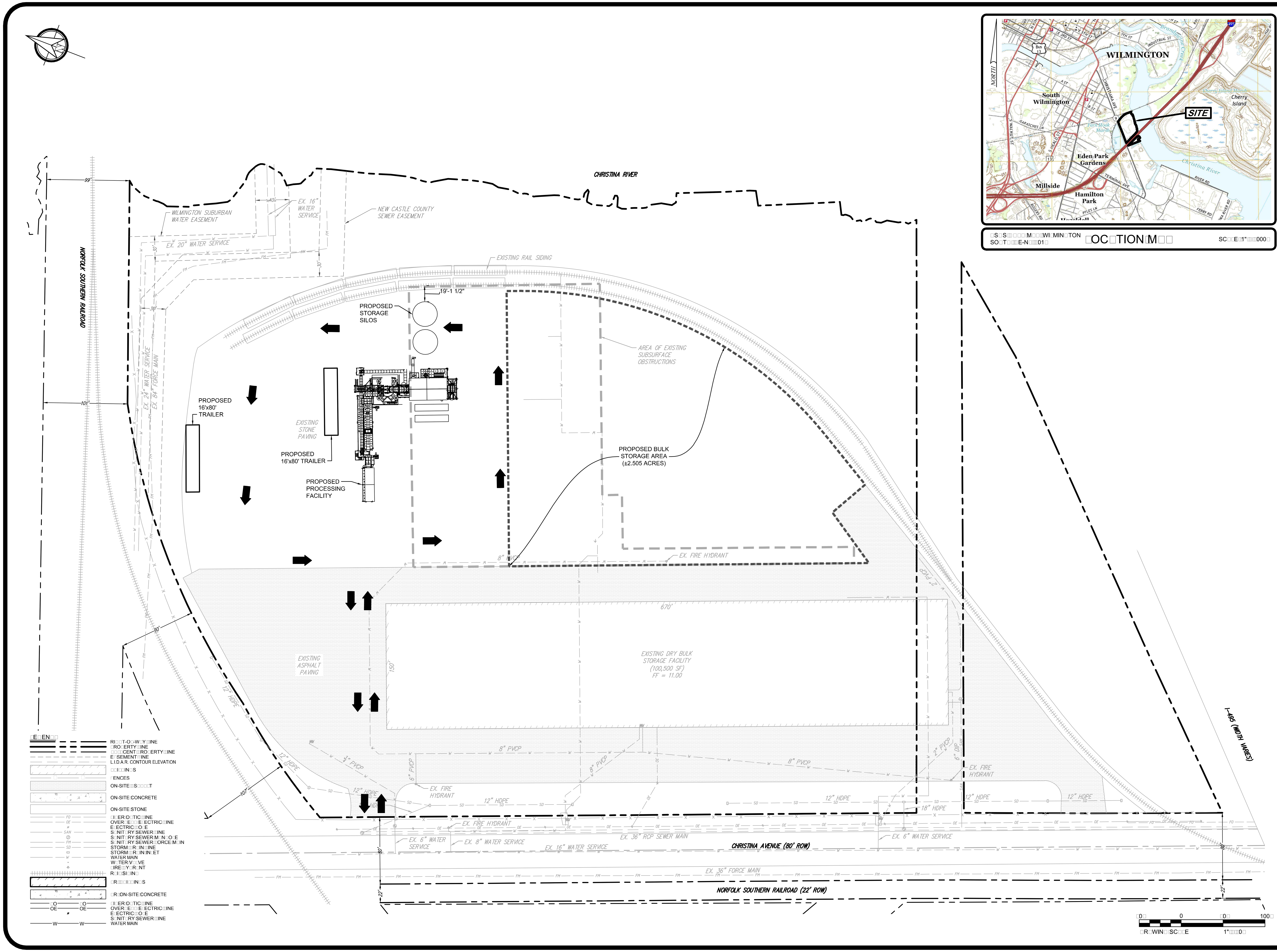
The individuals that can be contacted in the event fugitive dust issues are identified at the facility are listed in Table 1.

Table 1
Facility Contact Information

Primary Contact Information	Secondary Contact Information
Name: Lisa Dharwadkar Phone: (724) 545-2300	



Date: 10/2018	**Site Location Map**	DESIGNED BY: BNM	DUFFIELD ASSOCIATES Soil, Water & the Environment
SCALE: AS SHOWN		DRAWN BY: CSP	5400 LIMESTONE ROAD WILMINGTON, DE 19808-1232 TEL. (302)239-6634 FAX (302)239-8485
PROJECT NO. 8850.ED		CHECKED BY: MRB	OFFICES IN PENNSYLVANIA, SOUTHERN DELAWARE, MARYLAND AND NEW JERSEY
FIGURE 1		FILE: 8850.ED.mxd	EMAIL: DUFFIELD@DUFFNET.COM



ASSOCIATES
Soil, Water & the Environment

5400 LIMESTONE ROAD
WILMINGTON, DE 19808-1232
TEL. 302.239.6634
FAX 302.239.8485

OFFICES IN DELAWARE, MARYLAND, PENNSYLVANIA AND NEW JERSEY
WEB: HTTP://DUFFNET.COM
E-MAIL: DUFFIELD@DUFFNET.COM

CMC
CMC

REVISION

PRELIMINARY NOT FOR CONSTRUCTION

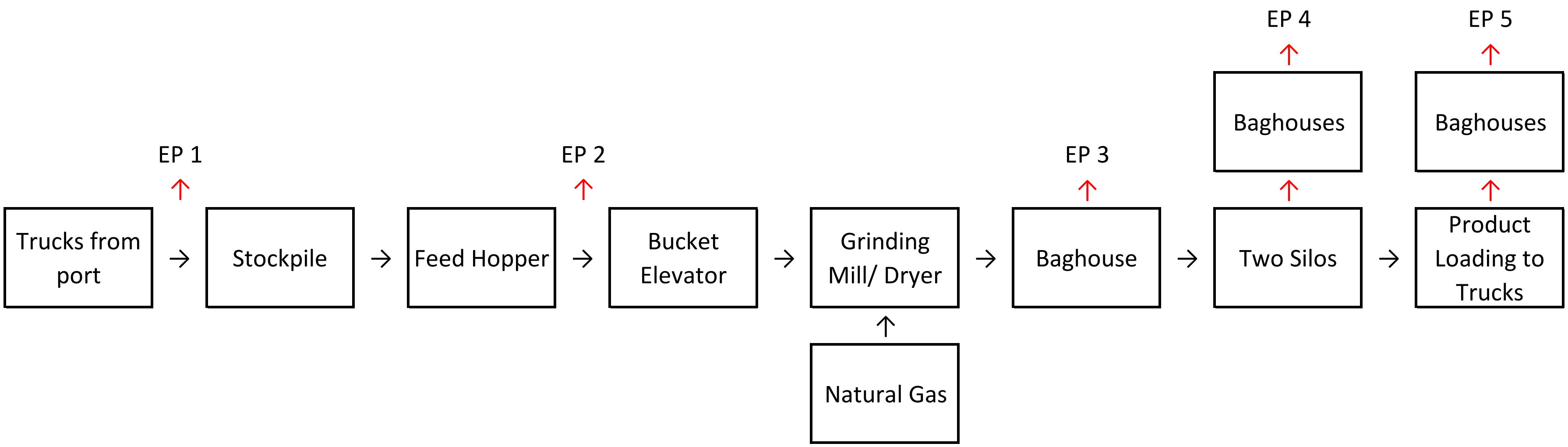
APPLICANT:

SITE PLAN

PROPOSED PROCESS UNIT
PORT CONTRACTORS FACILITY

CITY OF WILMIINGTON ~ NEW CASTLE COUNTY ~ DELAWARE

ATE
CALE
RO ECT NO
EET



DATE: 10/2018	**Process Flow Diagram**	DRAWN BY: BNM	DUFFIELD ASSOCIATES Soil, Water & the Environment
PROJECT NO: 8850.ED	Walan Specialty Construction Products, LLC	CHECKED BY: MRB	5400 LIMESTONE ROAD WILMINGTON, DE 19808-1232 TEL. (302)239-6634 FAX (302)239-8485
SHEET: FIGURE 2	Wilmington~Delaware	FILE: 8850.ED.Process_Flow_Diagram.xlxs	OFFICES IN PENNSYLVANIA, SOUTHERN DELAWARE, MARYLAND AND NEW JERSEY *EMAIL: DUFFIELD@DUFFNET.COM*

ENVIRONMENTAL PERMIT APPLICATION
BACKGROUND STATEMENT

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL ("DNREC")

ENVIRONMENTAL PERMIT APPLICATION BACKGROUND STATEMENT

Pursuant to 7 Del. C. Chapter 79

FILING STATUS:

This Background Statement is being filed with DNREC because:

☒ 1. It is an initial application for a new permit (or permits) and the applicant or applicant company has not held a permit issued by DNREC for a period of 5 or more years [See 7 Del. C. § 7902(a) and (b)];

☐ 2. It is required on an annual basis because the applicant or applicant company has been designated a chronic violator pursuant to 7 Del. C. § 7904 [See 7 Del. C. § 7902(a)(7) and (b)(2)]; or

☐ 3. It is required on an annual basis as the applicant or applicant company has been found guilty, pled guilty or no contest to any crime involving violation of environmental standards which resulted in serious physical injury or serious harm to the environment as defined in 7 Del. C. § 7902(c) [See 7 Del. C. § 7902(a)(7) and (b)(2)].

APPLICANT OR APPLICANT COMPANY'S NAME OR COMPANY'S NAME FILING STATEMENT	WALAN Specialty Construction Products, LLC
DATE OF APPLICATION OR DATE OF STATEMENT	October 15, 2018
PERMIT(S) BEING APPLIED FOR OR STATEMENT FOR FILING STATUSES 2 OR 3	☒ **Permit Type(s)** Natural Minor Source Air Permit ☐ **Statement for filing Statuses 2 or 3—If filing under these statuses, attach a statement of the date of designation as Chronic Violator or the date of Conviction/Plea.**
OTHER DNREC PERMITS HELD	☒ **N/A – No other permits held with DNREC** ☐ **List of all DNREC permits currently held with dates of issuance and expiration attached.**

ENVIRONMENTAL PERMIT APPLICATION BACKGROUND STATEMENT

Please note: Companies filing statements pursuant to Chapter 79 have the right to identify information to be afforded confidential status pursuant to 7 Del. C. § 7903(b) and the requirements set forth in Section 6, "Requests for Confidentiality" of the DNREC *Freedom of Information Act Regulation.*

PROVIDING ALL OF THE INFORMATION REQUESTED IN THIS FORM SATISFIES THE REQUIREMENTS OF 7 DEL. C. CHAPTER 79 ("ENVIRONMENTAL PERMIT APPLICATION BACKGROUND STATEMENT") UNLESS THE DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL ("DNREC") OR THE DELAWARE DEPARTMENT OF JUSTICE DETERMINES THAT ADDITIONAL SUBMISSIONS ARE NECESSARY. FAILURE TO PROVIDE THE INFORMATION REQUESTED OR PROVIDING ERRONEOUS INFORMATION IS GROUNDS FOR DENYING OR REVOKING AN ENVIRONMENTAL PERMIT/APPROVAL/LICENSE, AND FOR CIVIL AND/OR CRIMINAL PENALTIES.

A. **(Authority – 7 Del. C. § 7902(a)(1&2) & § 7905)** Attach a complete list (full names) of all current members of the applicant company's board of directors, all current corporate officers, all persons owning more than 20% of the applicant's stock or other resources, all subsidiary/affiliated companies with type of business performed, street addresses, all parent companies with addresses, all companies with which the applicant's company shares two or more members of the board of directors, and the name(s) of the person(s) serving as the applicant's local chief operating officer(s) with respect to each facility covered by the permit in question or for the statement required for filing Statuses 2 or 3. [Note: For companies that do not have a *facility* located in Delaware, no listing for the local chief operating officer(s) is required].

- ☐ Information attached
- ☒ Information attached, except for local chief operating officer as there is no facility located in the State of Delaware.

B. **(Authority - 7 Del. C. § 7905)** Please check one of the following selections below, showing type of ownership for the applicant or applicant/statement company:

☐	Proprietorship	List the state, county, book record and page number where the certificate is found (Attach hereto).
☐	Partnership	List the state, county, book record and page number where the certificate is found (Attach hereto).
☒	Corporation (LLCs included)	List the city, state, date of incorporation, corporation file number, current corporate standing, registered agent, and address of the registered agent (Attach hereto).
☐	Municipality	
☐	Public Institution/ Government Agency	
☐	Other	____________________

C. (Authority - 7 Del. C. § 7902(a)(3) & § 7905) Have any of the following been issued to or agreed to by the applicant or applicant/statement company, any employee, person, entity, or subsidiary/affiliated company, specified in response to Item A, for violation of any environmental statute, regulation, permit, license, approval, or order, regardless of the state in which it occurred, during the five years prior to the date of this application/statement

OFFENSE	YES	NO
Notice of Violation(s)	x	
Administrative Order(s)		x
Administrative Penalty(ies)		x
Civil Action(s)		x
Civil Penalty(ies)		x
Civil and/or Administrative Settlement Agreement(s)		x
Permit/License/Approval Revocation		x
Arrest(s)		x
Conviction(s)		x
Criminal Penalty(ies)		x
Criminal Plea Bargain		x

D. **(Authority - 7 Del. C. § 7902(a)(3), (a)(4) & § 7905)** If you answered "yes" to any of the actions listed in Item C above for the applicant or applicant company or any other person identified in Item A, attach a description of the incidents or events leading to the issuance of each action, regardless of the state in which it occurred, for the 5 years prior to the date of the statement, and the disposition of each action, what state the action/offense occurred in, and any actions that have been taken to correct the violations that led to such enforcement action.

- ☐ N/A
- ☒ Information attached

E. **(Authority - 7 Del. C. § 7902(a)(5) & § 7905)** Attach a description of any felony or other criminal conviction for a crime involving harm to the environment or violation of environmental standards of any person or entity identified in Item A above that resulted in a fine greater than $1,000 or a sentence longer than 7 days, regardless of whether such fine or sentence was suspended.

- ☒ N/A
- ☐ Description attached

F. **(Authority - 7 Del. C. § 7902(a)(6) & § 7905)** Attach copies of any and all settlements of environmental claims involving the applicant, associated with actions identified in response to Item D above, whether or not such settlements were based on agreements where the applicant did not admit liability for the action.

- ☒ N/A
- ☐ Information attached

Items for Filing Statuses 2 or 3 Only

G. (Authority - 7 Del. C. § 7902(a)(7) and § 7905) If the applicant or applicant/statement company has been found guilty, pled guilty or no contest, to any crime involving violation of environmental standards which resulted in serious physical injury or serious harm to the environment attach a summary of the events involved and a copy of the disposition of the action (*See 7 Del. C. § 7902(c) for definitions of "serious physical injury" or "serious harm to the environment" before answering this question.*)

☒ N/A

☐ Yes – Information Attached.

H. (Authority - 7 Del. C. § 7902(a)(8)) – If the applicant or applicant/statement company has been designated a chronic violator under 7 Del. C. § 7904, a detailed written report from an independent inspector who has inspected the applicant's premises for the purpose of detecting potential safety and environmental hazards to employees and the surrounding community. The Secretary may waive the duty to submit a detailed written report upon a showing of good cause by the applicant. A showing by the applicant that the acts which caused it to be designated as a chronic violator did not jeopardize public health shall constitute "good cause" under this paragraph.

I. (Authority - 7 Del. C. § 7902(a)(7)) – If the applicant or applicant/statement company has been designated a chronic violation under § 7904 of this Title, ***OR*** has been found guilty or pled no contest to any crime involving violation of environmental standards which resulted in serious physical injury or serious harm to the environment, a statement made under oath by the applicant or applicant/statement company's local chief operating officer with respect to the facilities covered by the permit, stating that: (a) disclosures made by the applicant/reporting company under federal and state environmental statutes and regulations during the preceding calendar year have been, to the chief operating officer's knowledge, complete and accurate, and (b) that the facility has implemented policies, programs, procedures, standards or systems reasonably designated, in light of the size, scope, and nature of facility operations to detect deter and promptly correct any noncompliance with state environmental statutes and regulations. The statement filed pursuant to this paragraph shall include an acknowledgement by the affiant that intentionally false statements submitted in compliance with this paragraph constitute criminal perjury as defined at 11 Del. C. §§1221-1222.

STATE OF DELAWARE – DEPT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

ENVIRONMENTAL PERMIT BACKGROUND STATEMENT

CERTIFICATION

I HEREBY CERTIFY THAT I HAVE READ THE PRECEEDING SUBMISSION, HAVE PROVIDED ALL OF THE INFORMATION REQUESTED, AND THAT ALL OF THE INFORMATION PROVIDED IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNATURE—APPLICANT OR
OFFICER OF APPLICANT / STATEMENT COMPANY

DATE: October 15, 2018

NAME: Lisa Dharwadkar Bhadsavle

TITLE: Vice President

COMPANY NAME: WALAN Specialty Construction Products, LLC

ADDRESS: 501 Christiana Avenue
Wilmington, DE 19801

TELEPHONE: 724-545-2300

FAX NUMBER:

REGISTERED AGENT NAME: N/A

ADDRESS:

TELEPHONE:

FAX NUMBER:

SWORN TO AND SUBSCRIBED BEFORE ME THIS 15 **DAY OF** October, 2018.

Mandy Lynn Wrighter
NOTARY PUBLIC SIGNATURE (SEAL)

Mandy Lynn Wrighter
PRINTED NAME OF NOTARY PUBLIC

Pennsylvania / Armstrong
STATE / COUNTY

MY COMMISSION EXPIRES ON: 02/09/2020

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
MANDY LYNN WRIGHTER, Notary Public
Kittanning Boro, Armstrong County
My Commission Expires Feb. 9, 2020
MEMBER PENNSYLVANIA ASSOCIATION OF NOTARIES

jmb:20-24.doc/Rev. 8/2012

APPLICATION OF WALAN SPECIALTY CONSTRUCTION PRODUCTS, LLC

APPLICATION OF WALAN SPECIALTY CONSTRUCTION PRODUCTS, LLC

WALAN Specialty Construction Products, LLC (WALAN), through its affiliate, Penn Mag, Inc. (Penn Mag) filed an Application for a Natural Minor Air Permit with the Department of Natural Resources and Environmental Control on December 5, 2017 (Initial Application). The Initial Application was amended by WALAN on January 29, 2018, to include corporate information about WALAN. A public hearing on the Initial Application was held on April 25, 2018. Thereafter, WALAN became aware that certain information in the Initial Application and Public Hearing presentation was incorrect. WALAN withdrew the Initial Application by letter dated August 28, 2018 (see Attachment A).

WALAN is filing the subject Application on this 16th day of October, 2018 (Application). The information that differs from the Initial Application is as follows:

1. Corporate information. Attachment A to the Environmental Permit Application Background Statement (Background Statement) has been revised to provide additional and updated information about WALAN and affiliated companies.

2. Violations. Section C of the Background Statement in the initial Application was completed with assistance of an environmental consultant, based upon WALAN's belief that neither WALAN nor its affiliates were determined to have violated a statute. On July 20, 2018, DNREC asked WALAN about Pennsylvania Department of Environmental Protection (DEP) Violation ID dated April 11, 2017 (See Attachment B). WALAN explained to DNREC that Penn Mag did submit to DEP the required self-monitoring results referenced in Attachment B. Penn Mag was unaware at that time that DEP had commenced use of an electronic system that did not recognize Penn Mag's submission. Penn Mag corrected this administrative error to the satisfaction of DEP. WALAN did not consider Attachment B to be a violation within the meaning of Section C of the Background Statement as Penn Mag made the submission manually, there was no involvement of any release into the environment, and no penalties were assessed. Upon receiving feedback from DNREC on the Initial Application, WALAN retained a new environmental consultant, as well as legal counsel, to assist in the preparation and submission of this Application, including the Background Statement.

3. Presentation slide on compliance with Pennsylvania Air Quality regulations. WALAN used a slide presentation at the April 25, 2018 public hearing. The Background slide, attached as Attachment C, states that "we (meaning Penn Mag) have been in full compliance with PA State Air Quality regulations." At the July 20, 2018 meeting with DNREC, WALAN was asked about the violation attached as Attachment C. The violation was not recalled by Penn Mag at the time the Background slide was prepared and discussed at the public hearing. Penn Mag addressed the violation to the satisfaction of DEP. As part of this Application, WALAN acknowledges this oversight, and retracts the statement made in the Background slide as being unintentionally incorrect. A revised presentation will be discussed at the public hearing on this Application.

5. Fugitive Dust Control Plan –More specificity and detail has been added to the Application

6. Truck routes – See Drawings attached to Application.

OTHER ITEMS

1. WALAN notes that it is contemplating the use of rail transportation at the facility. Information in this regard is still in the process of being developed and therefore is not included in the Application. Once those plans have been finalized WALAN intends to reach out to DNREC as appropriate.

2. WALAN has contacted the City of Wilmington, New Castle County, State of Delaware elected officials, and a number of local civic associations leaders, listed on attachment D. WALAN is engaged in ongoing discussions with these officials and leaders about the project, and has asked for their assistance in reaching out to local civic groups to schedule question and answer meetings regarding the project. WALAN intends for these outreach meetings to occur prior to the scheduled date for the permit hearing being requested.

ATTACHMENT A
Applicant Background Statement
October 12, 2018

1. Applicant company – **WALAN Specialty Construction Products, LLC, a Delaware limited liability company**

Current Board of Directors: Anil Bhadsavle

Current Corporate Officers: Anil Bhadsavle, President; Lisa Bhadsavle Dharwadkar, Treasurer and Vice-President; Mona Bhadsavle Conn, Secretary

Anil Bhadsavle owns 20% or more of the membership interests of WALAN

2. Subsidiary/affiliated company – **Penn Mag, Incorporated, a Pennsylvania corporation.** This is a mineral/material grinding business with two locations in Pennsylvania – 1. Adrian, 2. Claysburg. Penn Mag's business in Adrian, PA is grinding of Iron Ore. The business at the Claysburg, PA location is grinding of Chrome Ore.

Address: 719 Tarrtown Road, Adrian PA 16210

3. Subsidiary/affiliated company – **Anil, Inc., a Pennsylvania corporation.** Anil, Inc. is the parent corporation of Penn Mag, Incorporated, and has been a holding company since inception.

Address: 719 Tarrtown Road, Adrian, PA 16210

4. Subsidiary/affiliated company – **GrayCo, LLC, a Pennsylvania limited liability company.** This company engages in the business of assembly of electric controls.

Address: 487 Montgomery Road, Kittanning, PA 16201

Exhibit A

Fox Rothschild LLP
ATTORNEYS AT LAW

Citizens Bank Center
919 N. Market Street
Suite 300
Wilmington, DE 19899-2323
Tel (302) 654-7444 Fax (302) 656-8920
www.foxrothschild.com

SHARON ORAS MORGAN
Direct No: 302.622.4246
Email: SMorgan@FoxRothschild.com

August 28, 2018

Valerie S. Edge, Esquire
Delaware Department of Justice
102 West Water Street
Dover, Delaware 19904

Re: Walan Specialty Construction Products, LLC

Dear Valerie:

As you know, this firm represents Walan Specialty Construction Products, LLC ("Walan") with respect to its Natural Minor Permit Application with DNREC submitted on December 5, 2017 ("Application"). Walan submits this letter as notification to DNREC of its withdrawal, without prejudice, of the Application. Additionally, Walan is requesting a meeting with you and your client to discuss a proposed path forward.

By way of brief background, a public hearing on the Application was held on April 25, 2018. Thereafter, your client reached out to Walan to request a meeting, which took place on July 20, 2018. At that time DNREC addressed the compliance history of an entity related to Walan which, to the extent required, was inadvertently not included in the Background Statement submitted by Walan in connection with the Application, and that it rendered the information presented at the public hearing as defective. Walan was told by DNREC during that meeting that the Application was incomplete and inaccurate, and that Walan needed to determine whether it intended to move forward with the Application and, if so, a decision needed to be made as to the best path for correcting the record, including whether or not to schedule another public hearing.

On July 24, 2018, Mike Logan of Compliance Plus, on behalf of Walan, called and emailed (see attached) your client to advise that Walan intended to proceed with its Application and to take steps necessary to make the necessary corrections, and requested guidance on next steps. Walan did not receive a response. As you may recall, you and I spoke on a couple of occasions regarding

Fox Rothschild LLP
ATTORNEYS AT LAW

the Application. On August 14, 2018, I received your email, attached, advising that DNREC at that time required no additional information from Walan, nor did it contemplate an additional public hearing.

During our subsequent telephone conversation on or about August 22, 2018, on this matter and Walan's intention to correct the Application and record, you indicated that the record is closed.

Walan subsequently retained Duffield Associates as its new consultant. Rick Beringer reached out to your client yesterday to discuss Walan's withdrawal of the Application. After a series of calls among Duffield, my client, and your client, Walan was informed that withdrawal of the Application would not make a difference as DNREC intends to proceed with its recommendation that the Application be denied.

Walan is unclear on the applicable procedures here, in light of DNREC's indication that Walan can neither correct the record nor withdraw the Application, which seems to be at odds with our reading of 7 DEL. ADMIN. CODE § 1102-3.2 (2006), addressing an applicant's obligation to supplement the record as necessary to provide corrections or relevant information. As such, Walan is not clear on how it can comply with this section in light of indications of a closed record. There does not appear to be any provision prohibiting withdrawal of the Application. Accordingly, Walan is hereby withdrawing its Application (including all supporting documents), without prejudice.

Walan is committed to continue cooperating in good faith with DNREC, and would like to be able to proceed on the best path forward. To that end, we are requesting a meeting with you and your client at the earliest opportunity.

We look forward to hearing from you.

Very truly yours,

Sharon Oras Morgan

Sharon Oras Morgan

Enclosures

Attachment 1

From: "MIchael D. Logan" <mlogancps@aol.com>
Date: July 24, 2018 at 5:59:50 PM EDT
To: "'Marconi, Angela D. \(DNREC\)'" <Angela.Marconi@state.de.us>
Cc: "'Klotz, Bradley A. \(DNREC\)'" <Bradley.Klotz@state.de.us>, "'Craig Holdefer'" <choldefer@cps-2comply.com>, <lisa@pennmag.com>, "'Anil Bhadsavle'" <anilbhadsavle@yahoo.com>
Subject: RE: Walan - Proposed Meeting

Hello Angela,

Pursuant to my voicemail message that I left for you earlier today, I had just wanted to reach out to you, on behalf of Walan Construction Specialty Products, LLC, to confirm that the company wishes to continue and proceed with the air permit application process.

Accordingly, I would like to confirm with you what additional information we would need to submit to properly correct/amend the record to allow us to re-public notice the application. We are also interested in requesting that the Department include a pre-emptive public hearing schedule with any subsequent renotification in this matter.

Again, we appreciate the Department's continued assistance and efforts in this matter.

Mike

MICHAEL D. LOGAN
Vice President,
Environmental Services

COMPLIANCE PLUS SERVICES, INC.
www.cps-2comply.com

455 BUSINESS CENTER DRIVE, SUITE 250
HORSHAM, PA 19044
USA

215.734.1414
215.431.8085
215.734.1424
mlogan@CPS-2comply.com

From: MIchael D. Logan <mlogancps@aol.com>
Sent: Friday, July 20, 2018 5:34 PM
To: 'Marconi, Angela D. (DNREC)' <Angela.Marconi@state.de.us>
Cc: 'Klotz, Bradley A. (DNREC)' <Bradley.Klotz@state.de.us>; 'Craig Holdefer' <choldefer@cps-2comply.com>; 'lisa@pennmag.com' <lisa@pennmag.com>; 'Anil Bhadsavle' <anilbhadsavle@yahoo.com>
Subject: RE: Walan - Proposed Meeting

Angela,

Thank you for meeting with us this morning to review the issues related to the public hearing review for the Walan facility.

As we had indicated, we are reviewing the information that you provided and investigating the facility records regarding the matters discussed. We will get back to you shortly to address Walan's response and intended path forward.

If you need anything else from us in the interim, please do not hesitate to contact me. We appreciate your time and attention in this matter. Have a good weekend.

Mike

MICHAEL D. LOGAN
Vice President,
Environmental Services

COMPLIANCE PLUS SERVICES, INC.
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HORSHAM, PA 19044
USA

215.734.1414
215.431.8085
215.734.1424
mlogan@CPS-2comply.com

From: Marconi, Angela D. (DNREC) <Angela.Marconi@state.de.us>
Sent: Thursday, July 19, 2018 8:07 AM
To: 'MIchael D. Logan' <mlogancps@aol.com>
Cc: Klotz, Bradley A. (DNREC) <Bradley.Klotz@state.de.us>; 'Craig Holdefer' <choldefer@cps-2comply.com>; lisa@pennmag.com; 'Anil Bhadsavle' <anilbhadsavle@yahoo.com>
Subject: RE: Walan - Proposed Meeting

Thanks Mike,

We'll see you at 9 in the Grantham office.

-Angela

From: MIchael D. Logan [mailto:mlogancps@aol.com]
Sent: Wednesday, July 18, 2018 3:38 PM
To: Marconi, Angela D. (DNREC)
Cc: Klotz, Bradley A. (DNREC); 'Craig Holdefer'; lisa@pennmag.com; 'Anil Bhadsavle'
Subject: Walan - Proposed Meeting

Hi Angela,

Pursuant to our discussions earlier today, we were able to confirm that our client is available to meet this Friday, July 20, 2018. If possible, we would like to meet in the morning, perhaps at 9 am if that works for you. Please let me know.

If you need us to bring along any information to be prepared to review at the meeting, please let me know and we will prepare accordingly. Thank you for reaching out and have a good rest of the day.

Mike

MICHAEL D. LOGAN
Vice President,
Environmental Services

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USA

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215.431.8085
215.734.1424
mlogan@CPS-2comply.com

Attachment 2

From: Edge, Valerie (DOJ) <Valerie.Edge@state.de.us>
Sent: Tuesday, August 14, 2018 3:12 PM
To: Morgan, Sharon Oras <SMorgan@foxrothschild.com>
Cc: Marconi, Angela D. (DNREC) <Angela.Marconi@state.de.us>; Klotz, Bradley A. (DNREC) <Bradley.Klotz@state.de.us>
Subject: [EXT] RE: Walan Specialty Construction Products, LLC

Sharon,

I spoke with Angela Marconi, and Air Quality Management has determined that the appropriate next step is for it to do the technical response document that was requested by the hearing officer, rather than attempting to change the process mid-stream by re-noticing a new hearing. Thus, it is my understanding that AQM does not believe it requires further information at the time. Further, AQM does not yet know when that technical response document would be provided to the hearing officer, or when the hearing officer might make her recommendation to the Secretary.

Val

Valerie Edge
Deputy Attorney General
Delaware Department of Justice
102 W. Water Street
Dover, DE 19904
Email: valerie.edge@state.de.us
Phone: 302-739-4636
Direct Dial: 302-257-3219

From: Morgan, Sharon Oras [mailto:SMorgan@foxrothschild.com]
Sent: Monday, August 13, 2018 3:26 PM
To: Edge, Valerie (DOJ) <Valerie.Edge@state.de.us>
Subject: RE: Walan Specialty Construction Products, LLC

Thanks!

Sharon Morgan
Office Managing Partner
Fox Rothschild LLP
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Wilmington, DE 19899-2323
(302) 622-4246 - direct
(302) 656-8920- fax
SMorgan@foxrothschild.com
www.foxrothschild.com

From: Edge, Valerie (DOJ) <Valerie.Edge@state.de.us>
Sent: Monday, August 13, 2018 3:22 PM
To: Morgan, Sharon Oras <SMorgan@foxrothschild.com>
Subject: [EXT] RE: Walan Specialty Construction Products, LLC

Hi Sharon,
I am sorry to have not gotten back to you sooner. I will check with Angela about the follow up information, but I just got back from a meeting with her on a different subject and anticipate that she is driving right now. I hope to get back to you shortly.
Val

Valerie Edge
Deputy Attorney General
Delaware Department of Justice
102 W. Water Street
Dover, DE 19904
Email: valerie.edge@state.de.us
Phone: 302-739-4636
Direct Dial: 302-257-3219

From: Morgan, Sharon Oras [mailto:SMorgan@foxrothschild.com]
Sent: Monday, August 13, 2018 1:21 PM
To: Edge, Valerie (DOJ) <Valerie.Edge@state.de.us>
Subject: Walan Specialty Construction Products, LLC

Hi, Valerie. I wanted to follow up on our recent discussions about Walan Specialty Construction Products, LLC. Please let me know whether you have had an opportunity to speak with your client about next steps on this matter. If you believe it would be helpful to have a follow up meeting on this, please let me know.

Additionally, I was hoping you can give me some direction on communications between our clients. I understand that there was some discussion between Angela and my client (and Mike Logan of Compliance Plus) regarding providing DNREC with follow up information on the issues discussed on July 20, 2018. Should Mike reach out to Angela, should I provide information to you directly, and/or should we hold off until we received further feedback from your client? Your guidance would be appreciated so that we ensure we are being responsive and communicating through the proper channels.

Thanks, I look forward to hearing from you.

Sharon Morgan
Office Managing Partner
Fox Rothschild LLP
Citizens Bank Center
919 North Market Street, Suite 300
Wilmington, DE 19899-2323
(302) 622-4246 - direct
(302) 656-8920- fax
SMorgan@foxrothschild.com
www.foxrothschild.com

Exhibit B

- eFACTS on the Web
- DEP Information
  - About DEP
  - Contact Us
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- Search eFACTS
  - Authorization Search
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  - Facility Search
  - Inspection Search
  - Mammography Search
  - Name Search
  - Pollution Prevention
  - Sites by County/Municipality
  - Site Search
- Reports
  - Emission Summary
  - Facility Emissions
- Other Sites
  - eMapPA
  - eNotice
  - EPA ECHO
  - EPA Envirofacts
  - Permits, Licensing, and Certification
  - The PA Code

Violation Details for Inspection ID: 2611128

Facility: PENN MAG INC (571416)
Program: WPC NPDES

Disclaimer: The dollar amounts listed below are for the entire related enforcement, and may encompass many sites/facilities. The *Total Amount Collected* may or may not be related to the *Penalty Amount Assessed*, depending on how your program or regional office records payments in eFACTS. Questions regarding payments or penalties should be directed to the eFACTS Help Desk at:

(717) 705-3760 or mailto:ep-efactshelpdeskteam@pa.gov

Violation ID	Date	Violation Description
790099	04/11/2017	NPDES - Failure to use a format or process required by DEP for self-monitoring results
		Resolution: Corrected/Abated
		PA Code Legal Citation: 25 Pa. Code 92a.61(g) : PA Code Website
		Violation Type: Administrative
		Related Enforcements
		Please note: the following related enforcement data is accumulated from possibly many different sites/facilities that may be unrelated to the facility for this inspection. Enforcement ID: 355251 Enforcement Type: Notice of Violation Date Executed: 04/11/2017 Taken Against: PENN MAG INC On Appeal? N Enforcement Status: Comply/Closed # of Violations Addressed by this Enforcement and Penalty Action (possibly from many facilities): 1 Penalty Final Date: Penalty Amount Assessed: Total Amount Due: Total Amount Collected: Penalty Status:

Exhibit C

Background

- **For over 30 years, we have been in the mineral grinding business and in full compliance with PA State Air Quality regulations**
  - In operation since 1982, we have an iron ore grinding plant in Adrian, PA, servicing large clients across the globe.
  - In operation since 1987, is an iron chromite grinding plant in Claysburg, PA
  - We always perform with consideration for the health and safety of our employees, partners and customers.

- **Our future in Wilmington**
  - Various state Department of Transportations (DOTs) are beginning to require GGBFS as Cement Additive in DOT funded projects
  - Ground Granulated Blast Furnace Slag represents the best alternative to lowering emissions of an industry that will experience a substantial growth within the construction building sector of our economy.

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  - Name Search
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  - Sites by County/Municipality
  - Site Search
- Reports
  - Emission Summary
  - Facility Emissions
- Other Sites
  - eMapPA
  - eNotice
  - EPA ECHO
  - EPA Envirofacts
  - Permits, Licensing, and Certification
  - The PA Code

Violation Details for Inspection ID: 1783378

Facility: PENN MAG INC/ADRIAN (514433)
Program: Air Quality

Disclaimer: The dollar amounts listed below are for the entire related enforcement, and may encompass many sites/facilities. The *Total Amount Collected* may or may not be related to the *Penalty Amount Assessed*, depending on how your program or regional office records payments in eFACTS. Questions regarding payments or penalties should be directed to the eFACTS Help Desk at:

(717) 705-3768 or mailto:ep-efactshelpdeskteam@pa.gov

Violation ID	Date	Violation Description
561113	07/12/2009	Construction, Modification, Reactivation and Operation of Sources, Operating Permit Requirements, Compliance requirements. A person may not cause or permit the operation of a source subject to this article unless the source and air cleaning devices identified in the application for the plan approval and operating permit and the plan approval issued to the source are operated and maintained in accordance with specifications in the application and conditions in the plan approval and operating permit issued by the Department. A person may not cause or permit the operation of an air contamination source subject to this chapter in a manner inconsistent with good operating practices. Resolution: Corrected/Abated Legal Citation: 25 Pa Code 127.444 : PA Code Website Violation Type: Environmental Health & Safety **Related Enforcements** **Please note: the following related enforcement data is accumulated from possibly many different sites/facilities that may be unrelated to the facility for this inspection.** Enforcement ID: 245369 — Penalty Final Date: Enforcement Type: Notice of Violation — Penalty Amount Assessed: Date Executed: 03/25/2009 — Total Amount Due: Taken Against: PENN MAG INC — Total Amount Collected: On Appeal? N — Penalty Status: Enforcement Status: Comply/Closed # of Violations Addressed by this Enforcement and Penalty Action (possibly from many facilities): 2 **Please note: the following related enforcement data is accumulated from possibly many different sites/facilities that may be unrelated to the facility for this inspection.** Enforcement ID: 250135 — Penalty Final Date: 10/28/2009 Enforcement Type: Consent Assessment of Civil Penalty — Penalty Amount Assessed: 3000 Date Executed: 09/15/2009 — Total Amount Due: 0 Taken Against: PENN MAG INC — Total Amount Collected: 3000 On Appeal? N — Penalty Status: Completed Enforcement Status: Comply/Closed # of Violations Addressed by this Enforcement and Penalty Action (possibly from many facilities): 2

Violation ID	Date	Violation Description
561117	07/12/2009	General provisions, Prohibition of air pollution. Failure to prevent the emission of air pollution, as defined in the PA Air Pollution Control Act. Resolution: Corrected/Abated Legal Citation: 25 Pa Code 121.7 : PA Code Website Violation Type: Environmental Health & Safety **Related Enforcements** **Please note: the following related enforcement data is accumulated from possibly many different sites/facilities that may be unrelated to the facility for this inspection.** Enforcement ID: 245368 — Penalty Final Date: Enforcement Type: Notice of Violation — Penalty Amount Assessed: Date Executed: 03/25/2009 — Total Amount Due: Taken Against: PENN MAG INC — Total Amount Collected: On Appeal? N — Penalty Status: Enforcement Status: Comply/Closed # of Violations Addressed by this Enforcement and Penalty Action (possibly from many facilities): 2 **Please note: the following related enforcement data is accumulated from possibly many different sites/facilities that may be unrelated to the facility for this inspection.** Enforcement ID: 250135 — Penalty Final Date: 10/26/2009 Enforcement Type: Consent Assessment of Civil Penalty — Penalty Amount Assessed: 3000 Date Executed: 09/15/2009 — Total Amount Due: 0 Taken Against: PENN MAG INC — Total Amount Collected: 3000 On Appeal? N — Penalty Status: Completed Enforcement Status: Comply/Closed # of Violations Addressed by this Enforcement and Penalty Action (possibly from many facilities): 2

Exhibit D

WALAN Outreach Efforts

Wilmington City Council – Michelle Harlee
New Castle County Council – Penrose Hollins
State Representative James "JJ" Johnson
State Senator Margaret Rose Henry

New Castle County Council – Jea Street

Oakmont Civic Association
Simonds Gardens Civic Association
Castle Hills Civic Association
Minquadale Civic Association
All Civic Association

Dunlieth Civic Association
Rosehill Civic Association
Southbridge Civic Association
Eden and Hamilton Park Civic Association