| Id Number | Stack Number | Stack Id |
|---|---|---|
| 031036AAA | 0003 | 115247 |
| 031036AAA | 0004 | 115248 |
| 031036AAA | 0002 | 115246 |
| 031600AAR | 0046 | 118716 |
| 031600AAR | 0055 | 118725 |
| 031600AAR | 0056 | 118726 |
| 031600AAR | 0088 | 156582 |
| 031600AAR | 0109 | 250881 |
| 031600AAR | 0110 | 250882 |
| 031600AAR | 0111 | 250883 |
| 031600AAR | 0112 | 250884 |
| 031600AAR | 0114 | 250886 |
| 031600AFV | 0005 | 118896 |
| 031600AFV | 0005 | 118896 |
| 031600AFV | 0035 | 184796 |
| 031600ALC | 0002 | 118971 |
| 031600AOL | 0015 | 209976 |
| 031600BIY | 0001 | 119521 |
| 031600BIY | 0024 | 241900 |
| 031600BRA | 0001 | 119770 |
| 031600DPK | 0001 | 120674 |
| 031600DQO | 0021 | 173045 |
| 031600FDK | 0002 | 121107 |
| 031600FGT | 0003 | 195877 |
| 031600FGT | 0006 | 195880 |
| 031600FGT | 0007 | 195881 |
| 031600FHQ | 0001 | 121260 |
| 031600FHQ | 0002 | 121261 |
| 031600FHQ | 0003 | 190764 |
| 031600FHQ | 0004 | 215253 |
| 031600FHQ | 0004 | 215253 |
| 031600FLD | 0017 | 188346 |
| 031600FLD | 0016 | 188345 |
| 031600FWM | 0023 | 233161 |
| 031600GFX | 0003 | 193349 |
| 031600GHA | 0001 | 219682 |
| 031600GHA | 0001 | 219682 |
| 031600GHA | 0003 | 222391 |
| 031600GHA | 0003 | 222391 |
| 031600GHV | 0005 | 189629 |
| 031600GHV | 0005 | 189629 |
| 031600GKE | 0001 | 219577 |
| 031600GKE | 0009 | 222736 |
| 031600GKE | 0010 | 222737 |
| 031600GKE | 0011 | 222738 |
| 031600GKE | 0002 | 219591 |

| | | |
|---|---|---|
| 031600GKE | 0003 | 219592 |
| 031600GKE | 0004 | 219593 |
| 031600GKE | 0005 | 219594 |
| 031600GKE | 0006 | 219595 |
| 031600GKE | 0007 | 219596 |
| 031600GKE | 0008 | 219597 |
| 031600GKU | 0001 | 209195 |
| 031600GWV | 0007 | 234365 |

**Stack Description**
Boiler #3
Boiler #2
Boiler stack #1
60 million BTU/hr boiler
Air supply
Air supply
2 Natural gas fired hot water heaters
4 Big foot air houses (19.4 million BTU/hr each)
2 Hot water stations
Paint line water heater
Other natural gas combustion (curing ovens, oxidizers, space heaters)
Emergency generator
Kiln #2
Kiln #2
Engine
Boiler
Natural gas combustion
Boiler #1
Boiler #3
Gas heater
Silo loading
Centrifuge Boilers #1 and #2
2 Steam generators
Cement silo loading
Mixer and/or truck loading
Natural gas combustion
Portland cement terminal: Cement silo loading
Portland cement terminal: Truck loading/unloading
Portland cement terminal: Barge unloader
Slag dryer
Slag dryer
Product collector from shaft dryers (T51-HG1), Cyclone (T51-CN1), and Separator (T61-SR1)
Polymers (Y-Chutes, top of T61-RP2 bin and T61-RP2), and Aux. dryers (T71-HG2 and T71-HG7)
Natural gas combustion
Natural gas combustion
Turbine CT-01
Turbine CT-01
Turbine CT-02
Turbine CT-02
2 Boilers
2 Boilers
Turbine CTG-5
Backup generator EDG A
Backup generator EDG B
Backup generator EDG C
Turbine CTG-6

Turbine CTG-7
Turbine CTG-8
Turbine CTG-9
Turbine CTG-10
Turbine CTG-11
Turbine CTG-12
Combined boilers stack
Boliler

| Mn Emissions (lb/hr) | Diameter (ft) | Height (ft) | Flow Rate (acfm) | Temperature (F) | UTM Zone |
|---|---|---|---|---|---|
| 0.00000152 | 2.00 | 25 | 2752 | 300 | 16 |
| 0.000000589 | 2.00 | 25 | 2752 | 300 | 16 |
| 0.000000589 | 3.50 | 95 | 2600 | 220 | 16 |
| 0 | 3.30 | 117 | 19319 | 300 | 16 |
| 0 | 2.30 | 55 | 8000 | 225 | 16 |
| 0 | 1.00 | 45 | 2000 | 245 | 16 |
| 0.000001026 | 3.70 | 85 | 17345 | 361 | 16 |
| 0.000002546 | 1.76 | 37 | 3000 | 442 | 16 |
| 0.000001026 | 1.84 | 37 | 3300 | 430 | 16 |
| 0.000000266 | 1.84 | 37 | 3300 | 430 | 16 |
| 0.000039976 | 1.92 | 39 | 4860 | 258 | 16 |
| 7.4565E-06 | 2.02 | 36 | 12960 | 692 | 16 |
| 0.033000178 | 6.40 | 52 | 4115 | 181 | 16 |
| 0.032776655 | 6.40 | 52 | 4115 | 181 | 16 |
| 0 | 4.80 | 56 | 73901 | 503 | 16 |
| 0.000009272 | 2.50 | 112 | 9520 | 470 | 16 |
| 0.000002964 | 3.40 | 30 | 25373 | 324 | 16 |
| 0.000001748 | 5.00 | 90 | 7970 | 565 | 16 |
| 0.00000209 | 2.00 | 28 | 4936 | 395 | 16 |
| 0.00000171 | 2.50 | 35 | 700 | 350 | 16 |
| 0.000505 | 2.20 | 32 | 12424 | 113 | 16 |
| 1.38624E-06 | 1.83 | 46 | 2050 | 450 | 16 |
| 0.000001482 | 2.60 | 34 | 1 | 400 | 16 |
| 0.0189375 | 2.80 | 36 | 10266 | 80 | 16 |
| 0.03672 | 2.90 | 32 | 10220 | 80 | 16 |
| 0.00000342 | 2.70 | 50 | 8859 | 341 | 16 |
| 0.000101 | 5.30 | 50 | 3000 | 70 | 16 |
| 0.000606 | 7.92 | 20 | 3000 | 70 | 16 |
| 0 | 2.80 | 36 | 10266 | 80 | 16 |
| 0 | 5.33 | 157 | 74700 | 183 | 16 |
| 0.000011704 | 5.33 | 157 | 74700 | 183 | 16 |
| 6.65E-09 | 2.20 | 90 | 20000 | 205 | 16 |
| 1.672E-09 | 2.20 | 90 | 3336 | 205 | 16 |
| 0.000005852 | 3.40 | 58 | 15060 | 436 | 16 |
| 0.000006194 | 2.47 | 49 | 9240 | 331 | 16 |
| 0.106666 | 20.00 | 90 | 1658000 | 997 | 16 |
| 0 | 20.00 | 90 | 1658000 | 997 | 16 |
| 0.10025 | 20.00 | 90 | 1658000 | 997 | 16 |
| 0 | 20.00 | 90 | 1658000 | 997 | 16 |
| 0.000005434 | 1.50 | 35 | 4700 | 330 | 16 |
| 0.000004712 | 1.50 | 35 | 4700 | 330 | 16 |
| 0.0429471 | 12.14 | 84 | 611000 | 1050 | 16 |
| 0.01563884 | 3.00 | 12 | 16200 | 895 | 16 |
| 0.01563884 | 3.00 | 12 | 16200 | 895 | 16 |
| 0.01563884 | 3.00 | 12 | 16200 | 895 | 16 |
| 0.04244986 | 12.14 | 84 | 611000 | 1050 | 16 |

| | | | | | |
|---|---|---|---|---|---|
| 0.04277066 | 12.14 | 84 | 611000 | 1050 | 16 |
| 0.04341226 | 12.14 | 84 | 611000 | 1050 | 16 |
| 0.04197668 | 12.14 | 84 | 611000 | 1050 | 16 |
| 0.0420248 | 12.14 | 84 | 611000 | 1050 | 16 |
| 0.04220926 | 12.14 | 84 | 611000 | 1050 | 16 |
| 0.04207292 | 12.14 | 84 | 611000 | 1050 | 16 |
| 0.00000494 | 3.00 | 30 | 5150 | 350 | 16 |
| 0.000127848 | 3.78 | 74 | 19740 | 416 | 16 |

| UTM Northing | UTM Easting | Latitude | Longitude |
|---|---|---|---|
| 4610011 | 454809 | 41.640553 | -87.542623 |
| 4610011 | 454809 | 41.640553 | -87.542623 |
| 4610011 | 454809 | 41.640553 | -87.542623 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4612420 | 453419 | 41.662167 | -87.5595 |
| 4615216 | 453823 | 41.687371 | -87.554861 |
| 4615216 | 453823 | 41.687371 | -87.554861 |
| 4615216 | 453823 | 41.687371 | -87.554861 |
| 4613531 | 454085 | 41.672212 | -87.551584 |
| 4617392 | 450256 | 41.70676 | -87.597904 |
| 4613129 | 451612 | 41.668445 | -87.581256 |
| 4613129 | 451612 | 41.668445 | -87.581256 |
| 4618594 | 454528 | 41.718435 | -87.546145 |
| 4619060 | 454722 | 41.722045 | -87.544345 |
| 4613049 | 450146 | 41.667637 | -87.598862 |
| 4617978 | 453577 | 41.712233 | -87.558033 |
| 4617532 | 451809 | 41.708115 | -87.57925 |
| 4617532 | 451809 | 41.708115 | -87.57925 |
| 4617532 | 451809 | 41.708115 | -87.57925 |
| 4612185 | 452489 | 41.659995 | -87.570645 |
| 4612185 | 452489 | 41.659995 | -87.570645 |
| 4612185 | 452489 | 41.659995 | -87.570645 |
| 4612141 | 452468 | 41.659603 | -87.5709 |
| 4612141 | 452468 | 41.659603 | -87.5709 |
| 4617602 | 454330 | 41.708895 | -87.548945 |
| 4617602 | 454330 | 41.708895 | -87.548945 |
| 4613979 | 453740 | 41.675455 | -87.556245 |
| 4617336 | 450418 | 41.706267 | -87.595953 |
| 4614792 | 453654 | 41.683552 | -87.556862 |
| 4614792 | 453654 | 41.683552 | -87.556862 |
| 4614792 | 453697 | 41.683556 | -87.556351 |
| 4614792 | 453697 | 41.683556 | -87.556351 |
| 4612395 | 452774 | 41.661905 | -87.567245 |
| 4612395 | 452774 | 41.661905 | -87.567245 |
| 4618643 | 454621 | 41.718284 | -87.54553 |
| 4618584 | 454708 | 41.718046 | -87.545265 |
| 4618571 | 454708 | 41.718046 | -87.545265 |
| 4618559 | 454708 | 41.718046 | -87.545265 |
| 4618616 | 454621 | 41.718047 | -87.54553 |

| | | | |
|---|---|---|---|
| 4618590 | 454621 | 41.717811 | -87.54553 |
| 4618564 | 454621 | 41.717574 | -87.54553 |
| 4618643 | 454672 | 41.718292 | -87.544914 |
| 4618617 | 454672 | 41.718053 | -87.544914 |
| 4618590 | 454672 | 41.717812 | -87.544914 |
| 4618564 | 454672 | 41.717574 | -87.544914 |
| 4617728 | 451623 | 41.709869 | -87.581501 |
| 4613685 | 454218 | 41.673608 | -87.55 |

## Layman, Robb

**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Friday, October 25, 2019 3:33 PM
**To:** Sprague, Jeff
**Cc:** Barria, German; Bernoteit, Bob
**Subject:** [External] RE: Request for Emission Inventory Data for Use in Air Dispersion Modeling

Thank you Jeff.

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com



---

**From:** Sprague, Jeff <Jeff.Sprague@Illinois.gov>
**Sent:** Friday, October 25, 2019 11:09 AM
**To:** John Pinion <jpinion@rka-inc.com>
**Cc:** Barria, German <German.Barria@Illinois.gov>; Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>
**Subject:** RE: Request for Emission Inventory Data for Use in Air Dispersion Modeling

John,
As you've requested, I'm forwarding an inventory of manganese emission sources (see attached) for use in the dispersion modeling analysis for the proposed General III, LLC scrap metal recycling facility. An inventory of lead (Pb) emission sources will be forwarded either today or next week under separate cover.

Best regards,

Jeff

Jeffrey Sprague
Modeling Unit, Manager
Air Quality Planning Section
Bureau of Air
Illinois Environmental Protection Agency

(217) 524-4692
Jeff.Sprague@Illinois.gov

---

**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Thursday, October 24, 2019 11:53 AM
**To:** Sprague, Jeff <Jeff.Sprague@Illinois.gov>
**Cc:** 'Freeborn & Peters LLP; Zwick, Ann (azwick@freeborn.com)' <azwick@freeborn.com>; Darina Demirev <ddemirev@rka-inc.com>
**Subject:** [External] Request for Emission Inventory Data for Use in Air Dispersion Modeling

Jeff,

It was a pleasure meeting you in person yesterday.

As per our discussion, RKA is requesting a Emission Inventory Data for lead and manganese emission sources near the proposed location of General III, LLC at 11600 South Burley Avenue in Chicago, Illinois, for use in the IEPA requested air dispersion modeling analysis for the proposed project.

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com

## Layman, Robb

**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Friday, October 25, 2019 3:33 PM
**To:** Sprague, Jeff
**Cc:** Barria, German; Bernoteit, Bob
**Subject:** [External] RE: Near Sources---Lead (Pb) Emissions Inventory for Proposed General III, LLC Dispersion Modeling

Thank you Jeff

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com



---

**From:** Sprague, Jeff <Jeff.Sprague@Illinois.gov>
**Sent:** Friday, October 25, 2019 3:18 PM
**To:** John Pinion <jpinion@rka-inc.com>
**Cc:** Barria, German <German.Barria@Illinois.gov>; Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>; Sprague, Jeff <Jeff.Sprague@Illinois.gov>
**Subject:** Near Sources---Lead (Pb) Emissions Inventory for Proposed General III, LLC Dispersion Modeling

John,
Here's a preliminary emissions inventory of lead-emitting sources within five kilometers of the proposed General III, LLC location. It's a shorter list than I anticipated, so I'm going to make a follow-up inquiry to the individual who oversees our statewide database.

Best regards,

Jeff

Jeffrey Sprague
Modeling Unit, Manager
Air Quality Planning Section
Bureau of Air
Illinois Environmental Protection Agency

(217) 524-4692
Jeff.Sprague@Illinois.gov

## Layman, Robb

**From:** Sprague, Jeff
**Sent:** Wednesday, October 30, 2019 3:08 PM
**To:** jpinion@rka-inc.com
**Cc:** Barria, German; Bernoteit, Bob; Sprague, Jeff
**Subject:** Supplemental Lead (Pb) Emissions Inventory
**Attachments:** additional_Pb_sources.xlsx

John,

After reviewing what the Illinois EPA submitted to USEPA for the 2017 NEI, please include the additional lead (Pb) sources identified in the accompanying spreadsheet in your modeling for the proposed General III, LLC facility.

Best regards,

Jeff

Jeffrey Sprague
Modeling Unit, Manager
Air Quality Planning Section
Bureau of Air
Illinois Environmental Protection Agency

(217) 524-4692
Jeff.Sprague@Illinois.gov

| Id Number | NAICS | Name | Address | City | State |
|---|---|---|---|---|---|
| 031600AAR | 336111 | Ford Motor Co | 12600 S Torrence Ave | Chicago | IL |
| 031600FGT | 327320 | Ozinga chicago RMC Inc | 1818 E 103rd St | Chicago | IL |
| 031600FHQ | 212399 | Holcim (US) Inc | 2150 E 130th St | Chicago | IL |
| 031600GKE | 221112 | Exelon Generation Co LLC | 3141 E 96th St | Chicago | IL |

**ZIP**
60633-1111
60617-5641
60633-2300
60617-5474

## Johnson, AJ

**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Tuesday, November 19, 2019 9:35 AM
**To:** Sprague, Jeff; Bernoteit, Bob
**Cc:** 'Freeborn & Peters LLP; Zwick, Ann (azwick@freeborn.com)'; GII, LLC; Labkon, Adam (adamlabkon@general-iron.com) ; GII, LLC; Kallas, Jim (jimkallas@general-iron.com)
**Subject:** [WARNING: ATTACHMENT UNSCANNED][External] Modeling Protocol - General III, LLC
**Attachments:** 2019-11-18 GIII Metals Modeling Protocol - TRADE SECRET - Redacted.pdf

Jeff,

Please find attached a copy of the modeling protocol for metal emission impacts from the proposed General III, LLC scrap metal recycling facility at 11600 South Burley Avenue in Chicago.

Please note that the attached copy has Figures A-1, A-2, B-1 and B-2, that depict the Ferrous Material Processing System and Non-Ferrous Material Processing Facilities, are redacted and marked as Trade Secret.

We will be submitting two hard copies of the protocol to your attention, one will be the attached redacted copy and the other will be an unredacted copy containing the above referenced figures marked as Trade Secret. A Justification for Trade Secret information will also be submitted with the hard copies.

The Trade Secret figures are essentially identical to the figures submitted to IEPA on November 14, 2019, with Justification for designation as Trade Secret. The only difference is that Figures A-1 and B-1 show the limits of the multiple volume sources used for modeling.

The tables, in Appendix A and B, that identify the individual emission sources included in each proposed volume sources are not claimed as Trade Secret.

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com

# Air Dispersion Modeling Protocol to Assess Metal Emission Impacts

## General III, LLC – Chicago, Illinois

**November 18, 2019**

**R17421-7.1**

***Prepared for:***

**General III, LLC**
**1909 North Clifton Avenue**
**Chicago, Illinois 60614**
**Attn: Mr. Jim Kallas**

# This Document Contains Redacted TRADE SECRET Information

**Figures A-1, A-2, B-1, and B-3 Contain Trade Secret Information and Have Been Redacted from this Document.**

***Prepared by:***

**John G. Pinion**
**Principal Engineer**
**RK & Associates, Inc.**

RK & Associates, Inc.

**2 South 631 Route 59**
**Suite B**
**Warrenville, Illinois 60555**
**Phone: 630-393-9000**
**Fax: 630-393-9111**

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RK & Associates, Inc.

# TABLE OF CONTENTS



## TABLES

## FIGURES



## APPENDIXES

RK & Associates, Inc.

# 1.0 INTRODUCTION

General III, LLC (GIII), is proposing to construct and operate a new scrap metal recycling facility (Facility) in Cook County at 11600 South Burley Avenue in Chicago, Illinois. A Site Location Map and Facility Layout Map are presented in Figures 1-1 and 1-2.

GIII's proposed facility will be a state-of-the-art metal recycling facility located in the heart of an industrial district well buffered from residential properties. The proposed new metal shredder and material processing operations will utilize the latest technology to create a clean, efficient, and environmentally sensitive plant.

GIII will receive and shred mixed recyclables in various forms to produce uniform grades of ferrous and non-ferrous metals. Proposed scrap handling and processing activities include receiving, sorting, shredding, metal separation, and recovery of ferrous and non-ferrous metals.

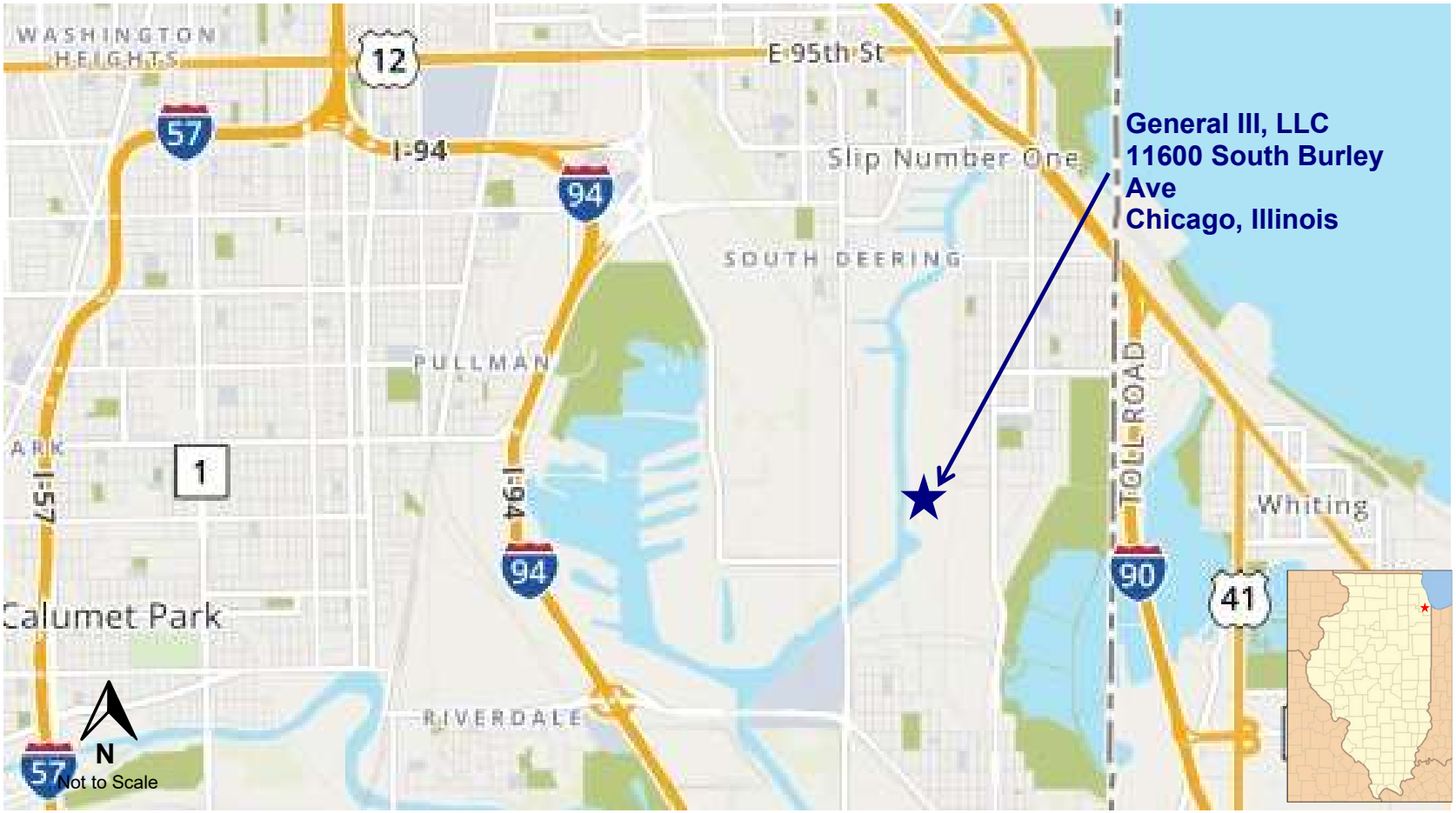
The proposed GIII facility will be a minor source with respect to federal and state nonattainment area new source review (NA NSR), prevention of significant deterioration (PSD) requirements and Title V permitting requirements. The proposed facility will also be an area source with respect to hazardous air pollutants (HAPs).

As part of the air permitting process, Illinois Environmental Protection Agency (IEPA) has requested that GIII perform air dispersion modeling of metal emissions from the proposed facility. Emission testing was conducted at the existing GII facility (formally General Iron Industries, Inc. ) located at 1909 North Clifton Avenue in Chicago, on June 13 and 14, 2018, that measured metal emissions from the discharge of the roll media filter used to control particulate emissions from the existing shredder operation, in accordance with USEPA Methods 1-4 and Method 29. Test results were submitted to IEPA in June 2018. Pursuant to USEPA Method 29, the emissions of seventeen metals were reported. IEPA requested that GIII evaluate the offsite impacts from those seventeen metals.

There are no IEPA or USEPA regulations limiting emissions of specific metals or requiring an ambient impact analysis. There is a National Ambient Air Quality Standard (NAAQS) for lead (Pb). In an effort to identify a standard for metals, RKA reviewed the Wisconsin Department of Natural Resources (WDNR's) rule regulating the emissions of air toxic pollutants (including metals) that is applicable to facilities that are not subject to other state or federal rules for metals emissions. WDNR's Air Toxics Rule (NR 445) sets health-based emission standards for about 550 air toxics, including metals. The standards in NR 445 are based on threshold limit values established by American Conference of Governmental Industrial Hygienists (ACGIH) and USEPA or California Air Resources Board risk factors. Wisconsin's NR 445 will be used to assess the potential impacts for the estimated emissions of the 17 identified metals as described in Section 3 of this document.

## 1.1 Facility Location and Contact Information

| | |
|---|---|
| Business Name: | General III, LLC. |
| Source Location: | 11600 South Burley – Chicago, Illinois 60617<br>Hyde Park Township, Cook County Illinois |
| Latitude/Longitude | 41.685201° N / -87.545847" W –<br>Approximate Location of Front Gate |
| Office/Mailing Address: | 1909 N. Clifton Avenue – Chicago, Illinois 60614 |
| General III, LLC | Mr. Jim Kallas - Environmental Manager<br>847-508-9170 – jim@general-iron.com |
| IEPA Site ID No.: | Not yet assigned |
| SIC Code: | 5093 – Scrap and Waste Materials |
| NAICS Code: | 423930 – Recyclable Material Merchant Wholesalers |
| RKA Contact for Application Preparation | John Pinion - Principal Engineer<br>2S631 Route 59, Suite B - Warrenville, Illinois 60555<br>630-393-9000 - jpinion@rka-inc.com |




| | | | | |
|---|---|---|---|---|
| RK & Associates, Inc.<br>2S631 ROUTE 59, SUITE B<br>WARRENVILLE, IL 60555<br>630-393-9000/630-393-9111 | COMMENTS:<br>Air Dispersion Modeling Protocol to Assess Metal Emission Impacts | Site Location Map<br>General III, LLC<br>11600 South Burley, Chicago, Illinois | | FIGURE<br>1-1 |
| | DRAWN BY:: | APPROVED BY:: JGP | PROJECT NUMBER R19439-7.10 | DATE DRAWN: 11-11-2019 | REVISED DATE |


| | | | | | |
|---|---|---|---|---|---|
| RK & Associates, Inc.<br>2S631 ROUTE 59, SUITE B<br>WARRENVILLE, IL 60555<br>630-393-9000/630-393-9111 | COMMENTS:<br>Air Dispersion Modeling Protocol to Assess Metal Emission Impacts | Facility Map<br>General III, LLC<br>11600 South Burley, Chicago, IL | | | FIGURE<br>1-2 |
| | DRAWN BY: | APPROVED BY:<br>JGP | PROJECT NUMBER:<br>R19439-7.10 | DATE DRAWN:<br>11-11-2019 | REVISED DATE |

RK & Associates, Inc.

# 2.0 EMISSION SOURCES

Emission sources, emission factors, and emission rates are described in detail in the Construction Permit Application submitted to IEPA dated September 24, 2019. The new proposed GIII facility will consist of the following operations:

- Raw material receiving and handling;
- Hammermill shredder;
- Ferrous separation and material processing; and,
- Non-ferrous separation and material processing.

The following emission sources are identified:

- Shredder controlled by roll-media filter, RTO, and quench packed tower scrubber;
- Ferrous Material Processing System –conveyors, magnetic separators, stockpiles, and material loadout;
- Non-Ferrous Material Processing System - feed hopper, conveyors transfer points, magnetic separators, screens, vibratory feed tables, stockpiles and material loadout, and a baghouse for control of emission sources located in the fines processing building;
- Stockpiles (fugitive emissions); and,
- Paved and Unpaved Roads (fugitive emissions)

## 2.1 Shredder Emissions

Emissions from the shredder will be collected and controlled by a hood located over the top of the shredder and ducted through a control system consisting of a roll media filter, RTO, and a quench/ packed tower scrubber. Emissions from the shredder (scrubber exhaust stack) will be modelled as a point source. Point source parameters are as follows:

| | |
|---|---|
| Stack Height: | 41 ft |
| Stack Diameter: | 6 ft |
| Exhaust Flow Rate: | 73,500 acfm |
| Exhaust Temperature: | 100˚F |

Emission testing conducted at the existing GII facility in Chicago on June 13 and 14, 2018 measured metals from the exhaust of the existing roll media filter pursuant to USEPA Methods 1-4 and Method 29. Due to the similarities in shredder material feed streams, the metals partitioning in filterable particulate measured at the discharge of the roll media filter at GII are assumed to be the representative of the metals partitioning in the estimated filterable particulate in shredder emissions discharged from the scrubber exhaust stack.

Metal emissions from the proposed shredder are presented in Appendix A, Table A-1a and A-1b.

## 2.2 Ferrous Material Processing

The Ferrous Material Processing System consists of multiple emissions sources as described in the construction permit application. Emission sources include conveyors, magnetic separators, stockpiles and material loadout.

For the purpose of modeling, emission sources that are spatially close together are combined into separate volume sources. The Ferrous Material Processing System emission sources have been grouped into thirteen (13) volume sources, V-1 through V-13, as shown in Figure A-1 in Appendix A. A layout drawing of the Ferrous Material Processing System is presented in Figure A-2 in Appendix A. Figures A-1 and A-2 contain TRADE SECRET information and have been redacted from this document.

Individual metal emission rates are calculated by multiplying the estimated particulate emission rate for each modeled source by the metal partitioning factor for each metal, expressed as a percentage of the total filterable particulate measured during the June 2018 GII shredder emission testing.

The type of emission source, the emission source identification number, and corresponding PM emissions are shown in Table A-2 in Appendix A.

Stockpile sources and their appropriate volume source group are shown in Table A-3. Emissions from stockpiles are different during the time piles are active and when piles are inactive. Table A-4 identifies the individual metal emission rates from material handling sources and stockpile sources. For the purpose of this modeling assessment, the stockpiles in the Ferrous Material Handling System are assumed to be active for 12 hours per day Monday through Saturday.

## 2.3 Non-Ferrous Material Processing

The Non-Ferrous Material Processing System consists of multiple emissions sources as described in the construction permit application. Emission sources include feed hopper, conveyors transfer points, magnetic separators, screens, vibratory feed tables, stockpiles and material loadout. Emission sources have been grouped into six (6) volume sources, VN-1 through VN-6, as shown in Figure B-1 in Appendix B. A layout drawing of the Non-Ferrous Material Processing System is presented in Figure B-2 in Appendix B. Figures B-1 and B-2 contain TRADE SECRET information and have been redacted from this document.

Individual metal emission rates are calculated by multiplying the estimated particulate emission rate for each modeled source by the metal partitioning factor for each metal, expressed as a percentage of the total filterable particulate measured during the June 2018 GII shredder emission testing.

The type of emission source, the emission source identification number, and corresponding PM emissions are shown in Table B-1 in Appendix B.

Stockpile sources and their appropriate volume source group are shown in Table B-2. Emissions from stockpiles are different during the time piles are active and when piles are inactive. Table B-3 contains combined emissions from material handling sources and stockpile sources. For the purpose of this modeling assessment, the stockpiles in the Non-Ferrous Material Handling System are assumed to be active for 24 hours per day Monday through Saturday.

Individual metal emission rates are shown in Table B-4a for active facility hours and in Table B-4b for inactive hours.

The Non-Ferrous Material Processing System includes a Fines Processing System that is located in a building. Emissions from the fines processing equipment are ducted to one of four identical dust collectors. Three of the dust collectors exhaust treated air back into the building and the fourth dust collector exhausts treated air to the outside atmosphere. Emissions from the single dust collector that exhausts to the atmosphere will be modeled as a point source with the following parameters:

| | |
|---|---|
| Stack Height: | 47 ft |
| Stack Diameter: | 2 ft |
| Exhaust Flow Rate: | 12,000 acfm |
| Exhaust Temperature: | Ambient |

Metal emissions from the dust collector are shown in Table B-4 in Appendix B.

## 2.4 Vehicle Traffic

The vast majority of material received at the proposed facility will be delivered by semi-trailers and the remaining portion will enter the facility in pickup truck sized vehicles driven by peddlers. Vehicles will enter the facility through a controlled gate and travel over a weigh scale before being routed to a designated unloading area.

Proposed vehicle routes are presented in Figure C-1 in Appendix C. Vehicle emissions will be modeled as a line of adjacent volume sources, representing each of the vehicle routes in the facility. Estimated roadway fugitive emissions will be distributed to reflect the frequency of the vehicle traffic on each road.

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# 3.0 DISPERSION MODELING

Dispersion modeling will be performed to predict the maximum impact from General III sources. AERMOD dispersion model Version 19191, AIRMET Version 19191, AERMINUTE Version 15272, AERMAP Version 18081, and AIRSURFACE Version 13016 will be used in this modeling analysis.

## 3.1 Meteorological Data

Surface meteorological data used in the modeling is obtained from the National Weather Service at the Midway Airport Station for the years 2014 through 2018. Wind data was downloaded as 1-minute average ASOS data and processed in AERMINUTE. Upper air data for the same period is obtained from nearest upper air Lincoln-Logan County station. Surface and upper air data is preprocessed with AERMET using surface parameters from AIRSURFACE.

## 3.2 Terrain Data

Receptor elevations, source elevations, and building elevations were obtain by running AERMAP, using National Elevation Dataset (NED) files downloaded from USGS website.

## 3.3 Receptor Network

A Cartesian receptor grid is placed around the property lines up to 5 km from the property line as follows:

- 50 m apart along the property line
- 100 m extending from the fence line to 2 km
- 500 m apart from 2 km to 5 km

## 3.4 Building Downwash

Downwash parameters will be developed based on detailed building information provided by GIII for proposed buildings, and information derived from aerial photos from Google Earth for nearby buildings.

## 3.5 Lead Modeling

Lead modeling will be performed to identify off site impacts for comparison to the National Ambient Air Quality Standard (NAAQS) for lead, which is 0.15 $\mu g/m^3$ on a rolling three-month average.

GIII lead emission sources described in Section 2 of this protocol will be modeled along with other, non-GIII offsite lead sources. IEPA has provided a list of offsite lead sources to be included in this modeling assessment. The list of offsite sources is included in Table 3-1.

## TABLE 3-1. OFFSITE LEAD SOURCES

| ID Number | Stack Number | Stack Id | Stack Description | Lead Emissions (lb/hr) | Stack Diameter (ft) | Stack Height (ft) | Flow Rate (acfm) | Temperature (F) | UTM Zone | UTM Northing | UTM Easting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 031600AAR | 109 | 250881 | 4 Big foot air houses (19.4 million BTU/hr each) | 0.00000335 | 1.76 | 37 | 3000 | 442 | 16 | 4612420 | 453419 |
| 031600FGT | 3 | 195877 | Cement silo loading | 0.000069 | 2.80 | 36 | 10266 | 80 | 16 | 4617532 | 451809 |
| 031600FGT | 6 | 195880 | Mixer and/or truck loading | 0.0002292 | 2.90 | 32 | 10220 | 80 | 16 | 4617532 | 451809 |
| 031600FHQ | 1 | 121260 | Portland cement terminal: Cement silo loading | 0.000368 | 5.30 | 50 | 3000 | 70 | 16 | 4612185 | 452489 |
| 031600FHQ | 2 | 121261 | Portland cement terminal: Truck loading/unloading | 0.002208 | 7.92 | 20 | 3000 | 70 | 16 | 4612185 | 452489 |
| 031600GKE | 9 | 222736 | Backup generator EDG A | 0.000277144 | 3.00 | 12 | 16200 | 895 | 16 | 4618584 | 454708 |
| 031600GKE | 10 | 222737 | Backup generator EDG B | 0.000277144 | 3.00 | 12 | 16200 | 895 | 16 | 4618571 | 454708 |
| 031600GKE | 11 | 222738 | Backup generator EDG C | 0.000277144 | 3.00 | 12 | 16200 | 895 | 16 | 4618559 | 454708 |
| 031600AFV | 5 | 118896 | Kiln #2 | 0.144 | 15.85 | 16 | 4115 | 356 | 16 | 4615216 | 453823 |
| 031600AFV | 27 | 184788 | Crude zinc oxide bin loadout (bag collector 5) | 0.009 | 29.87 | 30 | 123228 | 300 | 16 | 4615216 | 453823 |
| 031600AFV | 30 | 184791 | Feed handling system | 0.0018 | 22.86 | 23 | 4101 | 301 | 16 | 4615216 | 453823 |
| 031600GWV | 7 | 234365 | Boiler | 0.00019 | 22.56 | 23 | 19740 | 487 | 16 | 4613685 | 454218 |

AERMOD will be run for five years of meteorological data to predict the first-high monthly average concentration. AERMOD post files will be created and processed with LEADPOST, which outputs the rolling three-month averages. LEADPOST identifies the receptor of maximum impact based on a three-month rolling average.

Background lead ambient concentration will be added to the predicted maximum 3-month average concentration. The nearest statewide air monitoring site for lead is located at Washington High School, AQS ID 17-031-0022. The three-month rolling means for the past three years are shown in Table 3-2. The maximum three-month rolling mean from the latest three-year period will used as a background concentration.

Predicted modeled concentrations plus background concentration will be compared to the NAAQS.

## TABLE 3-2. LEAD BACKGROUND CONCENTRATIONS

| Year | Three-Month Rolling Mean ($\mu g/m^3$) | Design Value* ($\mu g/m3$) |
|---|---|---|
| 2018 | 0.01 | 0.02 |
| 2017 | 0.02 | |
| 2016 | 0.02 | |

* The design value is the maximum three-month rolling mean over the latest three-year period.

## 3.6 Manganese Modeling

There is no NAAQS for manganese. Modeling will be performed to identify predicted offsite impacts for comparison to Wisconsin's NR 445 standard of 4.8 µg/m$^3$ on a 24-hour average basis and USEPA's chronic inhalation Minimal Risk Level (MRL) of 0.3 µg/m$^3$ on an annual average basis.

GIII manganese sources described in Section 2 of this protocol will be modeled along with other, non-GIII offsite manganese sources. IEPA provided a list of offsite manganese sources to be included in this modeling assessment. The list of offsite manganese emission sources is included in Table 3-3.

AERMOD will be run for five years of meteorological data to predict the first-high 24-hour average concentration (for comparison to the NR 445 standard) and the annual concentration (for comparison the USEPA MRL).

Background manganese ambient concentration will be added to the predicted first-high 24-hour average concentration. The nearest statewide air monitoring site for manganese is located at Washington High School, AQS ID 17-031-0022. The maximum 24-hour and annual manganese concentrations measured during the past three years are shown in Table 3-4. The maximum 24-hour concentration among the last three years is 0.370 µg/m$^3$, which will be used as a the 24-hour background concentration. The maximum annual average among the three years is 0.070 µg/m$^3$ , which will be used as the annual background concentration.

## TABLE 3-3. OFFSITE MANGANESE SOURCES

| ID Number | Stack Number | Stack Id | Stack Description | Mn Emissions (lb/hr) | Stack Diameter (ft) | Stack Height (ft) | Flow Rate (acfm) | Temperature (F) | UTM Zone | UTM Northing | UTM Easting |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 031036AAA | 0003 | 115247 | Boiler #3 | 0.00000152 | 2.00 | 25 | 2752 | 300 | 16 | 4610011 | 454809 |
| 031036AAA | 0004 | 115248 | Boiler #2 | 0.000000589 | 2.00 | 25 | 2752 | 300 | 16 | 4610011 | 454809 |
| 031036AAA | 0002 | 115246 | Boiler stack #1 | 0.000000589 | 3.50 | 95 | 2600 | 220 | 16 | 4610011 | 454809 |
| 031600AAR | 0046 | 118716 | 60 million BTU/hr boiler | 0 | 3.30 | 117 | 19319 | 300 | 16 | 4612420 | 453419 |
| 031600AAR | 0055 | 118725 | Air supply | 0 | 2.30 | 55 | 8000 | 225 | 16 | 4612420 | 453419 |
| 031600AAR | 0056 | 118726 | Air supply | 0 | 1.00 | 45 | 2000 | 245 | 16 | 4612420 | 453419 |
| 031600AAR | 0088 | 156582 | 2 Natural gas fired hot water heaters | 0.000001026 | 3.70 | 85 | 17345 | 361 | 16 | 4612420 | 453419 |
| 031600AAR | 0109 | 250881 | 4 Big foot air houses (19.4 million BTU/hr each) | 0.000002546 | 1.76 | 37 | 3000 | 442 | 16 | 4612420 | 453419 |
| 031600AAR | 0110 | 250882 | 2 Hot water stations | 0.000001026 | 1.84 | 37 | 3300 | 430 | 16 | 4612420 | 453419 |
| 031600AAR | 0111 | 250883 | Paint line water heater | 0.000000266 | 1.84 | 37 | 3300 | 430 | 16 | 4612420 | 453419 |
| 031600AAR | 0112 | 250884 | Other natural gas combustion (curing ovens, oxidize | 0.000039976 | 1.92 | 39 | 4860 | 258 | 16 | 4612420 | 453419 |
| 031600AAR | 0114 | 250886 | Emergency generator | 7.4565E-06 | 2.02 | 36 | 12960 | 692 | 16 | 4612420 | 453419 |
| 031600AFV | 0005 | 118896 | Kiln #2 | 0.033000178 | 6.40 | 52 | 4115 | 181 | 16 | 4615216 | 453823 |
| 031600AFV | 0005 | 118896 | Kiln #2 | 0.032776655 | 6.40 | 52 | 4115 | 181 | 16 | 4615216 | 453823 |
| 031600AFV | 0035 | 184796 | Engine | 0 | 4.80 | 56 | 73901 | 503 | 16 | 4615216 | 453823 |
| 031600ALC | 0002 | 118971 | Boiler | 0.000009272 | 2.50 | 112 | 9520 | 470 | 16 | 4613531 | 454085 |
| 031600AOL | 0015 | 209976 | Natural gas combustion | 0.000002964 | 3.40 | 30 | 25373 | 324 | 16 | 4617392 | 450256 |
| 031600BIY | 0001 | 119521 | Boiler #1 | 0.000001748 | 5.00 | 90 | 7970 | 565 | 16 | 4613129 | 451612 |
| 031600BIY | 0024 | 241900 | Boiler #3 | 0.00000209 | 2.00 | 28 | 4936 | 395 | 16 | 4613129 | 451612 |
| 031600BRA | 0001 | 119770 | Gas heater | 0.00000171 | 2.50 | 35 | 700 | 350 | 16 | 4618594 | 454528 |
| 031600DPK | 0001 | 120674 | Silo loading | 0.000505 | 2.20 | 32 | 12424 | 113 | 16 | 4619060 | 454722 |
| 031600DQO | 0021 | 173045 | Centrifuge Boilers #1 and #2 | 1.38624E-06 | 1.83 | 46 | 2050 | 450 | 16 | 4613049 | 450146 |
| 031600FDK | 0002 | 121107 | 2 Steam generators | 0.000001482 | 2.60 | 34 | 1 | 400 | 16 | 4617978 | 453577 |
| 031600FGT | 0003 | 195877 | Cement silo loading | 0.0189375 | 2.80 | 36 | 10266 | 80 | 16 | 4617532 | 451809 |
| 031600FGT | 0006 | 195880 | Mixer and/or truck loading | 0.03672 | 2.90 | 32 | 10220 | 80 | 16 | 4617532 | 451809 |
| 031600FGT | 0007 | 195881 | Natural gas combustion | 0.00000342 | 2.70 | 50 | 8859 | 341 | 16 | 4617532 | 451809 |
| 031600FHQ | 0001 | 121260 | Portland cement terminal: Cement silo loading | 0.000101 | 5.30 | 50 | 3000 | 70 | 16 | 4612185 | 452489 |
| 031600FHQ | 0002 | 121261 | Portland cement terminal: Truck loading/unloading | 0.000606 | 7.92 | 20 | 3000 | 70 | 16 | 4612185 | 452489 |
| 031600FHQ | 0003 | 190764 | Portland cement terminal: Barge unloader | 0 | 2.80 | 36 | 10266 | 80 | 16 | 4612185 | 452489 |
| 031600FHQ | 0004 | 215253 | Slag dryer | 0 | 5.33 | 157 | 74700 | 183 | 16 | 4612141 | 452468 |
| 031600FHQ | 0004 | 215253 | Slag dryer | 0.000011704 | 5.33 | 157 | 74700 | 183 | 16 | 4612141 | 452468 |
| 031600FLD | 0017 | 188346 | Product collector from shaft dryers (T51-HG1), Cyclo | 6.65E-09 | 2.20 | 90 | 20000 | 205 | 16 | 4617602 | 454330 |
| 031600FLD | 0016 | 188345 | Polymers (Y-Chutes, top of T61-RP2 bin and T61-RP2 | 1.672E-09 | 2.20 | 90 | 3336 | 205 | 16 | 4617602 | 454330 |
| 031600FWM | 0023 | 233161 | Natural gas combustion | 0.000005852 | 3.40 | 58 | 15060 | 436 | 16 | 4613979 | 453740 |
| 031600GFX | 0003 | 193349 | Natural gas combustion | 0.000006194 | 2.47 | 49 | 9240 | 331 | 16 | 4617336 | 450418 |
| 031600GHA | 0001 | 219682 | Turbine CT-01 | 0.106666 | 20.00 | 90 | 1658000 | 997 | 16 | 4614792 | 453654 |
| 031600GHA | 0001 | 219682 | Turbine CT-01 | 0 | 20.00 | 90 | 1658000 | 997 | 16 | 4614792 | 453654 |
| 031600GHA | 0003 | 222391 | Turbine CT-02 | 0.10025 | 20.00 | 90 | 1658000 | 997 | 16 | 4614792 | 453697 |
| 031600GHA | 0003 | 222391 | Turbine CT-02 | 0 | 20.00 | 90 | 1658000 | 997 | 16 | 4614792 | 453697 |
| 031600GHV | 0005 | 189629 | 2 Boilers | 0.000005434 | 1.50 | 35 | 4700 | 330 | 16 | 4612395 | 452774 |
| 031600GHV | 0005 | 189629 | 2 Boilers | 0.000004712 | 1.50 | 35 | 4700 | 330 | 16 | 4612395 | 452774 |
| 031600GKE | 0001 | 219577 | Turbine CTG-5 | 0.0429471 | 12.14 | 84 | 611000 | 1050 | 16 | 4618643 | 454621 |
| 031600GKE | 0009 | 222736 | Backup generator EDG A | 0.01563884 | 3.00 | 12 | 16200 | 895 | 16 | 4618584 | 454708 |
| 031600GKE | 0010 | 222737 | Backup generator EDG B | 0.01563884 | 3.00 | 12 | 16200 | 895 | 16 | 4618571 | 454708 |
| 031600GKE | 0011 | 222738 | Backup generator EDG C | 0.01563884 | 3.00 | 12 | 16200 | 895 | 16 | 4618559 | 454708 |
| 031600GKE | 0002 | 219591 | Turbine CTG-6 | 0.04244986 | 12.14 | 84 | 611000 | 1050 | 16 | 4618616 | 454621 |
| 031600GKE | 0003 | 219592 | Turbine CTG-7 | 0.04277066 | 12.14 | 84 | 611000 | 1050 | 16 | 4618590 | 454621 |
| 031600GKE | 0004 | 219593 | Turbine CTG-8 | 0.04341226 | 12.14 | 84 | 611000 | 1050 | 16 | 4618564 | 454621 |
| 031600GKE | 0005 | 219594 | Turbine CTG-9 | 0.04197668 | 12.14 | 84 | 611000 | 1050 | 16 | 4618643 | 454672 |
| 031600GKE | 0006 | 219595 | Turbine CTG-10 | 0.0420248 | 12.14 | 84 | 611000 | 1050 | 16 | 4618617 | 454672 |
| 031600GKE | 0007 | 219596 | Turbine CTG-11 | 0.04220926 | 12.14 | 84 | 611000 | 1050 | 16 | 4618590 | 454672 |
| 031600GKE | 0008 | 219597 | Turbine CTG-12 | 0.04207292 | 12.14 | 84 | 611000 | 1050 | 16 | 4618564 | 454672 |
| 031600GKU | 0001 | 209195 | Combined boilers stack | 0.00000494 | 3.00 | 30 | 5150 | 350 | 16 | 4617728 | 451623 |
| 031600GWV | 0007 | 234365 | Boliler | 0.000127848 | 3.78 | 74 | 19740 | 416 | 16 | 4613685 | 454218 |

### TABLE 3-4. MANGANESE BACKGROUND CONCENTRATIONS

| Year | 1st High 24-Hour Concentration ($\mu g/m^3$) | Annual Mean ($\mu g/m^3$) | Maximum 24-Hour Concentration ($\mu g/m^3$) |
|---|---|---|---|
| 2018 | 0.197 | 0.048 | 0.370 |
| 2017 | 0.235 | 0.070 | |
| 2016 | 0.370 | 0.068 | |

## 3.7 Modeling Other Metals

There are no NAAQS for other metals. Wisconsin's Air Toxics Rule (NR 445) sets health-based emission standards. The metal impacts predicted by this modeling analysis will be compared to the NR 445 standards.

Table 3-5 includes a list of the other metals and their corresponding NR 445 limits.

### TABLE 3-5. NR 445 STANDARDS FOR OTHER METALS

| Metals | Ambient Air Standard | | Unit Risk Factor $(ug/m^3)^{-1}$ | Source |
|---|---|---|---|---|
| | 24 Hour ($ug/m^3$) | Annual ($ug/m^3$) | | |
| Antimony | 12.00 | NA | | |
| Arsenic | NA | Carcinogen | 0.00430 | IRIS |
| Barium | 12.00 | NA | | |
| Beryllium | NA | Carcinogen | 0.00240 | IRIS |
| | | 0.02 | | |
| Cadmium | NA | Carcinogen | 0.00180 | IRIS |
| Chromium (1) | 12.00 | NA | | |
| Cobalt | 0.48 | NA | | |
| Copper | 24.00 | NA | | |
| Nickel | NA | Carcinogen | 0.00026 | CAL |
| Phosphorus | 2.43 | NA | | |
| Selenium | 4.80 | NA | | |
| Thallium | 2.40 | NA | | |
| Silver(2) | NA | NA | | |
| Zinc(2) | NA | NA | | |
| Mercury | 2.40 | 0.30 | | |

(1) Chromium (metal) and compounds other than Chromium VI.
(2) Silver, and zinc compounds are not in NR445 and no inhalation RfC is reported on the EPA Integrated Risk Information System (IRIS).

For other metals, AERMOD will be run only with GIII sources described in Section 2. Five years of meteorological data will be used.

For non-carcinogenic metals, the predicted first-high 24-hour average will be compared to the NR 445 24-hour limit. For beryllium and mercury, the predicted maximum annual concentration will be compared to the NR 445 annual limit. There is no NR 445 limit for silver and zinc and there is no inhalation exposure dose reported on the Integrated Risk Information System. The predicted 24-hour average and predicted annual concentration for these two metals will be reported but not compared to any limits.

According to NR 445.08(2)(c), emissions of carcinogenic air contaminants having a unit risk factor established by either the EPA or the California Air Resources Board, shall not result in an ambient air concentration off the source property corresponding to an inhalation impact (or risk) greater than 1 in 1,000,000 ($1 \times 10^{-6}$).

The inhalation impact is determined by the following equation:

**Inhalation impact = (Inhalation impact concentration annual average) x (Unit risk factor)**

where:

the inhalation impact concentration is the annual average concentration of a contaminant in ($\mu g/m^3$); and,

the unit risk factor for the contaminant is the unit risk factor value established by either EPA or the California Air Resources Board and is expressed in $(\mu g/m^3)^{-1}$.

The predicted maximum annual concentrations will be multiplied by the compounds corresponding unit risk factor, and then compared to a value of 1 in 1,000,000.

The IEPA monitoring station located at Washington High School [AQS ID 17-031-0022] also reported ambient concentrations arsenic, beryllium, cadmium, chromium, and nickel. Published design values for these metals, if available, will be incorporated into the modeling results as background concentrations.

## 3.8 Adjustments to Background Data

The prevailing wind direction at the proposed GIII site is from the southwest to the northeast. A portion of the identified offsite lead and manganese emission sources are located upwind of the Washington High School Monitoring Station that is used to identify background concentrations. To the extent this spatial relationship exists, the lead and manganese impacts from these offsite sources would be double counted by first adding their modeled impacts to the predicted GIII impacts in the modeling analysis and then adding the offsite impacts a second time by including their contribution to the background concentrations.

If the modeling analysis shows that these offsite sources significantly contribute to the measured background concentrations at the Washington High School monitoring station, the following procedure will be used to adjust the background concentrations that will be added to the modeled impacts.

Measured concentrations at the monitoring station will be sorted into 36 groups by wind direction. Wind directions are divided into 36 sectors. Wind directions from 0° to 9° are included in Sector 1; wind directions from 10° to 19° are included in Sector 2, etc. The monitoring station data will be adjusted to subtract data measured on days when the wind direction indicates that the monitoring station is located downwind from significant offsite sources.

If modeling results show that adjustment of the lead and manganese background concentrations is warranted, RKA will work with IEPA to develop an acceptable procedure for this purpose.

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RK & Associates, Inc.

# Air Dispersion Modeling Protocol to Assess Metal Emission Impacts

## General III, LLC – Chicago, Illinois

**November 18, 2019**

# Appendix A

## Ferrous Material Processing

**Figures A-1 and A-2 contain TRADE SECRET information and have been redacted from this document.**

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# Figure A-1 Redacted

**Figure A-1 - Ferrous Processing System Flow Diagram**
**Air Dispersion Modeling Protocol**

**General III, LLC**
**11600 South Burley Avenue - Chicago, Illinois**

R 009782

TRADE SECRET

# Figure A-2 Redacted

**Figure A-2 - Ferrous Processing System Layout**
**Air Dispersion Modeling Protocol**

**General III, LLC**
**11600 South Burley Avenue - Chicago, Illinois**

## Table A-1a - Ferrous Material Processing - Metal Emissions in Active Hours (7 AM - 7 PM, Mon-Sat)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | V-1 | V-2 | V-3 | V-4 | V-5 | V-6 | V-7 | V-8 | V-9 | V-10 | V-11 | V-12 | V-13 | RTO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PM (Active)** | | 1.1610000 | 0.1400000 | 0.1400000 | 0.0462000 | 0.1881000 | 0.2087000 | 0.1458000 | 0.0244000 | 0.0391000 | 0.2412000 | 0.1996000 | 0.1996000 | 0.5673000 | 2.4704690 |
| Lead[b] | 0.0665% | 0.0007722 | 0.0000931 | 0.0000931 | 0.0000307 | 0.0001251 | 0.0001388 | 0.0000970 | 0.0000162 | 0.0000260 | 0.0001604 | 0.0001328 | 0.0001328 | 0.0003773 | 0.0016432 |
| Manganese | 0.0535% | 0.0006217 | 0.0000750 | 0.0000750 | 0.0000247 | 0.0001007 | 0.0001118 | 0.0000781 | 0.0000131 | 0.0000209 | 0.0001292 | 0.0001069 | 0.0001069 | 0.0003038 | 0.0013229 |
| Mercury | 1.2866% | 0.0149373 | 0.0018012 | 0.0018012 | 0.0005944 | 0.0024201 | 0.0026851 | 0.0018758 | 0.0003139 | 0.0005031 | 0.0031033 | 0.0025680 | 0.0025680 | 0.0072988 | 0.0317848 |
| Nickel | 0.0207% | 0.0002405 | 0.0000290 | 0.0000290 | 0.0000096 | 0.0000390 | 0.0000432 | 0.0000302 | 0.0000051 | 0.0000081 | 0.0000500 | 0.0000413 | 0.0000413 | 0.0001175 | 0.0005118 |
| Antimony | 0.0040% | 0.0000462 | 0.0000056 | 0.0000056 | 0.0000018 | 0.0000075 | 0.0000083 | 0.0000058 | 0.0000010 | 0.0000016 | 0.0000096 | 0.0000079 | 0.0000079 | 0.0000226 | 0.0000983 |
| Arsenic | 0.0015% | 0.0000179 | 0.0000022 | 0.0000022 | 0.0000007 | 0.0000029 | 0.0000032 | 0.0000022 | 0.0000004 | 0.0000006 | 0.0000037 | 0.0000031 | 0.0000031 | 0.0000087 | 0.0000380 |
| Beryllium | 0.0003% | 0.0000036 | 0.0000004 | 0.0000004 | 0.0000001 | 0.0000006 | 0.0000006 | 0.0000005 | 0.0000001 | 0.0000001 | 0.0000007 | 0.0000006 | 0.0000006 | 0.0000018 | 0.0000076 |
| Cadmium | 0.0147% | 0.0001704 | 0.0000205 | 0.0000205 | 0.0000068 | 0.0000276 | 0.0000306 | 0.0000214 | 0.0000036 | 0.0000057 | 0.0000354 | 0.0000293 | 0.0000293 | 0.0000833 | 0.0003625 |
| Chromium[c] | 0.0163% | 0.0001888 | 0.0000228 | 0.0000228 | 0.0000075 | 0.0000306 | 0.0000339 | 0.0000237 | 0.0000040 | 0.0000064 | 0.0000392 | 0.0000325 | 0.0000325 | 0.0000923 | 0.0004018 |
| Cobalt | 0.0014% | 0.0000160 | 0.0000019 | 0.0000019 | 0.0000006 | 0.0000026 | 0.0000029 | 0.0000020 | 0.0000003 | 0.0000005 | 0.0000033 | 0.0000027 | 0.0000027 | 0.0000078 | 0.0000340 |
| Phosphorus | 0.2000% | 0.0023217 | 0.0002800 | 0.0002800 | 0.0000924 | 0.0003761 | 0.0004173 | 0.0002916 | 0.0000488 | 0.0000782 | 0.0004823 | 0.0003991 | 0.0003991 | 0.0011344 | 0.0049402 |
| Selenium | 0.0074% | 0.0000858 | 0.0000103 | 0.0000103 | 0.0000034 | 0.0000139 | 0.0000154 | 0.0000108 | 0.0000018 | 0.0000029 | 0.0000178 | 0.0000148 | 0.0000148 | 0.0000419 | 0.0001826 |
| Zinc | 3.7272% | 0.0432723 | 0.0052180 | 0.0052180 | 0.0017219 | 0.0070108 | 0.0077786 | 0.0054342 | 0.0009094 | 0.0014573 | 0.0089899 | 0.0074394 | 0.0074394 | 0.0211442 | 0.0920783 |
| Barium | 0.0360% | 0.0004182 | 0.0000504 | 0.0000504 | 0.0000166 | 0.0000677 | 0.0000752 | 0.0000525 | 0.0000088 | 0.0000141 | 0.0000869 | 0.0000719 | 0.0000719 | 0.0002043 | 0.0008898 |
| Copper | 0.0266% | 0.0003083 | 0.0000372 | 0.0000372 | 0.0000123 | 0.0000499 | 0.0000554 | 0.0000387 | 0.0000065 | 0.0000104 | 0.0000640 | 0.0000530 | 0.0000530 | 0.0001506 | 0.0006560 |
| Silver | 0.0064% | 0.0000746 | 0.0000090 | 0.0000090 | 0.0000030 | 0.0000121 | 0.0000134 | 0.0000094 | 0.0000016 | 0.0000025 | 0.0000155 | 0.0000128 | 0.0000128 | 0.0000364 | 0.0001587 |
| Thallium | 0.0012% | 0.0000143 | 0.0000017 | 0.0000017 | 0.0000006 | 0.0000023 | 0.0000026 | 0.0000018 | 0.0000003 | 0.0000005 | 0.0000030 | 0.0000025 | 0.0000025 | 0.0000070 | 0.0000305 |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

## Table A-1b - Ferrous Material Processing - Metal Emissions in Inactive Hours (7 PM - 7 AM, Mon-Sat, All Day, Sun)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | V-1 | V-2 | V-3 | V-4 | V-5 | V-6 | V-7 | V-8 | V-9 | V-10 | V-11 | V-12 | V-13 | RTO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PM (Inactive)** | | 0.0794000 | - | - | 0.0004000 | - | 0.0371000 | - | - | 0.0002000 | - | 0.0529000 | 0.0529000 | - | |
| Lead [b] | 0.0665% | 0.0000528 | | | 0.0000003 | | 0.0000247 | | | 0.0000001 | | 0.0000352 | 0.0000352 | | |
| Manganese | 0.0535% | 0.0000425 | | | 0.0000002 | | 0.0000199 | | | 0.0000001 | | 0.0000283 | 0.0000283 | | |
| Mercury | 1.2866% | 0.0010216 | | | 0.0000051 | | 0.0004773 | | | 0.0000026 | | 0.0006806 | 0.0006806 | | |
| Nickel | 0.0207% | 0.0000164 | | | 0.0000001 | | 0.0000077 | | | 0.0000000 | | 0.0000110 | 0.0000110 | | |
| Antimony | 0.0040% | 0.0000032 | | | 0.0000000 | | 0.0000015 | | | 0.0000000 | | 0.0000021 | 0.0000021 | | |
| Arsenic | 0.0015% | 0.0000012 | | | 0.0000000 | | 0.0000006 | | | 0.0000000 | | 0.0000008 | 0.0000008 | | |
| Beryllium | 0.0003% | 0.0000002 | | | 0.0000000 | | 0.0000001 | | | 0.0000000 | | 0.0000002 | 0.0000002 | | |
| Cadmium | 0.0147% | 0.0000117 | | | 0.0000001 | | 0.0000054 | | | 0.0000000 | | 0.0000078 | 0.0000078 | | |
| Chromium [c] | 0.0163% | 0.0000129 | | | 0.0000001 | | 0.0000060 | | | 0.0000000 | | 0.0000086 | 0.0000086 | | |
| Cobalt | 0.0014% | 0.0000011 | | | 0.0000000 | | 0.0000005 | | | 0.0000000 | | 0.0000007 | 0.0000007 | | |
| Phosphorus | 0.2000% | 0.0001588 | | | 0.0000008 | | 0.0000742 | | | 0.0000004 | | 0.0001058 | 0.0001058 | | |
| Selenium | 0.0074% | 0.0000059 | | | 0.0000000 | | 0.0000027 | | | 0.0000000 | | 0.0000039 | 0.0000039 | | |
| Zinc | 3.7272% | 0.0029594 | | | 0.0000149 | | 0.0013828 | | | 0.0000075 | | 0.0019717 | 0.0019717 | | |
| Barium | 0.0360% | 0.0000286 | | | 0.0000001 | | 0.0000134 | | | 0.0000001 | | 0.0000191 | 0.0000191 | | |
| Copper | 0.0266% | 0.0000211 | | | 0.0000001 | | 0.0000099 | | | 0.0000001 | | 0.0000140 | 0.0000140 | | |
| Silver | 0.0064% | 0.0000051 | | | 0.0000000 | | 0.0000024 | | | 0.0000000 | | 0.0000034 | 0.0000034 | | |
| Thallium | 0.0012% | 0.0000010 | | | 0.0000000 | | 0.0000005 | | | 0.0000000 | | 0.0000007 | 0.0000007 | | |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-1 | 55 | | Truck Dumping of Raw Feed | Unprepared | 5.4 [a2] | Outside | N | - | 0% | 0% | Drop | 300 | 0.00127 [c] | | 0.3797 |
| V-1 | 56 | | Raw Feed from Ground after Truck Dumping | Unprepared | 5.4 [a2] | Outside | N | - | 0% | 0% | Drop | 300 | 0.00127 [c] | | 0.3797 |
| V-1 | 59 | Magnet/ Clam | Drop Raw Scrap to Infeed Conveyor | Unprepared | N [a4] | Outside | N | - | NA | 0% | D | 500 | 0.00020 [f] | | 0.1022 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.8616** |
| V-2 | 37 | E-01 | Drop Raw Scrap onto Shredder Feed Chute | Unprepared | Y [a4] | Outside | N | - | NA | 0% | A | 500 | 0.00014 [d] | | 0.0700 |
| V-2 | 40 | E-05 | Shredder Under Mill Vibratory Conveyor | Shred | Y [0] | Inside | N | - | NA | 0% | A | 500 | 0.00014 [d] | | 0.0700 |
| V-2 | 79 | E-02 | Shredder Bottom Discharge | Shred | Y [0] | shredder emissions | 0 | - | 0% | 0% | A | 500 | Emissions captured and controlled by shredder emission | | |
| V-2 | 81 | E-02 | Shredder Chute | Unprepared | Y [0] | shredder emissions | 0 | - | 0% | 0% | A | 500 | Emissions captured and controlled by shredder emission | | |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.1400** |
| V-3 | 4 | C-001 | Shredded Material Transfer Conveyor | Shred | Y [0] | Outside | N | - | NA | 0% | A | 500 | 0.00014 [d] | | 0.0700 |
| V-3 | 5 | C-002 | Shredded Material Transfer Conveyor | Shred | Y [0] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-3 | 6 | C-002 | Mat'l Not Removed by Poker Picker | Shred | Y [0] | Outside | N | - | NA | 0% | A | 499 | 0.00014 [d] | | 0.0699 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.1400** |
| V-4 | 58 | - | Poker Loadout | Pokers | N [0] | Outside | N | - | 0% | 0% | D | 183 | 0.00020 [f] | | 0.0374 |
| V-4 | 62 | E-06 | Poker Picker Chute to Stockpile | Shred | 1.5% [a1] | Outside | N | - | 0% | 0% | Drop | 1 | 0.00761 [c] | | 0.0076 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.0450** |

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-5 | 7 | C-003 | Ferrous Transfer Conveyor | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 130 | 0.00014 | [d] | 0.0182 |
| V-5 | 8 | C-003 | Ferrous Transfer Conveyor | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 369 | 0.00014 | [d] | 0.0517 |
| V-5 | 31 | C-032 | ASR Transfer Conveyor | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 4 | 0.00014 | [d] | 0.0006 |
| V-5 | 32 | C-033 | Magnetic Material | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 5 | 0.00014 | [d] | 0.0007 |
| V-5 | 33 | C-033 | ASR Not Removed by Magnet E-12 | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 129 | 0.00014 | [d] | 0.0181 |
| V-5 | 34 | C-034 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 5 | 0.00014 | [d] | 0.0007 |
| V-5 | 35 | C-035 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 5 | 0.00014 | [d] | 0.0007 |
| V-5 | 36 | C-036 | ASR Transfer Conveyor | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 129 | 0.00014 | [d] | 0.0181 |
| V-5 | 41 | E-07 | Magnet Discharge to Chute | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 187 | 0.00014 | [d] | 0.0262 |
| V-5 | 42 | E-07 | Magnet Discharge to Chute | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 187 | 0.00014 | [d] | 0.0262 |
| V-5 | 49 | E-12 | Ferrous Removed by Magnet | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 5 | 0.00014 | [d] | 0.0007 |
| V-5 | 53 | E-7 | ASR Not Removed by Magnet | Shred | Y | [a3] | Outside | N | - | NA | 0% | A | 2 | 0.00014 | [d] | 0.0003 |
| V-5 | 54 | E-7 | Ferrous Removed by Magnet E-7 | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 185 | 0.00014 | [d] | 0.0259 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | | **0.1881** |
| V-6 | 61 | C-037 | ASR Transfer Conveyor to Stockpile | Residue | 10 | [a3] | Outside | N | - | 0% | 0% | Drop | 129 | 0.00053 | [c] | 0.0689 |

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-7 | 9 | C-006 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | Y | Z-Box Air Loop | 100% | 100% | A | 183 | 0.00014 | [d] | 0.0000 |
| V-7 | 10 | C-007 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | Y | Z-Box Air Loop | 100% | 100% | A | 183 | 0.00014 | [d] | 0.0000 |
| V-7 | 21 | C-022 | Ferrous Transfer Conveyor | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 22 | C-023 | Ferrous Transfer Conveyor | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 23 | C-024 | Non-metallic transfer conveyor | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 4 | 0.00014 | [d] | 0.0006 |
| V-7 | 30 | C-031 | ASR Transfer Conveyor | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 4 | 0.00014 | [d] | 0.0006 |
| V-7 | 38 | E-015 | Z-Box Separator Cyclone | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 | [d] | 0.0003 |
| V-7 | 39 | E-016 | Z-Box Separator Cyclone | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 | [d] | 0.0003 |
| V-7 | 43 | E-08 | ASR Not Removed by Magnet | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 | [d] | 0.0003 |
| V-7 | 44 | E-08 | Ferrous Removed by Magnet E-7 | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 185 | 0.00014 | [d] | 0.0259 |
| V-7 | 45 | E-10 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 | [d] | 0.0179 |
| V-7 | 46 | E-11 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 | [d] | 0.0179 |
| V-7 | 47 | E-11 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 48 | E-11 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 64 | SC-001 | Supplemental Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 183 | 0.00014 | [d] | 0.0256 |
| V-7 | 66 | SC-002 | Supplemental Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 183 | 0.00014 | [d] | 0.0256 |
| V-7 | 70 | C-004 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 185 | Emissions captured by inward air flow at inlet to Z-Box separator | | |
| V-7 | 72 | C-005 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 185 | Emissions captured by inward air flow at inlet to Z-Box separator | | |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | | **0.1458** |

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-8 | 24 | C-025 | Non-metallic not removed by magnet E-13 | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 [d] | | 0.0003 |
| V-8 | 25 | C-025 | material removed by first magnet to second magnet | Ferrous | Y [a2] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 26 | C-026 | Ferrous Transfer Conveyor | Ferrous | Y [a2] | 0 | 0 | - | 0% | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 27 | C-027 | Ferrous Transfer Conveyor | Ferrous | Y [a2] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 28 | C-028 | Non-metallic Transfer Conveyor | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 29 | C-029 | Non-metallic Transfer Conveyor | Ferrous | Y [0] | 0 | 0 | - | 0% | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 50 | E-13 | Ferrous Removed by E-13 | Ferrous | Y [a2] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 51 | E-13 | Ferrous Removed by E-13 | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 52 | E-14 | Mat'l Not removed by Separator | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 0.25 | 0.00014 [d] | | 0.0000 |
| V-8 | 60 | C-030 | Mat'l not Removed by Separator | Ferrous | 1.5 [a1] | Outside | Y | Cover | 0% | 0% | Drop | 2.25 | 0.00761 [c] | | 0.0171 |
| V-8 | 63 | E-14 | Final Discharge from Mat'l Separator | Ferrous | 1.5 [a1] | Outside | N | - | 0% | 0% | Drop | 0.75 | 0.00761 [c] | | 0.0057 |
| V-8 | 65 | SC-009 | Supplemental Conveyor | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 [d] | | 0.0003 |
| V-8 | 67 | SC-010 | Supplemental Conveyor | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 [d] | | 0.0003 |
| | | | | | | | | | | | | **Total Filterable PM Emissions** | | | **0.0244** |
| V-9 | 57 | - | Non-metallic Loadout | Non-metallic | N [0] | Outside | N | - | 0% | 0% | D | 187 | 0.00020 [f] | | **0.0382** |

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-10 | 11 | C-008 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 56 | 0.00014 [d] | | 0.0078 |
| V-10 | 12 | C-009 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | | 0.0179 |
| V-10 | 13 | C-010 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | | 0.0179 |
| V-10 | 14 | C-011 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 [d] | | 0.0077 |
| V-10 | 15 | C-012 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 56 | 0.00014 [d] | | 0.0078 |
| V-10 | 16 | C-013 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | | 0.0179 |
| V-10 | 17 | C-014 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | | 0.0179 |
| V-10 | 18 | C-015 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 [d] | | 0.0077 |
| V-10 | 19 | C-016 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | | 0.0514 |
| V-10 | 20 | C-020 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | | 0.0514 |
| V-10 | 68 | SC-005 | Supplemental Conveyor | Shred | Y [0] | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | | 0.0179 |
| V-10 | 69 | SC-008 | Supplemental Conveyor | Shred | Y [0] | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | | 0.0179 |
| V-10 | 71 | C-014 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | Alternate to C-014 to C-016. Emissions from 100% of material | | |
| V-10 | 73 | C-012 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | Alternate to C-012 to C-016. Emissions from 100% of material | | |
| V-10 | 74 | C-015 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | Alternate to C-015 to C-016. Emissions from 100% of material | | |
| V-10 | 75 | C-019 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | Alternate to C-016 top C-017. Emissions from 100% of material | | |
| V-10 | 76 | C-013 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | Alternate to C-013 to C-016. Emissions from 100% of material | | |
| V-10 | 77 | C-017 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | Alternate to C-020/C-021 or C-017/C-018. | | |
| V-10 | 78 | C-020 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | Alternate to C-017 to C-018. Emissions from 100% of material | | |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.2412** |

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-11 | 82 | C-018 | Ferrous Transfer Conveyor to stockpile | Shred | 5.4% [a2] | | Outside | N | - | NA | 0% | Drop | 367 | Alternate to C-021 to S Ferrous Stockpile or Barge 2 to Barge. | | |
| | | | | | | | | | | | | | | | | |
| V-12 | 80 | C-21 | Ferrous Transfer Conveyor to stockpile | Shred | 5.4% [a2] | | Outside | N | - | NA | 0% | Drop | 367 | Alternate to C-018 to N Ferrous Stockpile or Barge 2 to Barge. | | |
| | | | | | | | | | | | | | | | | |
| V-13 | 1 | Barge 1 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | | 0.0514 |
| V-13 | 2 | Barge 2 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | | 0.0514 |
| V-13 | 3 | Barge 3 | Ferrous Transfer Conveyor to barge (stockpile) | Shred | 5.4% [a2] | | Outside | N | - | 0% | 0% | Drop | 367 | 0.00127 [c] | | 0.4645 |
| | | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.5673** |

a1 Controlled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying used based on conservative assumption that moisture content i

a2 Material moisture was assumed to be the mean of material moisture contents identified in AP42, Table 13.2.4-1.

a3 Northern Metals (Minneapolis, MN) found moisture content of ASR in the range of 20 to 30%; from MPCA Construction Permit Technical Support Document for Northern Metals in Becker MN, Stream COMG-2. Calculations for the ASR stacking conveyor drop point conservatively assumes 10% moisture.

a4 Moisture content of raw materials is assumed to be >1.5% based on application of water from water atomization cannons used for fugitive dust control.

b Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3. Emissions calculated with control Eff. factor included for source being inside of a building.

c Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3.

d Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying. If moisture content is greater than 1.5% by weight, controlled emission factors are used.

e Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for screening. If moisture content is greater than 1.5% by weight, controlled emission factors are used.

f Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for truck loading of curshed stone. Use uncontrolled emisson factor to be conservative.

g Particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying. For sources controlled by a dust collector the emission factor is multiplied by the identified capture Eff. and then by the quantity of 1-control Eff.. Dust collectors vent back into to the building. These emission calculations conservatively assume dust collector emission are vented to the atmosphere.

h Metal HAPs as percent of total PM measured at the discharge of the existing roll media filter in June 2018.

# Table A-3 Ferrous Plant Stockpile - Particulate Emissions
# General III, LLC - Chicago, Illinois

| Volume Source Grouping | Stock Pile | Stock Pile Area Acres | Control Factor[b] | Inactive Emissions[a,d] PM lb/hr | Active Emissions[a,d] PM lb/hr |
|---|---|---|---|---|---|
| V-1 | Raw Material Truck Dumping (Drop 1) | 0.3630 | 1.0 | 0.0529 | 0.1996 |
| V-1 | Raw Material Movement from Truck Dumping Area to Stockpile (Drop 2) | 0.1815 | 1.0 | 0.0265 | 0.0998 |
| | | | Total | 0.0794 | 0.2994 |
| V-4 | Poker North | 0.0115 | 0.1 | 0.0002 | 0.0006 |
| V-4 | Poker South | 0.0115 | 0.1 | 0.0002 | 0.0006 |
| | | | Total | 0.0004 | 0.0012 |
| V-6 | ASR | 0.2541 | 1.0 | 0.0371 | 0.1398 |
| V-9 | Fluff (Bin) | 0.0161 | 0.1 | 0.0002 | 0.0009 |
| V-11 | Ferrous North | 0.3630 | 1.0 | 0.0529 | 0.1996 |
| V-12 | Ferrous South | 0.3630 | 1.0 | 0.0529 | 0.1996 |

a. Stockpile emissions calculation from TCEQ for crushed stone downloaded August 2019.
https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx

b. Control Factor of 0.1 (90% control) for partial enclosure consisting of walls on three sides of bin. Control Factor of 1.0 for no control.

c. Assume number of active days to be 6 days per week and 52 weeks per year and inactive days to be 1 day per week and 52 weeks per year.

d. From TCEQ Guidance

Stockpile emission calculation:

PM Emission Rate (tpy) = [(inactive day PM EF x No. of inactive days) x stockpile area/2000 x control factor] +
[(active day PM EF x No. of active days) x (stockpile area/2000) x control factor]

Inactive Day PM Emission Factor = 3.50 lb-PM/acre-day

Active Day PM Emission Factor = 13.20 lb-PM/acre-day

## Table A-4 - Ferrous Material Processing - PM Emission Summary
## General III, LLC - Chicago, Illinois

| Volume Source | Filterable PM Emissions | | | | | |
|---|---|---|---|---|---|---|
| | Matl Handling | | Stockpile | | Total | |
| | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr |
| V-1 | 0.8616 | | 0.2994 | 0.0794 | 1.1610 | 0.0794 |
| V-2 | 0.1400 | | | | 0.1400 | |
| V-3 | 0.1400 | | | | 0.1400 | |
| V-4 | 0.0450 | | 0.0012 | 0.0004 | 0.0462 | 0.0004 |
| V-5 | 0.1881 | | | | 0.1881 | |
| V-6 | 0.0689 | | 0.1398 | 0.0371 | 0.2087 | 0.0371 |
| V-7 | 0.1458 | | | | 0.1458 | |
| V-8 | 0.0244 | | | | 0.0244 | |
| V-9 | 0.0382 | | 0.0009 | 0.0002 | 0.0391 | 0.0002 |
| V-10 | 0.2412 | | | | 0.2412 | |
| V-11 | 0.0000 | | 0.1996 | 0.0529 | 0.1996 | 0.0529 |
| V-12 | 0.0000 | | 0.1996 | 0.0529 | 0.1996 | 0.0529 |
| V-13 | 0.5673 | | | | 0.5673 | |
| **Totals** | **2.46050** | | **0.84050** | **0.22290** | **3.30100** | **0.22290** |

RK & Associates, Inc.

# Air Dispersion Modeling Protocol to Assess Metal Emission Impacts

## General III, LLC – Chicago, Illinois

**November 18, 2019**

# Appendix B

## Non-Ferrous Material Processing Figures and Tables

**Figures B-1 and B-2 contain TRADE SECRET information and have been redacted from this document.**

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# Figure B-1 Redacted

**Figure B-1 - Non-Ferrous Processing System Flow Diagram**
**Air Dispersion Modeling Protocol**

**General III, LLC**
**11600 South Burley Avenue - Chicago, Illinois**

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# Figure B-2 Redacted

**Figure B-2 - Non-Ferrous Processing System Layout**
**Air Dispersion Modeling Protocol**

**General III, LLC**
**11600 South Burley Avenue - Chicago, Illinois**

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-1 | 113 | C-001 | Conveyor | Residue | Y [0] | Outside | Y | N | NA | | 0% | 70 | 0.000140 [d] | 0.0098 |
| VN-1 | 114 | C-002 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 68 | 0.003000 [0] | 0.2037 |
| VN-1 | 115 | C-002 | Conveyor | Ferrous | N [0] | Outside | Y | N | NA | | 0% | 2 | 0.003000 [0] | 0.0063 |
| VN-1 | 116 | C-003 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 67.90 | 0.003000 [0] | 0.2037 |
| VN-1 | 117 | C-004 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 60.90 | 0.003000 [0] | 0.1827 |
| VN-1 | 118 | C-005 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 30.45 | 0.003000 [0] | 0.0914 |
| VN-1 | 119 | C-006 | Conveyor | Residue | N [0] | Outside | | N | NA | | 0% | 30.45 | 0.003000 [0] | 0.0914 |
| VN-1 | 122 | C-009 | Conveyor | Residue | N [0] | Outside | | N | NA | | 0% | 9.14 | 0.003000 [0] | 0.0274 |
| VN-1 | 123 | C-010 | Conveyor | Residue | N [0] | Outside | | N | NA | | 0% | 9.14 | 0.003000 [0] | 0.0274 |
| VN-1 | 124 | C-011 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 8.40 | 0.003000 [0] | 0.0252 |
| VN-1 | 129 | C-016 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 2.7 | 0.003000 [0] | 0.0081 |
| VN-1 | 174 | E-01 | Vibratory Batch Feeder | Residue | Y [0] | Outside | | N | NA | | 0% | 70 | 0.000140 [d] | 0.0098 |
| VN-1 | 175 | E-03 | Screener | Residue | Y [0] | Outside | | N | NA | | 0% | 60.90 | 0.002200 [e] | 0.1340 |
| VN-1 | 176 | E-03 | Screener | Residue | Y [0] | Outside | | N | NA | | 0% | 6.80 | 0.002200 [e] | 0.0150 |
| VN-1 | 177 | E-03 | Screener | Residue | Y [0] | Outside | | N | NA | | 0% | 2.70 | 0.002200 [e] | 0.0059 |
| VN-1 | 178 | E-04 | Screener | Residue | Y [0] | Outside | | N | NA | | 0% | 15.75 | 0.002200 [e] | 0.0347 |
| VN-1 | 179 | E-04 | Screener | Residue | Y [0] | Outside | | N | NA | | 0% | 9.14 | 0.002200 [e] | 0.0201 |
| VN-1 | 180 | E-04 | Screener | Residue | Y [0] | Outside | | N | NA | | 0% | 4.20 | 0.002200 [e] | 0.0092 |
| VN-1 | 190 | E-11 | Screener | Residue | N [0] | Outside | | N | NA | | 0% | 15.75 | 0.025000 [d] | 0.3938 |
| VN-1 | 191 | E-11 | Screener | Residue | N [0] | Outside | | N | NA | | 0% | 9.14 | 0.025000 [d] | 0.2285 |
| VN-1 | 192 | E-11 | Screener | Residue | N [0] | Outside | | N | NA | | 0% | 4.20 | 0.025000 [d] | 0.1050 |
| VN-1 | 244 | End Loader | Drop ASR into feed hopper | Residue into Hopper | N [0] | Outside | | Y | Cover | | 0% | 70.00 | 0.000204 [d] | 0.0143 |
| VN-1 | 246 | SC-001 | Supplemental Conveyor | Residue | 0 [0] | 0 | | 0 | 0 | | 0% | 15.75 | 0.003000 | 0.0473 |
| VN-1 | 247 | SC-002 | Supplemental Conveyor | Residue | 0 [0] | 0 | | 0 | 0 | | 0% | 16 | 0.003000 | 0.0473 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **1.9420** |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-2 | 120 | C-007 | Conveyor | Residue | N [0] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 15.75 | 0.003000 [0] | 0.0095 |
| VN-2 | 121 | C-008 | Conveyor | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 15.75 | 0.003000 [0] | 0.0095 |
| VN-2 | 125 | C-012 | Conveyor | Residue | N [0] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 9.14 | 0.003000 [0] | 0.0055 |
| VN-2 | 126 | C-013 | Conveyor | Residue | N [0] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 9.14 | 0.003000 [0] | 0.0055 |
| VN-2 | 127 | C-014 | Conveyor | Residue | N [0] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 8.40 | 0.003000 [0] | 0.0050 |
| VN-2 | 128 | C-015 | Conveyor | Ferrous | N [0] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | .25 | 0.003000 [0] | 0.0002 |
| VN-2 | 130 | C-017 | Conveyor | Ferrous | N [0] | Outside | | N | NA | | 0% | 1.75 | 0.003000 [0] | 0.0053 |
| VN-2 | 131 | C-018 | Conveyor | Ferrous | N [0] | Outside | Y | N | NA | | 0% | 1.75 | 0.003000 [0] | 0.0053 |
| VN-2 | 132 | C-019 | Conveyor | Lights | N [0] | Outside | Y | N | NA | | 0% | 0.25 | 0.003000 [0] | 0.0008 |
| VN-2 | 133 | C-020 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 11.12 | 0.003000 [0] | 0.0334 |
| VN-2 | 134 | C-021 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 11.12 | 0.003000 [0] | 0.0334 |
| VN-2 | 135 | C-022 | Conveyor to Wind Sifter | Mixed Non-Ferrous | N [0] | Outside | Y | Y | Wind Sifter | 100% | 100% | 0.80 | 0.003000 [0] | 0.0024 |
| VN-2 | 136 | C-023 | Conveyor to Wind Sifter | Residue | N [0] | Outside | Y | Y | Wind Sifter | 100% | 100% | 7.29 | 0.000140 [0] | 0.0010 |
| VN-2 | 137 | C-024 | Conveyor to Wind Sifter | Residue | N [0] | Outside | Y | Y | Wind Sifter | 100% | 100% | 7.29 | 0.000140 [0] | 0.0010 |
| VN-2 | 139 | C-035 | Conveyor | Residue | N [0] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 2.7 | 0.003000 [0] | 0.0016 |
| VN-2 | 147 | C-044 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 24.87 | 0.003000 [0] | 0.0746 |
| VN-2 | 181 | E-05 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 14.87 | 0.003000 | 0.0089 |
| VN-2 | 182 | E-05 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 9.87 | 0.003000 | 0.0059 |
| VN-2 | 183 | E-05 | Magnetic Separation | Ferrous | N [0] | Inside | | N | NA | | 0% | 0.88 | 0.003000 | 0.0026 |
| VN-2 | 184 | E-05 | Magnetic Separation | Ferrous | N [0] | Inside | | N | NA | | 0% | 5.00 | 0.003000 | 0.0150 |
| VN-2 | 185 | E-06 | Eddy Current Separator | Residue | N [0] | Outside | | N | NA | | 0% | 6.12 | 0.003000 [d] | 0.0184 |
| VN-2 | 186 | E-06 | Eddy Current Separator | Mids | N [0] | Outside | | N | NA | | 0% | 3.50 | 0.003000 [d] | 0.0105 |
| VN-2 | 187 | E-06 | Eddy Current Separator | Zorba | N [0] | Outside | | N | NA | | 0% | 0.25 | 0.003000 [d] | 0.0008 |
| VN-2 | 188 | E-07 | Wind Sifter | Lights | N [0] | Outside | | Y | Cover | | 0% | 0.25 | 0.002200 [d] | 0.0006 |
| VN-2 | 189 | E-07 | Wind Sifter | Heavies | 1.5 [a] | Outside | | Y | Wind Sifter | 90% | 100% | 1.50 | 0.007606 [c] | 0.0103 |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-2 | 193 | E-12 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 14.87 | 0.003000 | 0.0089 |
| VN-2 | 194 | E-12 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 9.87 | 0.003000 | 0.0059 |
| VN-2 | 195 | E-12 | Magnetic Separation | Ferrous | N [0] | Inside | | N | NA | | 0% | 0.88 | 0.003000 | 0.0026 |
| VN-2 | 196 | E-12 | Magnetic Separation | Ferrous | N [0] | Inside | | N | NA | | 0% | 5.00 | 0.003000 | 0.0150 |
| VN-2 | 197 | E-12 | Magnetic Separation | Zorba | N [0] | Outside | | N | NA | | 0% | 0.25 | 0.003000 [d] | 0.0008 |
| VN-2 | 198 | E-13 | Eddy Current Separator | Residue | N [0] | Outside | | N | NA | | 0% | 6.12 | 0.003000 [d] | 0.0184 |
| VN-2 | 199 | E-13 | Eddy Current Separator | Mids | N [0] | Outside | | N | NA | | 0% | 3.50 | 0.003000 [d] | 0.0105 |
| VN-2 | 200 | E-14 | Wind Sifter | Lights | N [0] | Outside | | Y | Cover | | 0% | 0.20 | 0.002200 [d] | 0.0004 |
| VN-2 | 201 | E-14 | Wind Sifter | Heavies | 1.5 [a] | Outside | | Y | Wind Sifter | 100% | 100% | 0.60 | 0.007606 [c] | 0.0046 |
| VN-2 | 202 | E-15 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 9.09 | 0.003000 | 0.0055 |
| VN-2 | 203 | E-15 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.29 | 0.003000 | 0.0050 |
| VN-2 | 204 | E-15 | Magnetic Separation | Ferrous | N [0] | Outside | | N | NA | | 0% | 0.05 | 0.003000 [d] | 0.0002 |
| VN-2 | 205 | E-15 | Magnetic Separation | Mixed Non-Ferrous | N [0] | Outside | | N | NA | | 0% | 0.40 | 0.003000 [d] | 0.0012 |
| VN-2 | 206 | E-16 | Eddy Current Separator | Residue | N [0] | Outside | | N | NA | | 0% | 7.29 | 0.003000 [d] | 0.0219 |
| VN-2 | 207 | E-16 | Eddy Current Separator | Zorba | N [0] | Outside | | N | NA | | 0% | 1.00 | 0.003000 [d] | 0.0030 |
| VN-2 | 208 | E-17 | Wind Sifter | Lights | N [0] | Outside | | Y | Cover | | 0% | 1.09 | 0.002200 [d] | 0.0024 |
| VN-2 | 209 | E-17 | Wind Sifter | Residue | N [0] | Outside | | Y | Wind Sifter | 100% | 100% | 6.20 | 0.002200 [d] | 0.0136 |
| VN-2 | 210 | E-21 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.29 | 0.003000 | 0.0050 |
| VN-2 | 211 | E-21 | Magnetic Separation | Ferrous | N [0] | Outside | | N | NA | | 0% | 0.05 | 0.003000 [d] | 0.0002 |
| VN-2 | 212 | E-21 | Magnetic Separation | Mixed Non-Ferrous | N [0] | Outside | | N | NA | | 0% | 0 | 0.003000 [d] | 0.0012 |
| VN-2 | 213 | E-22 | Eddy Current Separator | Zorba | N [0] | Outside | | N | NA | | 0% | 1.00 | 0.003000 [d] | 0.0030 |
| VN-2 | 214 | E-22 | Eddy Current Separator | Residue | N [0] | Outside | | N | NA | | 0% | 7.29 | 0.003000 [d] | 0.0219 |
| VN-2 | 215 | E-23 | Wind Sifter | Lights | N [0] | Outside | | Y | Cover | | 0% | 1 | 0.002200 [d] | 0.0024 |
| VN-2 | 216 | E-23 | Wind Sifter | Residue | N [0] | Outside | | Y | Wind Sifter | 100% | 100% | 6.20 | 0.002200 [d] | 0.0136 |
| VN-2 | 217 | E-27 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.15 | 0.003000 | 0.0049 |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-2 | 219 | E-28 | Eddy Current Separator | Residue | N [0] | Outside | | N | NA | | 0% | 7.15 | 0.003000 [d] | 0.0215 |
| VN-2 | 221 | E-34 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 6.55 | 0.003000 | 0.0039 |
| VN-2 | 222 | E-34 | Magnetic Separation | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 6.55 | 0.003000 | 0.0039 |
| VN-2 | 224 | E-35 | Eddy Current Separator | Residue | N [0] | Outside | | N | NA | | 0% | 5.05 | 0.003000 [d] | 0.0152 |
| VN-2 | 231 | E-43 | Vibratory Feeder | Residue | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 2.70 | 0.003000 | 0.0016 |
| VN-2 | 232 | E-44 | Eddy Current Separator drop to stockpile | Zorba | 1.5 [a] | Inside | | N | NA | | 0% | 0.50 | 0.007600 | 0.0038 |
| VN-2 | 240 | E-49 | Transfer Conveyor | Residue onto ECS | N [0] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.15 | 0.003000 | 0.0049 |
| VN-2 | 242 | ECS | Eddy Current Separator drop to container | Zorba | 1.5 [a] | Inside | | N | NA | | 0% | 0.04 | 0.007600 | 0.0003 |
| VN-2 | 243 | ECS | Eddy Current Separator drop to container | Zorba | 1.5 [a] | Inside | | N | NA | | 0% | 0.18 | 0.007600 | 0.0014 |
| VN-2 | 248 | SC-003 | Supplemental Conveyor | Residue | 0 [0] | 0 | | 0 | 0 | | 0% | 7.34 | 0.003000 | 0.0220 |
| VN-2 | 249 | SC-004 | Supplemental Conveyor | Residue | 0 [0] | 0 | | 0 | 0 | | 0% | 7.34 | 0.003000 | 0.0220 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **0.5395** |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-3 | 138 | C-034 | Conveyor | Material Separator | N [0] | Outside | Y | N | NA | | 0% | 0.55 | 0.003000 [0] | 0.0017 |
| VN-3 | 140 | C-039 | Conveyor | Mixed Non-Ferrous | N [0] | Outside | | N | NA | | 0% | 0.80 | 0.003000 [0] | 0.0024 |
| VN-3 | 141 | C-040 | Conveyor | Residue | N [0] | Outside | | N | NA | | 0% | 2.80 | 0.003000 [0] | 0.0084 |
| VN-3 | 142 | C-040 | Conveyor | Mids | N [0] | Outside | | N | NA | | 0% | 7 | 0.003000 [0] | 0.0210 |
| VN-3 | 143 | C-040 | Conveyor | Residue | N [0] | Outside | | N | NA | | 0% | 4.20 | 0.003000 [0] | 0.0126 |
| VN-3 | 144 | C-041 | Conveyor | Zorba | N [0] | Outside | | N | NA | | 0% | 0.50 | 0.003000 [0] | 0.0015 |
| VN-3 | 145 | C-042 | Conveyor | Zorba | N [0] | Outside | | N | NA | | 0% | 1.50 | 0.003000 [0] | 0.0045 |
| VN-3 | 146 | C-043 | Conveyor | Zorba | N [0] | Outside | | N | NA | | 0% | 3 | 0.003000 [0] | 0.0090 |
| VN-3 | 148 | C-044 | Conveyor | Lights Zuric | N [0] | Outside | Y | N | NA | | 0% | 0.30 | 0.003000 [0] | 0.0009 |
| VN-3 | 149 | C-045 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 24.87 | 0.003000 [0] | 0.0746 |
| VN-3 | 150 | C-047 | Conveyor | To SSI | N [0] | Outside | | N | NA | | 0% | 0.55 | 0.003000 [0] | 0.0017 |
| VN-3 | 151 | C-048 | Conveyor | Out of SSI | N [0] | Outside | | N | NA | | 0% | 0.55 | 0.003000 [0] | 0.0017 |
| VN-3 | 152 | C-050 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 25.07 | 0.003000 [0] | 0.0752 |
| VN-3 | 153 | C-052 | Conveyor | Residue | N [0] | Outside | | N | NA | | 0% | 2 | 0.003000 [0] | 0.0068 |
| VN-3 | 154 | C-055 | Conveyor | Wire | N [0] | Outside | Y | N | NA | | 0% | 1.00 | 0.003000 [0] | 0.0030 |
| VN-3 | 155 | C-058 | Conveyor | Zuric drops | N [0] | Outside | Y | N | NA | | 0% | 0.30 | 0.003000 [0] | 0.0009 |
| VN-3 | 156 | C-060 | Conveyor | Zone | N [0] | Outside | Y | N | NA | | 0% | 1.20 | 0.003000 [0] | 0.0036 |
| VN-3 | 162 | C-064 | Conveyor drop to container | Zorba | 1.5 [a] | Outside | | N | NA | | 0% | 0.70 | 0.007606 [c] | 0.0053 |
| VN-3 | 163 | C-065 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 2.2 | 0.003000 [d] | 0.0066 |
| VN-3 | 164 | C-066 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 54.39 | 0.003000 [d] | 0.1632 |
| VN-3 | 165 | C-067 | Conveyor | Residue | N [0] | Outside | Y | N | NA | | 0% | 54.39 | 0.003000 [d] | 0.1632 |
| VN-3 | 168 | C-071 | Conveyor | Lights | N [0] | Outside | Y | Y | Cover | | 0% | 0.03 | 0.000140 [d] | 0.0000 |
| VN-3 | 169 | C-072 | Conveyor | Lights | N [0] | Outside | Y | Y | Cover | | 0% | 0 | 0.000140 [d] | 0.0000 |
| VN-3 | 170 | DC-01 Cyc | DC-01 fines discharge to covered coneyor | Lights | N [0] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |
| VN-3 | 171 | DC-02 Cyc | DC-02 fines discharge to covered coneyor | Lights | N [0] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-3 | 172 | DC-03 Cyc | DC-03 fines discharge to covered coneyor | Lights | N [0] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |
| VN-3 | 173 | DC-04 Cyc | DC-04 fines discharge to covered coneyor | Lights | N [0] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |
| VN-3 | 218 | E-27 | Magnetic Separation | Ferrous | N [0] | Outside | | N | NA | | 0% | 0.25 | 0.003000 [d] | 0.0008 |
| VN-3 | 220 | E-28 | Eddy Current Separator | Zorba | N [0] | Outside | | N | NA | | 0% | 1.00 | 0.003000 [d] | 0.0030 |
| VN-3 | 223 | E-35 | Eddy Current Separator | Zorba | N [0] | Outside | | N | NA | | 0% | 1.50 | 0.003000 [d] | 0.0045 |
| VN-3 | 225 | E-40 | Separator | Lights Zuric | N [0] | Outside | | N | NA | | 0% | 0.24 | 0.025000 [d] | 0.0060 |
| VN-3 | 226 | E-40 | Separator | Heavies Zuric | N [0] | Outside | | N | NA | | 0% | 0.96 | 0.025000 [d] | 0.0240 |
| VN-3 | 227 | E-40 | Separator | Lights Zuric | N [0] | Outside | | N | NA | | 0% | 0.35 | 0.025000 [d] | 0.0088 |
| VN-3 | 228 | E-41 | Separator | Lights | N [0] | Outside | | N | NA | | 0% | 0.95 | 0.025000 [d] | 0.0238 |
| VN-3 | 229 | E-41 | Separator drop to container | Heavies | 1.5 [a] | Outside | | N | NA | | 0% | 0.05 | 0.007606 [c] | 0.0004 |
| VN-3 | 230 | E-42 | Low speed shredder for size reduction | Out of SSI | N [0] | Outside | | N | NA | | 0% | 0.55 | 0.003000 [d] | 0.0017 |
| VN-3 | 234 | E-46 | Separator | Heavier Zorba | N [0] | Outside | | N | NA | | 0% | 1.25 | 0.02500 [d] | 0.0313 |
| VN-3 | 235 | E-46 | Separator | Lights Zorba | N [0] | Outside | | N | NA | | 0% | 0.25 | 0.02500 [d] | 0.0063 |
| VN-3 | 236 | E-47 | Separator | Zorba | N [0] | Outside | | N | NA | | 0% | 2.70 | 0.02500 [d] | 0.0675 |
| VN-3 | 237 | E-47 | Separator | Heavies Zorba | N [0] | Outside | | N | NA | | 0% | 0.85 | 0.02500 [d] | 0.0213 |
| VN-3 | 238 | E-47 | Separator | Lights Zorba | N [0] | Outside | | N | NA | | 0% | 0.15 | 0.02500 [d] | 0.0038 |
| VN-3 | 239 | E-47 | Separator | Light Zorba | N [0] | Outside | | N | NA | | 0% | 0.30 | 0.02500 [d] | 0.0075 |
| VN-3 | 241 | E-50 | Air Vibe | To Infeed SSI | N [0] | Outside | | Y | Cover | | 0% | 0.55 | 0.00014 [d] | 0.0001 |
| VN-3 | 250 | SC-005 | Supplemental Conveyor | Residue | 0.0% [0] | 0 | | 0 | 0 | | 0% | 54.39 | 0.00300 | 0.1632 |
| VN-3 | 251 | SC-006 | Supplemental Conveyor | Residue | 0.0% [0] | 0 | | 0 | 0 | | 0% | 54.39 | 0.00300 | 0.1632 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **1.1050** |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-4 | 159 | C-062 | Conveyor | Heavier Zorba | N [0] | Outside | | N | NA | | 0% | 1.25 | 0.003000 [d] | 0.0038 |
| VN-4 | 160 | C-063 | Conveyor drop to stockpile | Zorba | 1.5 [a] | Outside | | N | NA | | 0% | 2.70 | 0.007606 [c] | 0.0205 |
| VN-4 | 161 | C-063 | Conveyor drop to stockpile | Heavies Zorba | 1.5% [a] | Outside | | N | NA | | 0% | 0.85 | 0.00761 [c] | 0.0065 |
| VN-4 | 233 | E-44 | Eddy Current Separator | Residue | N [0] | Outside | | N | NA | | 0% | 2.2 | 0.00300 [d] | 0.0066 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **0.0374** |
| VN-5 | 157 | C-061 | Conveyor drop to stockpile | Heavies Zuric | 1.5% [a] | Outside | | N | NA | | 0% | 0.96 | 0.00761 [c] | 0.0073 |
| VN-5 | 158 | C-061 | Conveyor drop to stockpile | Heavies Zuric | 1.5% [a] | Outside | | N | NA | | 0% | 0.30 | 0.00761 [c] | 0.0023 |
| VN-5 | 167 | C-070 | Conveyor drop to stockpile | Waste to Stockpile | 1.5% [a] | Outside | | N | NA | | 0% | 0.55 | 0.00761 [c] | 0.0042 |
| | | | | | | | | | | | | | **Total** | **0.0138** |
| VN-6 | 166 | C-068 | Conveyor drop to stockpile | Residue | 1.5 [a] | Outside | Y | N | NA | | 0% | 54.39 | 0.007606 [c] | 0.4137 |
| VN-6 | 245 | End Loader | load waste to truck | Waste | N [0] | Outside | | N | NA | | 0% | 0.00 | 0.00020 [0] | 0.0000 |
| | | | | | | | | | | | | | **Total** | **0.4137** |

a Material moisture content (%) for light materials - AP-42, Table 13.2.4-1 for crushed limestone -

b Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3.
Emissions calculated with control Eff. factor included for source being inside of a building.

c Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3.

d Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying. If moisture is greater than 1.5% by weight, use controlled emission factors.

e Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for screening. If moisture is greater than 1.5% by weight, use controlled emission factors.

f Sources located inside the Fines Building emit to the atmosphere through Dust Collection DC-01. Emissions are estimated by 12,000

g Metal HAPs as percent of total PM measured at the discharge of the existing roll media filter in June 2018.

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# Table B-2 - Non-Ferrous Plant Stockpile - Particulate Emissions
# General III, LLC - Chicago, Illinois

| Volume Source Grouping | Stock Pile | Stock Pile Area Acres | Control Factor[b] | | Inactive Emissions[a,d] PM lb/hr | Active Emissions[a,d] PM lb/hr |
|---|---|---|---|---|---|---|
| VN-1 | FE from E-02 | 0.0047 | 0.1 | | 0.0001 | 0.0003 |
| VN-4 | 5" + Zorba | 0.0189 | 0.1 | | 0.0003 | 0.0010 |
| VN-4 | 2-1/2" - 5" Zorba | 0.0189 | 0.1 | | 0.0003 | 0.0010 |
| VN-4 | 5/8" - 2-1/2" Zorba | 0.0189 | 0.1 | | 0.0003 | 0.0010 |
| | | | Total | | 0.0009 | 0.0030 |
| VN-5 | Tailings | 0.0195 | 0.1 | | 0.0003 | 0.0011 |
| VN-5 | Open | 0.0195 | 0.1 | | 0.0003 | 0.0011 |
| VN-5 | Wire | 0.0195 | 0.1 | | 0.0003 | 0.0011 |
| VN-5 | Wire Rich Solids | 0.0195 | 0.1 | | 0.0003 | 0.0011 |
| VN-5 | Zurick | 0.0195 | 0.1 | | 0.0003 | 0.0011 |
| | | | Total | | 0.0015 | 0.0055 |
| VN-6 | Waste | 0.0868 | 0.1 | | 0.0013 | 0.0048 |

a. Stockpile emissions calculation from TCEQ for crushed stone downloaded August 2019.
https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx

b. Control Factor of 0.1 (90% control) for partial enclosure consisting of walls on three sides of bin. Control Factor of 1.0 for no control.

c. Assume number of active days to be 6 days per week and 52 weeks per year and inactive days to be 1 day per week and 52 weeks per year.

d. From TCEQ Guidance

Stockpile emission calculation:

PM Emission Rate (tpy) = [(inactive day PM EF x No. of inactive days) x stockpile area/2000 x control factor] +
[(active day PM EF x No. of active days) x (stockpile area/2000) x control factor]

Inactive Day PM Emission Factor = 3.50 lb-PM/acre-day

Active Day PM Emission Factor = 13.20 lb-PM/acre-day

## Table B-3 - Non-Ferrous Material Processing - PM Emission Summary
## General III, LLC - Chicago, Illinois

| Srouces | PM Emission | | | | | |
|---|---|---|---|---|---|---|
| | Matl Handling | | Stockpile | | Tot | |
| | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr |
| VN-1 | 1.9420 | 1.9420 | 0.0003 | 0.0001 | 1.9423 | 1.9421 |
| VN-2 | 0.5395 | 0.5395 | | | 0.5395 | 0.5395 |
| VN-3 | 1.1050 | 1.1050 | | | 1.1050 | 1.1050 |
| VN-4 | 0.0374 | 0.0374 | 0.003 | 0.0009 | 0.0404 | 0.0383 |
| VN-5 | 0.0138 | 0.0138 | 0.0055 | 0.0015 | 0.0193 | 0.0153 |
| VN-6 | 0.4137 | 0.4137 | 0.0048 | 0.0013 | 0.4185 | 0.4150 |

## Table B-4a - Non-Ferrous Material Processing - Metal Emissions in Active Hours
## (7 AM - 7 PM, Mon-Sat)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | VN-1 | VN-2 | VN-3 | VN-4 | VN-5 | VN-6 | DC-1 |
|---|---|---|---|---|---|---|---|---|
| **PM** | | 1.9423000 | 0.5395280 | 1.1050000 | 0.0404000 | 0.0193000 | 0.4185000 | 0.5143000 |
| Lead [b] | 0.0665% | 0.001291882 | 0.000358856 | 0.000734968 | 0.000026871 | 0.000012837 | 0.000278357 | 0.000342076 |
| Manganese | 0.0535% | 0.001040081 | 0.000288912 | 0.000591716 | 0.000021634 | 0.000010335 | 0.000224102 | 0.000275402 |
| Mercury | 1.2866% | 0.024989429 | 0.006941511 | 0.014216815 | 0.000519782 | 0.000248312 | 0.005384377 | 0.006616930 |
| Nickel | 0.0207% | 0.000402342 | 0.000111762 | 0.000228898 | 0.000008369 | 0.000003998 | 0.000086691 | 0.000106536 |
| Antimony | 0.0040% | 0.000077309 | 0.000021475 | 0.000043982 | 0.000001608 | 0.000000768 | 0.000016657 | 0.000020470 |
| Arsenic | 0.0015% | 0.000029897 | 0.000008305 | 0.000017009 | 0.000000622 | 0.000000297 | 0.000006442 | 0.000007916 |
| Beryllium | 0.0003% | 0.000006004 | 0.000001668 | 0.000003416 | 0.000000125 | 0.000000060 | 0.000001294 | 0.000001590 |
| Cadmium | 0.0147% | 0.000285034 | 0.000079176 | 0.000162160 | 0.000005929 | 0.000002832 | 0.000061415 | 0.000075474 |
| Chromium [c] | 0.0163% | 0.000315879 | 0.000087744 | 0.000179708 | 0.000006570 | 0.000003139 | 0.000068061 | 0.000083641 |
| Cobalt | 0.0014% | 0.000026711 | 0.000007420 | 0.000015196 | 0.000000556 | 0.000000265 | 0.000005755 | 0.000007073 |
| Phosphorus | 0.2000% | 0.003884029 | 0.001078897 | 0.002209675 | 0.000080788 | 0.000038594 | 0.000836877 | 0.001028449 |
| Selenium | 0.0074% | 0.000143533 | 0.000039870 | 0.000081658 | 0.000002985 | 0.000001426 | 0.000030926 | 0.000038006 |
| Zinc | 3.7272% | 0.072392600 | 0.020109064 | 0.041185102 | 0.001505772 | 0.000719342 | 0.015598159 | 0.019168776 |
| Barium | 0.0360% | 0.000699570 | 0.000194325 | 0.000397995 | 0.000014551 | 0.000006951 | 0.000150734 | 0.000185239 |
| Copper | 0.0266% | 0.000515713 | 0.000143254 | 0.000293396 | 0.000010727 | 0.000005124 | 0.000111119 | 0.000136555 |
| Silver | 0.0064% | 0.000124735 | 0.000034649 | 0.000070963 | 0.000002594 | 0.000001239 | 0.000026876 | 0.000033028 |
| Thallium | 0.0012% | 0.000024006 | 0.000006668 | 0.000013657 | 0.000000499 | 0.000000239 | 0.000005172 | 0.000006356 |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

## Table B-4b - Non-Ferrous Material Processing - Metal Emissions in Inactive Hours
## (7 PM - 7 AM, Mon-Sat, All Day, Sun)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | VN-1 | VN-2 | VN-3 | VN-4 | VN-5 | VN-6 | DC-1 |
|---|---|---|---|---|---|---|---|---|
| PM | | 1.9421000 | 0.5395280 | 1.1050000 | 0.0383000 | 0.0153000 | 0.4150000 | 0.5143000 |
| Lead [b] | 0.0665% | 0.001291749 | 0.000358856 | 0.000734968 | 0.000025474 | 0.000010176 | 0.000276029 | 0.000342076 |
| Manganese | 0.0535% | 0.001039974 | 0.000288912 | 0.000591716 | 0.000020509 | 0.000008193 | 0.000222228 | 0.000275402 |
| Mercury | 1.2866% | 0.024986856 | 0.006941511 | 0.014216815 | 0.000492764 | 0.000196848 | 0.005339347 | 0.006616930 |
| Nickel | 0.0207% | 0.000402300 | 0.000111762 | 0.000228898 | 0.000007934 | 0.000003169 | 0.000085966 | 0.000106536 |
| Antimony | 0.0040% | 0.000077301 | 0.000021475 | 0.000043982 | 0.000001524 | 0.000000609 | 0.000016518 | 0.000020470 |
| Arsenic | 0.0015% | 0.000029894 | 0.000008305 | 0.000017009 | 0.000000590 | 0.000000236 | 0.000006388 | 0.000007916 |
| Beryllium | 0.0003% | 0.000006004 | 0.000001668 | 0.000003416 | 0.000000118 | 0.000000047 | 0.000001283 | 0.000001590 |
| Cadmium | 0.0147% | 0.000285005 | 0.000079176 | 0.000162160 | 0.000005621 | 0.000002245 | 0.000060902 | 0.000075474 |
| Chromium [c] | 0.0163% | 0.000315847 | 0.000087744 | 0.000179708 | 0.000006229 | 0.000002488 | 0.000067492 | 0.000083641 |
| Cobalt | 0.0014% | 0.000026709 | 0.000007420 | 0.000015196 | 0.000000527 | 0.000000210 | 0.000005707 | 0.000007073 |
| Phosphorus | 0.2000% | 0.003883629 | 0.001078897 | 0.002209675 | 0.000076589 | 0.000030595 | 0.000829878 | 0.001028449 |
| Selenium | 0.0074% | 0.000143518 | 0.000039870 | 0.000081658 | 0.000002830 | 0.000001131 | 0.000030668 | 0.000038006 |
| Zinc | 3.7272% | 0.072385146 | 0.020109064 | 0.041185102 | 0.001427502 | 0.000570255 | 0.015467708 | 0.019168776 |
| Barium | 0.0360% | 0.000699498 | 0.000194325 | 0.000397995 | 0.000013795 | 0.000005511 | 0.000149473 | 0.000185239 |
| Copper | 0.0266% | 0.000515660 | 0.000143254 | 0.000293396 | 0.000010169 | 0.000004062 | 0.000110189 | 0.000136555 |
| Silver | 0.0064% | 0.000124722 | 0.000034649 | 0.000070963 | 0.000002460 | 0.000000983 | 0.000026651 | 0.000033028 |
| Thallium | 0.0012% | 0.000024003 | 0.000006668 | 0.000013657 | 0.000000473 | 0.000000189 | 0.000005129 | 0.000006356 |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

RK & Associates, Inc.

# Air Dispersion Modeling Protocol to Assess Metal Emission Impacts

## General III, LLC – Chicago, Illinois

**November 18, 2019**

# Appendix C

## Vehicle Traffic

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**Figure C-1 Anticipated Traffic Routes**

**General III, LLC**
**11600 South Burley Avenue**
**Chicago, Illinois**

CALUMET RIVER

N.I.C.

PEDDLER METAL DROP OFF AREA

FERROUS MATERIAL

PRIVATE SITE RAIL ROAD

NORTHFOLK SOUTHERN RAIL

S BURLEY AVE. (PRIVATE)

SORTING FACILITY

SHREDDER

SHREDDER MOTOR FACILITY

METAL DROP OF AREA

IN FEED FOR THE SHREDDER

WATER DETENTION POND 2 ACRES

PROPERTY LEASE BOUNDARY

105'

FERROUS MATERIAL

METAL DROP OF AREA

WEIGH STATIONS

TRAILER LOADING AREA

NON-FERROUS MATERIAL

AIR FILTRATION FACILITY

PRODUCT OUT

GATE

GATE

PROPERTY LEASE BOUNDARY

NON-FERROUS IN FEED

NON-FERROUS WASTE

NON-FERROUS

10'-0" WIDE LANDSCAPE

EMPLOYEE PARKING

GATE

MAINTENANCE FACILITY

OFFICE BUILDING

TRUCK PARKING POST EXIT

LANDSCAPE

LAY DOWN AREA

PROPERTY LEASE BOUNDARY

TRUCK MOVEMENT ON THE SITE

90'-1"

GATE

GATE

E 116TH ST. (PRIVATE)

EXISTING CONTROLLED ACCESS

BURLEY AVE.

N.I.C.

PROGRESS SET - NOT FOR CONSTRUCTION

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## Layman, Robb

**From:** Sprague, Jeff
**Sent:** Wednesday, November 20, 2019 3:35 PM
**To:** John Pinion
**Cc:** Barria, German; Bernoteit, Bob; Layman, Robb; Sprague, Jeff
**Subject:** RE: Modeling Protocol - General III, LLC
**Attachments:** mdw2012.txt; mdw2013.txt; mdw2014.txt; mdw2015.txt; mdw2016.txt

John,

I've reviewed the electronic version of the modeling protocol, as well as the non-redacted hardcopy version, and have the following remarks for your consideration:

1.) The June-September, 2017 surface meteorological observations for the Midway Airport Station show considerable wind direction/wind speed data missing. If you choose to use the Midway site, I am recommending that you use the data for years 2012-2016. Furthermore, I am recommending that you use the coincident upper air sounding data for Davenport, Iowa in preparing the AERMOD-ready meteorological inputs. To facilitate your efforts, I have attached the surface characteristics files for Midway for your AERMET Stage 3 processing.
2.) The write-up was essentially silent on the issue of ambient air boundaries. It's important that documentation be provided (that is acceptable to IEPA) which demonstrates that the general public is effectively precluded from accessing General III LLC property where receptors have been excluded from the modeling.
3.) Building downwash parameters developed for structures other than those owned by General III LLC (i.e. for Reserve Marine Terminals, Regency Technologies, Napuck Salvage of Waupaca, and/or South Shore Recycling) should be based upon dimensional data obtained directly from the other facilities. This is especially true for building height measurements. Relying exclusively upon Google Earth for developing building dimension data can have significant shortcomings.
4.) If maximum modeled impacts occur within that portion of the receptor grid where initial receptor spacing is greater than 100 meters, then a "sub-grid" of receptors with 100 meter spacing should be incorporated to delineate the "true" peak impact location.
5.) Though Wisconsin's NR 445 Air Toxics Rule does not have annual non-carcinogenic ambient air standards for cobalt, cadmium, and nickel, there are "chronic" ATSDR Minimal Risk Levels for these substances, and the modeling analysis should address the maximum modeled concentrations against these levels. Additionally, there is a "chronic" ATSDR Minimal Risk Level for mercury that is tighter than the NR 445 standard, and should preferentially be considered.
6.) What are the emission units in Table A-1a and in subsequent tables? Do the values reflect a single hourly value, or do they reflect an aggregate value for all "active hours" (7 AM – 7 PM), "inactive hours" (7 PM – 7 AM), etc., specific to that table? For emissions from stockpiles that are assumed to be active for 12 hours per day, are you distributing these emissions over 24 hours in developing your modeled emission rate, or are you applying an "active" hourly emission rate to all hours in a day?
7.) Please provide a citation/reference for the use of 90% control of stockpile particulate emissions when the stockpile is in a partial enclosure of walls on three sides.
8.) Figure A-1 shows two separate volume sources for the "Pokers", yet only one volume source (V-4) representing "Poker Loadout" and "Poker Picker Chute to Stockpile" appears in Table A-2. Similarly, the "Poker North" and "Poker South" stockpile emissions are only represented by volume source V-4 in Table A-3. Will the model have two separate volume sources representing these emissions (for example, V-4a and V-4b), or are the emissions combined into just one volume source (V-4)?
9.) Figures A-1 and B-1 show geometric shapes indicated by dashed and stippled red lines representing an area of emissions that will constitute volume sources. Most of these geometric shapes cannot by themselves represent the final shape and dimensions of volume sources, because volume sources are constrained to be the same

length in the “x” and “y” directions. Please provide a table specifying the model inputs for each of the volume sources created and explanatory remarks regarding the release heights of the volume sources and the derivation of initial lateral and vertical dimensions.

If you should have any questions in regard to these comments, please feel free to contact me.

Best regards,

Jeff

Jeffrey Sprague
Modeling Unit, Manager
Air Quality Planning Section
Bureau of Air
Illinois Environmental Protection Agency

(217) 524-4692
Jeff.Sprague@Illinois.gov

---

**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Tuesday, November 19, 2019 9:35 AM
**To:** Sprague, Jeff <Jeff.Sprague@Illinois.gov>; Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>
**Cc:** 'Freeborn & Peters LLP; Zwick, Ann (azwick@freeborn.com)' <azwick@freeborn.com>; GII, LLC; Labkon, Adam (adamlabkon@general-iron.com) <AdamLabkon@General-Iron.com>; GII, LLC; Kallas, Jim (jimkallas@general-iron.com) <jimkallas@general-iron.com>
**Subject:** [WARNING: ATTACHMENT UNSCANNED][External] Modeling Protocol - General III, LLC

Jeff,

Please find attached a copy of the modeling protocol for metal emission impacts from the proposed General III, LLC scrap metal recycling facility at 11600 South Burley Avenue in Chicago.

Please note that the attached copy has Figures A-1, A-2, B-1 and B-2, that depict the Ferrous Material Processing System and Non-Ferrous Material Processing Facilities, are redacted and marked as Trade Secret.

We will be submitting two hard copies of the protocol to your attention, one will be the attached redacted copy and the other will be an unredacted copy containing the above referenced figures marked as Trade Secret. A Justification for Trade Secret information will also be submitted with the hard copies.

The Trade Secret figures are essentially identical to the figures submitted to IEPA on November 14, 2019, with Justification for designation as Trade Secret. The only difference is that Figures A-1 and B-1 show the limits of the multiple volume sources used for modeling.

The tables, in Appendix A and B, that identify the individual emission sources included in each proposed volume sources are not claimed as Trade Secret.

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com

mdw2012.txt

```
** 2012 MDW
** Generated by AERSURFACE, dated 13016
** Generated from "illinois.nlcd.tif"
** Center Latitude (decimal degrees):     41.784098
** Center Longitude (decimal degrees):   -87.755142
** Datum: NAD83
** Study radius (km) for surface roughness:   1.0
** Airport? Y, Continuous snow cover? N
** Surface moisture? Average 1 2 3 8 9 10 12, Dry 4 5 6 7 11, Arid region? N
** Month/Season assignments? User-specified
** Late autumn after frost and harvest, or winter with no snow: 12 1 2 3
** Winter with continuous snow on the ground: 0
** Transitional spring (partial green coverage, short annuals): 4 5
** Midsummer with lush vegetation: 6 7 8
** Autumn with unharvested cropland: 9 10 11


   FREQ_SECT  MONTHLY 12
   SECTOR   1    0   30
   SECTOR   2   30   60
   SECTOR   3   60   90
   SECTOR   4   90  120
   SECTOR   5  120  150
   SECTOR   6  150  180
   SECTOR   7  180  210
   SECTOR   8  210  240
   SECTOR   9  240  270
   SECTOR  10  270  300
   SECTOR  11  300  330
   SECTOR  12  330  360
**           Month    Sect    Alb      Bo        Zo
   SITE_CHAR    1       1     0.23     1.09     0.027
   SITE_CHAR    1       2     0.23     1.09     0.025
   SITE_CHAR    1       3     0.23     1.09     0.026
   SITE_CHAR    1       4     0.23     1.09     0.031
   SITE_CHAR    1       5     0.23     1.09     0.039
   SITE_CHAR    1       6     0.23     1.09     0.087
   SITE_CHAR    1       7     0.23     1.09     0.079
   SITE_CHAR    1       8     0.23     1.09     0.072
   SITE_CHAR    1       9     0.23     1.09     0.133
   SITE_CHAR    1      10     0.23     1.09     0.056
   SITE_CHAR    1      11     0.23     1.09     0.041
   SITE_CHAR    1      12     0.23     1.09     0.029
   SITE_CHAR    2       1     0.21     1.19     0.028
   SITE_CHAR    2       2     0.21     1.19     0.026
   SITE_CHAR    2       3     0.21     1.19     0.027
   SITE_CHAR    2       4     0.21     1.19     0.032
   SITE_CHAR    2       5     0.21     1.19     0.040
```

| | | | | | |
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| SITE_CHAR | 2 | 6 | 0.21 | 1.19 | 0.089 |
| SITE_CHAR | 2 | 7 | 0.21 | 1.19 | 0.081 |
| SITE_CHAR | 2 | 8 | 0.21 | 1.19 | 0.075 |
| SITE_CHAR | 2 | 9 | 0.21 | 1.19 | 0.136 |
| SITE_CHAR | 2 | 10 | 0.21 | 1.19 | 0.058 |
| SITE_CHAR | 2 | 11 | 0.21 | 1.19 | 0.042 |
| SITE_CHAR | 2 | 12 | 0.21 | 1.19 | 0.030 |
| SITE_CHAR | 3 | 1 | 0.18 | 1.30 | 0.029 |
| SITE_CHAR | 3 | 2 | 0.18 | 1.30 | 0.027 |
| SITE_CHAR | 3 | 3 | 0.18 | 1.30 | 0.028 |
| SITE_CHAR | 3 | 4 | 0.18 | 1.30 | 0.033 |
| SITE_CHAR | 3 | 5 | 0.18 | 1.30 | 0.042 |
| SITE_CHAR | 3 | 6 | 0.18 | 1.30 | 0.092 |
| SITE_CHAR | 3 | 7 | 0.18 | 1.30 | 0.084 |
| SITE_CHAR | 3 | 8 | 0.18 | 1.30 | 0.077 |
| SITE_CHAR | 3 | 9 | 0.18 | 1.30 | 0.139 |
| SITE_CHAR | 3 | 10 | 0.18 | 1.30 | 0.060 |
| SITE_CHAR | 3 | 11 | 0.18 | 1.30 | 0.044 |
| SITE_CHAR | 3 | 12 | 0.18 | 1.30 | 0.031 |
| SITE_CHAR | 4 | 1 | 0.17 | 2.47 | 0.036 |
| SITE_CHAR | 4 | 2 | 0.17 | 2.47 | 0.034 |
| SITE_CHAR | 4 | 3 | 0.17 | 2.47 | 0.034 |
| SITE_CHAR | 4 | 4 | 0.17 | 2.47 | 0.040 |
| SITE_CHAR | 4 | 5 | 0.17 | 2.47 | 0.052 |
| SITE_CHAR | 4 | 6 | 0.17 | 2.47 | 0.108 |
| SITE_CHAR | 4 | 7 | 0.17 | 2.47 | 0.099 |
| SITE_CHAR | 4 | 8 | 0.17 | 2.47 | 0.094 |
| SITE_CHAR | 4 | 9 | 0.17 | 2.47 | 0.158 |
| SITE_CHAR | 4 | 10 | 0.17 | 2.47 | 0.074 |
| SITE_CHAR | 4 | 11 | 0.17 | 2.47 | 0.054 |
| SITE_CHAR | 4 | 12 | 0.17 | 2.47 | 0.038 |
| SITE_CHAR | 5 | 1 | 0.17 | 2.47 | 0.036 |
| SITE_CHAR | 5 | 2 | 0.17 | 2.47 | 0.034 |
| SITE_CHAR | 5 | 3 | 0.17 | 2.47 | 0.034 |
| SITE_CHAR | 5 | 4 | 0.17 | 2.47 | 0.040 |
| SITE_CHAR | 5 | 5 | 0.17 | 2.47 | 0.052 |
| SITE_CHAR | 5 | 6 | 0.17 | 2.47 | 0.108 |
| SITE_CHAR | 5 | 7 | 0.17 | 2.47 | 0.099 |
| SITE_CHAR | 5 | 8 | 0.17 | 2.47 | 0.094 |
| SITE_CHAR | 5 | 9 | 0.17 | 2.47 | 0.158 |
| SITE_CHAR | 5 | 10 | 0.17 | 2.47 | 0.074 |
| SITE_CHAR | 5 | 11 | 0.17 | 2.47 | 0.054 |
| SITE_CHAR | 5 | 12 | 0.17 | 2.47 | 0.038 |
| SITE_CHAR | 6 | 1 | 0.17 | 2.50 | 0.042 |
| SITE_CHAR | 6 | 2 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 6 | 3 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 6 | 4 | 0.17 | 2.50 | 0.046 |
| SITE_CHAR | 6 | 5 | 0.17 | 2.50 | 0.060 |

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 6 | 6 | 0.17 | 2.50 | 0.120 |
| SITE_CHAR | 6 | 7 | 0.17 | 2.50 | 0.111 |
| SITE_CHAR | 6 | 8 | 0.17 | 2.50 | 0.105 |
| SITE_CHAR | 6 | 9 | 0.17 | 2.50 | 0.171 |
| SITE_CHAR | 6 | 10 | 0.17 | 2.50 | 0.084 |
| SITE_CHAR | 6 | 11 | 0.17 | 2.50 | 0.062 |
| SITE_CHAR | 6 | 12 | 0.17 | 2.50 | 0.044 |
| SITE_CHAR | 7 | 1 | 0.17 | 2.50 | 0.042 |
| SITE_CHAR | 7 | 2 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 7 | 3 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 7 | 4 | 0.17 | 2.50 | 0.046 |
| SITE_CHAR | 7 | 5 | 0.17 | 2.50 | 0.060 |
| SITE_CHAR | 7 | 6 | 0.17 | 2.50 | 0.120 |
| SITE_CHAR | 7 | 7 | 0.17 | 2.50 | 0.111 |
| SITE_CHAR | 7 | 8 | 0.17 | 2.50 | 0.105 |
| SITE_CHAR | 7 | 9 | 0.17 | 2.50 | 0.171 |
| SITE_CHAR | 7 | 10 | 0.17 | 2.50 | 0.084 |
| SITE_CHAR | 7 | 11 | 0.17 | 2.50 | 0.062 |
| SITE_CHAR | 7 | 12 | 0.17 | 2.50 | 0.044 |
| SITE_CHAR | 8 | 1 | 0.17 | 1.23 | 0.042 |
| SITE_CHAR | 8 | 2 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 8 | 3 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 8 | 4 | 0.17 | 1.23 | 0.046 |
| SITE_CHAR | 8 | 5 | 0.17 | 1.23 | 0.060 |
| SITE_CHAR | 8 | 6 | 0.17 | 1.23 | 0.120 |
| SITE_CHAR | 8 | 7 | 0.17 | 1.23 | 0.111 |
| SITE_CHAR | 8 | 8 | 0.17 | 1.23 | 0.105 |
| SITE_CHAR | 8 | 9 | 0.17 | 1.23 | 0.171 |
| SITE_CHAR | 8 | 10 | 0.17 | 1.23 | 0.084 |
| SITE_CHAR | 8 | 11 | 0.17 | 1.23 | 0.062 |
| SITE_CHAR | 8 | 12 | 0.17 | 1.23 | 0.044 |
| SITE_CHAR | 9 | 1 | 0.17 | 1.30 | 0.036 |
| SITE_CHAR | 9 | 2 | 0.17 | 1.30 | 0.034 |
| SITE_CHAR | 9 | 3 | 0.17 | 1.30 | 0.035 |
| SITE_CHAR | 9 | 4 | 0.17 | 1.30 | 0.040 |
| SITE_CHAR | 9 | 5 | 0.17 | 1.30 | 0.052 |
| SITE_CHAR | 9 | 6 | 0.17 | 1.30 | 0.108 |
| SITE_CHAR | 9 | 7 | 0.17 | 1.30 | 0.099 |
| SITE_CHAR | 9 | 8 | 0.17 | 1.30 | 0.094 |
| SITE_CHAR | 9 | 9 | 0.17 | 1.30 | 0.158 |
| SITE_CHAR | 9 | 10 | 0.17 | 1.30 | 0.074 |
| SITE_CHAR | 9 | 11 | 0.17 | 1.30 | 0.054 |
| SITE_CHAR | 9 | 12 | 0.17 | 1.30 | 0.038 |
| SITE_CHAR | 10 | 1 | 0.17 | 1.30 | 0.036 |
| SITE_CHAR | 10 | 2 | 0.17 | 1.30 | 0.034 |
| SITE_CHAR | 10 | 3 | 0.17 | 1.30 | 0.035 |
| SITE_CHAR | 10 | 4 | 0.17 | 1.30 | 0.040 |
| SITE_CHAR | 10 | 5 | 0.17 | 1.30 | 0.052 |

mdw2012.txt

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 10 | 6 | 0.17 | 1.30 | 0.108 |
| SITE_CHAR | 10 | 7 | 0.17 | 1.30 | 0.099 |
| SITE_CHAR | 10 | 8 | 0.17 | 1.30 | 0.094 |
| SITE_CHAR | 10 | 9 | 0.17 | 1.30 | 0.158 |
| SITE_CHAR | 10 | 10 | 0.17 | 1.30 | 0.074 |
| SITE_CHAR | 10 | 11 | 0.17 | 1.30 | 0.054 |
| SITE_CHAR | 10 | 12 | 0.17 | 1.30 | 0.038 |
| SITE_CHAR | 11 | 1 | 0.17 | 2.62 | 0.036 |
| SITE_CHAR | 11 | 2 | 0.17 | 2.62 | 0.034 |
| SITE_CHAR | 11 | 3 | 0.17 | 2.62 | 0.035 |
| SITE_CHAR | 11 | 4 | 0.17 | 2.62 | 0.040 |
| SITE_CHAR | 11 | 5 | 0.17 | 2.62 | 0.052 |
| SITE_CHAR | 11 | 6 | 0.17 | 2.62 | 0.108 |
| SITE_CHAR | 11 | 7 | 0.17 | 2.62 | 0.099 |
| SITE_CHAR | 11 | 8 | 0.17 | 2.62 | 0.094 |
| SITE_CHAR | 11 | 9 | 0.17 | 2.62 | 0.158 |
| SITE_CHAR | 11 | 10 | 0.17 | 2.62 | 0.074 |
| SITE_CHAR | 11 | 11 | 0.17 | 2.62 | 0.054 |
| SITE_CHAR | 11 | 12 | 0.17 | 2.62 | 0.038 |
| SITE_CHAR | 12 | 1 | 0.19 | 0.90 | 0.029 |
| SITE_CHAR | 12 | 2 | 0.19 | 0.90 | 0.027 |
| SITE_CHAR | 12 | 3 | 0.19 | 0.90 | 0.028 |
| SITE_CHAR | 12 | 4 | 0.19 | 0.90 | 0.033 |
| SITE_CHAR | 12 | 5 | 0.19 | 0.90 | 0.042 |
| SITE_CHAR | 12 | 6 | 0.19 | 0.90 | 0.091 |
| SITE_CHAR | 12 | 7 | 0.19 | 0.90 | 0.083 |
| SITE_CHAR | 12 | 8 | 0.19 | 0.90 | 0.076 |
| SITE_CHAR | 12 | 9 | 0.19 | 0.90 | 0.138 |
| SITE_CHAR | 12 | 10 | 0.19 | 0.90 | 0.059 |
| SITE_CHAR | 12 | 11 | 0.19 | 0.90 | 0.044 |
| SITE_CHAR | 12 | 12 | 0.19 | 0.90 | 0.031 |

mdw2013.txt

```
** 2013 MDW
** Generated by AERSURFACE, dated 13016
** Generated from "illinois.nlcd.tif"
** Center Latitude (decimal degrees):     41.784098
** Center Longitude (decimal degrees):   -87.755142
** Datum: NAD83
** Study radius (km) for surface roughness:   1.0
** Airport? Y, Continuous snow cover? N
** Surface moisture? Average 2 3 6 8 11, Wet 1 4 5 10, Dry 7 9 12, Arid region? N
** Month/Season assignments? User-specified
** Late autumn after frost and harvest, or winter with no snow: 12 1 2 3
** Winter with continuous snow on the ground: 0
** Transitional spring (partial green coverage, short annuals): 4 5
** Midsummer with lush vegetation: 6 7 8
** Autumn with unharvested cropland: 9 10 11


   FREQ_SECT  MONTHLY 12
   SECTOR   1    0   30
   SECTOR   2   30   60
   SECTOR   3   60   90
   SECTOR   4   90  120
   SECTOR   5  120  150
   SECTOR   6  150  180
   SECTOR   7  180  210
   SECTOR   8  210  240
   SECTOR   9  240  270
   SECTOR  10  270  300
   SECTOR  11  300  330
   SECTOR  12  330  360
**           Month    Sect    Alb      Bo        Zo
   SITE_CHAR    1       1     0.19     0.83     0.028
   SITE_CHAR    1       2     0.19     0.83     0.026
   SITE_CHAR    1       3     0.19     0.83     0.027
   SITE_CHAR    1       4     0.19     0.83     0.032
   SITE_CHAR    1       5     0.19     0.83     0.041
   SITE_CHAR    1       6     0.19     0.83     0.091
   SITE_CHAR    1       7     0.19     0.83     0.083
   SITE_CHAR    1       8     0.19     0.83     0.076
   SITE_CHAR    1       9     0.19     0.83     0.137
   SITE_CHAR    1      10     0.19     0.83     0.059
   SITE_CHAR    1      11     0.19     0.83     0.043
   SITE_CHAR    1      12     0.19     0.83     0.030
   SITE_CHAR    2       1     0.28     0.86     0.024
   SITE_CHAR    2       2     0.28     0.86     0.022
   SITE_CHAR    2       3     0.28     0.86     0.024
   SITE_CHAR    2       4     0.28     0.86     0.028
   SITE_CHAR    2       5     0.28     0.86     0.036
```

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 2 | 6 | 0.28 | 0.86 | 0.081 |
| SITE_CHAR | 2 | 7 | 0.28 | 0.86 | 0.074 |
| SITE_CHAR | 2 | 8 | 0.28 | 0.86 | 0.067 |
| SITE_CHAR | 2 | 9 | 0.28 | 0.86 | 0.126 |
| SITE_CHAR | 2 | 10 | 0.28 | 0.86 | 0.051 |
| SITE_CHAR | 2 | 11 | 0.28 | 0.86 | 0.037 |
| SITE_CHAR | 2 | 12 | 0.28 | 0.86 | 0.026 |
| SITE_CHAR | 3 | 1 | 0.24 | 1.06 | 0.026 |
| SITE_CHAR | 3 | 2 | 0.24 | 1.06 | 0.024 |
| SITE_CHAR | 3 | 3 | 0.24 | 1.06 | 0.026 |
| SITE_CHAR | 3 | 4 | 0.24 | 1.06 | 0.030 |
| SITE_CHAR | 3 | 5 | 0.24 | 1.06 | 0.039 |
| SITE_CHAR | 3 | 6 | 0.24 | 1.06 | 0.086 |
| SITE_CHAR | 3 | 7 | 0.24 | 1.06 | 0.078 |
| SITE_CHAR | 3 | 8 | 0.24 | 1.06 | 0.072 |
| SITE_CHAR | 3 | 9 | 0.24 | 1.06 | 0.132 |
| SITE_CHAR | 3 | 10 | 0.24 | 1.06 | 0.055 |
| SITE_CHAR | 3 | 11 | 0.24 | 1.06 | 0.040 |
| SITE_CHAR | 3 | 12 | 0.24 | 1.06 | 0.028 |
| SITE_CHAR | 4 | 1 | 0.17 | 0.81 | 0.036 |
| SITE_CHAR | 4 | 2 | 0.17 | 0.81 | 0.034 |
| SITE_CHAR | 4 | 3 | 0.17 | 0.81 | 0.034 |
| SITE_CHAR | 4 | 4 | 0.17 | 0.81 | 0.040 |
| SITE_CHAR | 4 | 5 | 0.17 | 0.81 | 0.052 |
| SITE_CHAR | 4 | 6 | 0.17 | 0.81 | 0.108 |
| SITE_CHAR | 4 | 7 | 0.17 | 0.81 | 0.099 |
| SITE_CHAR | 4 | 8 | 0.17 | 0.81 | 0.094 |
| SITE_CHAR | 4 | 9 | 0.17 | 0.81 | 0.158 |
| SITE_CHAR | 4 | 10 | 0.17 | 0.81 | 0.074 |
| SITE_CHAR | 4 | 11 | 0.17 | 0.81 | 0.054 |
| SITE_CHAR | 4 | 12 | 0.17 | 0.81 | 0.038 |
| SITE_CHAR | 5 | 1 | 0.17 | 0.81 | 0.036 |
| SITE_CHAR | 5 | 2 | 0.17 | 0.81 | 0.034 |
| SITE_CHAR | 5 | 3 | 0.17 | 0.81 | 0.034 |
| SITE_CHAR | 5 | 4 | 0.17 | 0.81 | 0.040 |
| SITE_CHAR | 5 | 5 | 0.17 | 0.81 | 0.052 |
| SITE_CHAR | 5 | 6 | 0.17 | 0.81 | 0.108 |
| SITE_CHAR | 5 | 7 | 0.17 | 0.81 | 0.099 |
| SITE_CHAR | 5 | 8 | 0.17 | 0.81 | 0.094 |
| SITE_CHAR | 5 | 9 | 0.17 | 0.81 | 0.158 |
| SITE_CHAR | 5 | 10 | 0.17 | 0.81 | 0.074 |
| SITE_CHAR | 5 | 11 | 0.17 | 0.81 | 0.054 |
| SITE_CHAR | 5 | 12 | 0.17 | 0.81 | 0.038 |
| SITE_CHAR | 6 | 1 | 0.17 | 1.23 | 0.042 |
| SITE_CHAR | 6 | 2 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 6 | 3 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 6 | 4 | 0.17 | 1.23 | 0.046 |
| SITE_CHAR | 6 | 5 | 0.17 | 1.23 | 0.060 |

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 6 | 6 | 0.17 | 1.23 | 0.120 |
| SITE_CHAR | 6 | 7 | 0.17 | 1.23 | 0.111 |
| SITE_CHAR | 6 | 8 | 0.17 | 1.23 | 0.105 |
| SITE_CHAR | 6 | 9 | 0.17 | 1.23 | 0.171 |
| SITE_CHAR | 6 | 10 | 0.17 | 1.23 | 0.084 |
| SITE_CHAR | 6 | 11 | 0.17 | 1.23 | 0.062 |
| SITE_CHAR | 6 | 12 | 0.17 | 1.23 | 0.044 |
| SITE_CHAR | 7 | 1 | 0.17 | 2.50 | 0.042 |
| SITE_CHAR | 7 | 2 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 7 | 3 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 7 | 4 | 0.17 | 2.50 | 0.046 |
| SITE_CHAR | 7 | 5 | 0.17 | 2.50 | 0.060 |
| SITE_CHAR | 7 | 6 | 0.17 | 2.50 | 0.120 |
| SITE_CHAR | 7 | 7 | 0.17 | 2.50 | 0.111 |
| SITE_CHAR | 7 | 8 | 0.17 | 2.50 | 0.105 |
| SITE_CHAR | 7 | 9 | 0.17 | 2.50 | 0.171 |
| SITE_CHAR | 7 | 10 | 0.17 | 2.50 | 0.084 |
| SITE_CHAR | 7 | 11 | 0.17 | 2.50 | 0.062 |
| SITE_CHAR | 7 | 12 | 0.17 | 2.50 | 0.044 |
| SITE_CHAR | 8 | 1 | 0.17 | 1.23 | 0.042 |
| SITE_CHAR | 8 | 2 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 8 | 3 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 8 | 4 | 0.17 | 1.23 | 0.046 |
| SITE_CHAR | 8 | 5 | 0.17 | 1.23 | 0.060 |
| SITE_CHAR | 8 | 6 | 0.17 | 1.23 | 0.120 |
| SITE_CHAR | 8 | 7 | 0.17 | 1.23 | 0.111 |
| SITE_CHAR | 8 | 8 | 0.17 | 1.23 | 0.105 |
| SITE_CHAR | 8 | 9 | 0.17 | 1.23 | 0.171 |
| SITE_CHAR | 8 | 10 | 0.17 | 1.23 | 0.084 |
| SITE_CHAR | 8 | 11 | 0.17 | 1.23 | 0.062 |
| SITE_CHAR | 8 | 12 | 0.17 | 1.23 | 0.044 |
| SITE_CHAR | 9 | 1 | 0.17 | 2.62 | 0.036 |
| SITE_CHAR | 9 | 2 | 0.17 | 2.62 | 0.034 |
| SITE_CHAR | 9 | 3 | 0.17 | 2.62 | 0.035 |
| SITE_CHAR | 9 | 4 | 0.17 | 2.62 | 0.040 |
| SITE_CHAR | 9 | 5 | 0.17 | 2.62 | 0.052 |
| SITE_CHAR | 9 | 6 | 0.17 | 2.62 | 0.108 |
| SITE_CHAR | 9 | 7 | 0.17 | 2.62 | 0.099 |
| SITE_CHAR | 9 | 8 | 0.17 | 2.62 | 0.094 |
| SITE_CHAR | 9 | 9 | 0.17 | 2.62 | 0.158 |
| SITE_CHAR | 9 | 10 | 0.17 | 2.62 | 0.074 |
| SITE_CHAR | 9 | 11 | 0.17 | 2.62 | 0.054 |
| SITE_CHAR | 9 | 12 | 0.17 | 2.62 | 0.038 |
| SITE_CHAR | 10 | 1 | 0.17 | 0.85 | 0.036 |
| SITE_CHAR | 10 | 2 | 0.17 | 0.85 | 0.034 |
| SITE_CHAR | 10 | 3 | 0.17 | 0.85 | 0.035 |
| SITE_CHAR | 10 | 4 | 0.17 | 0.85 | 0.040 |
| SITE_CHAR | 10 | 5 | 0.17 | 0.85 | 0.052 |

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 10 | 6 | 0.17 | 0.85 | 0.108 |
| SITE_CHAR | 10 | 7 | 0.17 | 0.85 | 0.099 |
| SITE_CHAR | 10 | 8 | 0.17 | 0.85 | 0.094 |
| SITE_CHAR | 10 | 9 | 0.17 | 0.85 | 0.158 |
| SITE_CHAR | 10 | 10 | 0.17 | 0.85 | 0.074 |
| SITE_CHAR | 10 | 11 | 0.17 | 0.85 | 0.054 |
| SITE_CHAR | 10 | 12 | 0.17 | 0.85 | 0.038 |
| SITE_CHAR | 11 | 1 | 0.18 | 1.27 | 0.035 |
| SITE_CHAR | 11 | 2 | 0.18 | 1.27 | 0.033 |
| SITE_CHAR | 11 | 3 | 0.18 | 1.27 | 0.035 |
| SITE_CHAR | 11 | 4 | 0.18 | 1.27 | 0.039 |
| SITE_CHAR | 11 | 5 | 0.18 | 1.27 | 0.051 |
| SITE_CHAR | 11 | 6 | 0.18 | 1.27 | 0.107 |
| SITE_CHAR | 11 | 7 | 0.18 | 1.27 | 0.098 |
| SITE_CHAR | 11 | 8 | 0.18 | 1.27 | 0.093 |
| SITE_CHAR | 11 | 9 | 0.18 | 1.27 | 0.157 |
| SITE_CHAR | 11 | 10 | 0.18 | 1.27 | 0.073 |
| SITE_CHAR | 11 | 11 | 0.18 | 1.27 | 0.053 |
| SITE_CHAR | 11 | 12 | 0.18 | 1.27 | 0.037 |
| SITE_CHAR | 12 | 1 | 0.27 | 1.58 | 0.025 |
| SITE_CHAR | 12 | 2 | 0.27 | 1.58 | 0.023 |
| SITE_CHAR | 12 | 3 | 0.27 | 1.58 | 0.024 |
| SITE_CHAR | 12 | 4 | 0.27 | 1.58 | 0.029 |
| SITE_CHAR | 12 | 5 | 0.27 | 1.58 | 0.036 |
| SITE_CHAR | 12 | 6 | 0.27 | 1.58 | 0.082 |
| SITE_CHAR | 12 | 7 | 0.27 | 1.58 | 0.075 |
| SITE_CHAR | 12 | 8 | 0.27 | 1.58 | 0.068 |
| SITE_CHAR | 12 | 9 | 0.27 | 1.58 | 0.127 |
| SITE_CHAR | 12 | 10 | 0.27 | 1.58 | 0.052 |
| SITE_CHAR | 12 | 11 | 0.27 | 1.58 | 0.038 |
| SITE_CHAR | 12 | 12 | 0.27 | 1.58 | 0.027 |

mdw2014.txt

```
** 2014 MDW
** Generated by AERSURFACE, dated 13016
** Generated from "illinois.nlcd.tif"
** Center Latitude (decimal degrees):     41.784098
** Center Longitude (decimal degrees):   -87.755142
** Datum: NAD83
** Study radius (km) for surface roughness:   1.0
** Airport? Y, Continuous snow cover? N
** Surface moisture? Average 1 2 4 5 9 10, Wet 6 7 8, Dry 3 11 12, Arid region? N
** Month/Season assignments? User-specified
** Late autumn after frost and harvest, or winter with no snow: 12 1 2 3
** Winter with continuous snow on the ground: 0
** Transitional spring (partial green coverage, short annuals): 4 5
** Midsummer with lush vegetation: 6 7 8
** Autumn with unharvested cropland: 9 10 11


   FREQ_SECT  MONTHLY 12
   SECTOR   1    0   30
   SECTOR   2   30   60
   SECTOR   3   60   90
   SECTOR   4   90  120
   SECTOR   5  120  150
   SECTOR   6  150  180
   SECTOR   7  180  210
   SECTOR   8  210  240
   SECTOR   9  240  270
   SECTOR  10  270  300
   SECTOR  11  300  330
   SECTOR  12  330  360
**           Month    Sect    Alb      Bo        Zo
   SITE_CHAR    1       1     0.37     0.48     0.020
   SITE_CHAR    1       2     0.37     0.48     0.018
   SITE_CHAR    1       3     0.37     0.48     0.020
   SITE_CHAR    1       4     0.37     0.48     0.024
   SITE_CHAR    1       5     0.37     0.48     0.030
   SITE_CHAR    1       6     0.37     0.48     0.072
   SITE_CHAR    1       7     0.37     0.48     0.065
   SITE_CHAR    1       8     0.37     0.48     0.059
   SITE_CHAR    1       9     0.37     0.48     0.115
   SITE_CHAR    1      10     0.37     0.48     0.044
   SITE_CHAR    1      11     0.37     0.48     0.031
   SITE_CHAR    1      12     0.37     0.48     0.022
   SITE_CHAR    2       1     0.37     0.48     0.020
   SITE_CHAR    2       2     0.37     0.48     0.018
   SITE_CHAR    2       3     0.37     0.48     0.020
   SITE_CHAR    2       4     0.37     0.48     0.024
   SITE_CHAR    2       5     0.37     0.48     0.030
```

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 2 | 6 | 0.37 | 0.48 | 0.072 |
| SITE_CHAR | 2 | 7 | 0.37 | 0.48 | 0.065 |
| SITE_CHAR | 2 | 8 | 0.37 | 0.48 | 0.059 |
| SITE_CHAR | 2 | 9 | 0.37 | 0.48 | 0.115 |
| SITE_CHAR | 2 | 10 | 0.37 | 0.48 | 0.044 |
| SITE_CHAR | 2 | 11 | 0.37 | 0.48 | 0.031 |
| SITE_CHAR | 2 | 12 | 0.37 | 0.48 | 0.022 |
| SITE_CHAR | 3 | 1 | 0.25 | 1.79 | 0.026 |
| SITE_CHAR | 3 | 2 | 0.25 | 1.79 | 0.024 |
| SITE_CHAR | 3 | 3 | 0.25 | 1.79 | 0.025 |
| SITE_CHAR | 3 | 4 | 0.25 | 1.79 | 0.030 |
| SITE_CHAR | 3 | 5 | 0.25 | 1.79 | 0.037 |
| SITE_CHAR | 3 | 6 | 0.25 | 1.79 | 0.084 |
| SITE_CHAR | 3 | 7 | 0.25 | 1.79 | 0.077 |
| SITE_CHAR | 3 | 8 | 0.25 | 1.79 | 0.070 |
| SITE_CHAR | 3 | 9 | 0.25 | 1.79 | 0.130 |
| SITE_CHAR | 3 | 10 | 0.25 | 1.79 | 0.054 |
| SITE_CHAR | 3 | 11 | 0.25 | 1.79 | 0.039 |
| SITE_CHAR | 3 | 12 | 0.25 | 1.79 | 0.028 |
| SITE_CHAR | 4 | 1 | 0.18 | 1.19 | 0.035 |
| SITE_CHAR | 4 | 2 | 0.18 | 1.19 | 0.033 |
| SITE_CHAR | 4 | 3 | 0.18 | 1.19 | 0.034 |
| SITE_CHAR | 4 | 4 | 0.18 | 1.19 | 0.039 |
| SITE_CHAR | 4 | 5 | 0.18 | 1.19 | 0.051 |
| SITE_CHAR | 4 | 6 | 0.18 | 1.19 | 0.107 |
| SITE_CHAR | 4 | 7 | 0.18 | 1.19 | 0.098 |
| SITE_CHAR | 4 | 8 | 0.18 | 1.19 | 0.093 |
| SITE_CHAR | 4 | 9 | 0.18 | 1.19 | 0.157 |
| SITE_CHAR | 4 | 10 | 0.18 | 1.19 | 0.073 |
| SITE_CHAR | 4 | 11 | 0.18 | 1.19 | 0.053 |
| SITE_CHAR | 4 | 12 | 0.18 | 1.19 | 0.037 |
| SITE_CHAR | 5 | 1 | 0.17 | 1.21 | 0.036 |
| SITE_CHAR | 5 | 2 | 0.17 | 1.21 | 0.034 |
| SITE_CHAR | 5 | 3 | 0.17 | 1.21 | 0.034 |
| SITE_CHAR | 5 | 4 | 0.17 | 1.21 | 0.040 |
| SITE_CHAR | 5 | 5 | 0.17 | 1.21 | 0.052 |
| SITE_CHAR | 5 | 6 | 0.17 | 1.21 | 0.108 |
| SITE_CHAR | 5 | 7 | 0.17 | 1.21 | 0.099 |
| SITE_CHAR | 5 | 8 | 0.17 | 1.21 | 0.094 |
| SITE_CHAR | 5 | 9 | 0.17 | 1.21 | 0.158 |
| SITE_CHAR | 5 | 10 | 0.17 | 1.21 | 0.074 |
| SITE_CHAR | 5 | 11 | 0.17 | 1.21 | 0.054 |
| SITE_CHAR | 5 | 12 | 0.17 | 1.21 | 0.038 |
| SITE_CHAR | 6 | 1 | 0.17 | 0.82 | 0.042 |
| SITE_CHAR | 6 | 2 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 6 | 3 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 6 | 4 | 0.17 | 0.82 | 0.046 |
| SITE_CHAR | 6 | 5 | 0.17 | 0.82 | 0.060 |

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 6 | 6 | 0.17 | 0.82 | 0.120 |
| SITE_CHAR | 6 | 7 | 0.17 | 0.82 | 0.111 |
| SITE_CHAR | 6 | 8 | 0.17 | 0.82 | 0.105 |
| SITE_CHAR | 6 | 9 | 0.17 | 0.82 | 0.171 |
| SITE_CHAR | 6 | 10 | 0.17 | 0.82 | 0.084 |
| SITE_CHAR | 6 | 11 | 0.17 | 0.82 | 0.062 |
| SITE_CHAR | 6 | 12 | 0.17 | 0.82 | 0.044 |
| SITE_CHAR | 7 | 1 | 0.17 | 0.82 | 0.042 |
| SITE_CHAR | 7 | 2 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 7 | 3 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 7 | 4 | 0.17 | 0.82 | 0.046 |
| SITE_CHAR | 7 | 5 | 0.17 | 0.82 | 0.060 |
| SITE_CHAR | 7 | 6 | 0.17 | 0.82 | 0.120 |
| SITE_CHAR | 7 | 7 | 0.17 | 0.82 | 0.111 |
| SITE_CHAR | 7 | 8 | 0.17 | 0.82 | 0.105 |
| SITE_CHAR | 7 | 9 | 0.17 | 0.82 | 0.171 |
| SITE_CHAR | 7 | 10 | 0.17 | 0.82 | 0.084 |
| SITE_CHAR | 7 | 11 | 0.17 | 0.82 | 0.062 |
| SITE_CHAR | 7 | 12 | 0.17 | 0.82 | 0.044 |
| SITE_CHAR | 8 | 1 | 0.17 | 0.82 | 0.042 |
| SITE_CHAR | 8 | 2 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 8 | 3 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 8 | 4 | 0.17 | 0.82 | 0.046 |
| SITE_CHAR | 8 | 5 | 0.17 | 0.82 | 0.060 |
| SITE_CHAR | 8 | 6 | 0.17 | 0.82 | 0.120 |
| SITE_CHAR | 8 | 7 | 0.17 | 0.82 | 0.111 |
| SITE_CHAR | 8 | 8 | 0.17 | 0.82 | 0.105 |
| SITE_CHAR | 8 | 9 | 0.17 | 0.82 | 0.171 |
| SITE_CHAR | 8 | 10 | 0.17 | 0.82 | 0.084 |
| SITE_CHAR | 8 | 11 | 0.17 | 0.82 | 0.062 |
| SITE_CHAR | 8 | 12 | 0.17 | 0.82 | 0.044 |
| SITE_CHAR | 9 | 1 | 0.17 | 1.30 | 0.036 |
| SITE_CHAR | 9 | 2 | 0.17 | 1.30 | 0.034 |
| SITE_CHAR | 9 | 3 | 0.17 | 1.30 | 0.035 |
| SITE_CHAR | 9 | 4 | 0.17 | 1.30 | 0.040 |
| SITE_CHAR | 9 | 5 | 0.17 | 1.30 | 0.052 |
| SITE_CHAR | 9 | 6 | 0.17 | 1.30 | 0.108 |
| SITE_CHAR | 9 | 7 | 0.17 | 1.30 | 0.099 |
| SITE_CHAR | 9 | 8 | 0.17 | 1.30 | 0.094 |
| SITE_CHAR | 9 | 9 | 0.17 | 1.30 | 0.158 |
| SITE_CHAR | 9 | 10 | 0.17 | 1.30 | 0.074 |
| SITE_CHAR | 9 | 11 | 0.17 | 1.30 | 0.054 |
| SITE_CHAR | 9 | 12 | 0.17 | 1.30 | 0.038 |
| SITE_CHAR | 10 | 1 | 0.17 | 1.30 | 0.036 |
| SITE_CHAR | 10 | 2 | 0.17 | 1.30 | 0.034 |
| SITE_CHAR | 10 | 3 | 0.17 | 1.30 | 0.035 |
| SITE_CHAR | 10 | 4 | 0.17 | 1.30 | 0.040 |
| SITE_CHAR | 10 | 5 | 0.17 | 1.30 | 0.052 |

mdw2014.txt

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 10 | 6 | 0.17 | 1.30 | 0.108 |
| SITE_CHAR | 10 | 7 | 0.17 | 1.30 | 0.099 |
| SITE_CHAR | 10 | 8 | 0.17 | 1.30 | 0.094 |
| SITE_CHAR | 10 | 9 | 0.17 | 1.30 | 0.158 |
| SITE_CHAR | 10 | 10 | 0.17 | 1.30 | 0.074 |
| SITE_CHAR | 10 | 11 | 0.17 | 1.30 | 0.054 |
| SITE_CHAR | 10 | 12 | 0.17 | 1.30 | 0.038 |
| SITE_CHAR | 11 | 1 | 0.20 | 2.26 | 0.033 |
| SITE_CHAR | 11 | 2 | 0.20 | 2.26 | 0.031 |
| SITE_CHAR | 11 | 3 | 0.20 | 2.26 | 0.033 |
| SITE_CHAR | 11 | 4 | 0.20 | 2.26 | 0.037 |
| SITE_CHAR | 11 | 5 | 0.20 | 2.26 | 0.048 |
| SITE_CHAR | 11 | 6 | 0.20 | 2.26 | 0.102 |
| SITE_CHAR | 11 | 7 | 0.20 | 2.26 | 0.093 |
| SITE_CHAR | 11 | 8 | 0.20 | 2.26 | 0.088 |
| SITE_CHAR | 11 | 9 | 0.20 | 2.26 | 0.151 |
| SITE_CHAR | 11 | 10 | 0.20 | 2.26 | 0.069 |
| SITE_CHAR | 11 | 11 | 0.20 | 2.26 | 0.050 |
| SITE_CHAR | 11 | 12 | 0.20 | 2.26 | 0.035 |
| SITE_CHAR | 12 | 1 | 0.18 | 2.62 | 0.029 |
| SITE_CHAR | 12 | 2 | 0.18 | 2.62 | 0.027 |
| SITE_CHAR | 12 | 3 | 0.18 | 2.62 | 0.028 |
| SITE_CHAR | 12 | 4 | 0.18 | 2.62 | 0.033 |
| SITE_CHAR | 12 | 5 | 0.18 | 2.62 | 0.042 |
| SITE_CHAR | 12 | 6 | 0.18 | 2.62 | 0.092 |
| SITE_CHAR | 12 | 7 | 0.18 | 2.62 | 0.084 |
| SITE_CHAR | 12 | 8 | 0.18 | 2.62 | 0.077 |
| SITE_CHAR | 12 | 9 | 0.18 | 2.62 | 0.139 |
| SITE_CHAR | 12 | 10 | 0.18 | 2.62 | 0.060 |
| SITE_CHAR | 12 | 11 | 0.18 | 2.62 | 0.044 |
| SITE_CHAR | 12 | 12 | 0.18 | 2.62 | 0.031 |

mdw2015.txt

```
** MDW 2015
** Generated by AERSURFACE, dated 13016
** Generated from "illinois.nlcd.tif"
** Center Latitude (decimal degrees):     41.784098
** Center Longitude (decimal degrees):   -87.755142
** Datum: NAD83
** Study radius (km) for surface roughness:   1.0
** Airport? Y, Continuous snow cover? N
** Surface moisture? Average 1 4 5 7 8,  Wet 6 9 11 12,  Dry 2 3 10, Arid region? N
** Month/Season assignments? User-specified
** Late autumn after frost and harvest, or winter with no snow: 12 1 2 3
** Winter with continuous snow on the ground: 0
** Transitional spring (partial green coverage, short annuals): 4 5
** Midsummer with lush vegetation: 6 7 8
** Autumn with unharvested cropland: 9 10 11


   FREQ_SECT  MONTHLY 12
   SECTOR   1    0   30
   SECTOR   2   30   60
   SECTOR   3   60   90
   SECTOR   4   90  120
   SECTOR   5  120  150
   SECTOR   6  150  180
   SECTOR   7  180  210
   SECTOR   8  210  240
   SECTOR   9  240  270
   SECTOR  10  270  300
   SECTOR  11  300  330
   SECTOR  12  330  360
**           Month    Sect    Alb      Bo        Zo
   SITE_CHAR    1       1     0.27     0.93     0.025
   SITE_CHAR    1       2     0.27     0.93     0.023
   SITE_CHAR    1       3     0.27     0.93     0.024
   SITE_CHAR    1       4     0.27     0.93     0.029
   SITE_CHAR    1       5     0.27     0.93     0.037
   SITE_CHAR    1       6     0.27     0.93     0.083
   SITE_CHAR    1       7     0.27     0.93     0.075
   SITE_CHAR    1       8     0.27     0.93     0.069
   SITE_CHAR    1       9     0.27     0.93     0.128
   SITE_CHAR    1      10     0.27     0.93     0.053
   SITE_CHAR    1      11     0.27     0.93     0.038
   SITE_CHAR    1      12     0.27     0.93     0.027
   SITE_CHAR    2       1     0.37     0.48     0.020
   SITE_CHAR    2       2     0.37     0.48     0.018
   SITE_CHAR    2       3     0.37     0.48     0.020
   SITE_CHAR    2       4     0.37     0.48     0.024
   SITE_CHAR    2       5     0.37     0.48     0.030
```

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 2 | 6 | 0.37 | 0.48 | 0.072 |
| SITE_CHAR | 2 | 7 | 0.37 | 0.48 | 0.065 |
| SITE_CHAR | 2 | 8 | 0.37 | 0.48 | 0.059 |
| SITE_CHAR | 2 | 9 | 0.37 | 0.48 | 0.115 |
| SITE_CHAR | 2 | 10 | 0.37 | 0.48 | 0.044 |
| SITE_CHAR | 2 | 11 | 0.37 | 0.48 | 0.031 |
| SITE_CHAR | 2 | 12 | 0.37 | 0.48 | 0.022 |
| SITE_CHAR | 3 | 1 | 0.24 | 1.93 | 0.026 |
| SITE_CHAR | 3 | 2 | 0.24 | 1.93 | 0.024 |
| SITE_CHAR | 3 | 3 | 0.24 | 1.93 | 0.025 |
| SITE_CHAR | 3 | 4 | 0.24 | 1.93 | 0.030 |
| SITE_CHAR | 3 | 5 | 0.24 | 1.93 | 0.038 |
| SITE_CHAR | 3 | 6 | 0.24 | 1.93 | 0.086 |
| SITE_CHAR | 3 | 7 | 0.24 | 1.93 | 0.078 |
| SITE_CHAR | 3 | 8 | 0.24 | 1.93 | 0.071 |
| SITE_CHAR | 3 | 9 | 0.24 | 1.93 | 0.131 |
| SITE_CHAR | 3 | 10 | 0.24 | 1.93 | 0.055 |
| SITE_CHAR | 3 | 11 | 0.24 | 1.93 | 0.040 |
| SITE_CHAR | 3 | 12 | 0.24 | 1.93 | 0.028 |
| SITE_CHAR | 4 | 1 | 0.17 | 1.21 | 0.036 |
| SITE_CHAR | 4 | 2 | 0.17 | 1.21 | 0.034 |
| SITE_CHAR | 4 | 3 | 0.17 | 1.21 | 0.034 |
| SITE_CHAR | 4 | 4 | 0.17 | 1.21 | 0.040 |
| SITE_CHAR | 4 | 5 | 0.17 | 1.21 | 0.052 |
| SITE_CHAR | 4 | 6 | 0.17 | 1.21 | 0.108 |
| SITE_CHAR | 4 | 7 | 0.17 | 1.21 | 0.099 |
| SITE_CHAR | 4 | 8 | 0.17 | 1.21 | 0.094 |
| SITE_CHAR | 4 | 9 | 0.17 | 1.21 | 0.158 |
| SITE_CHAR | 4 | 10 | 0.17 | 1.21 | 0.074 |
| SITE_CHAR | 4 | 11 | 0.17 | 1.21 | 0.054 |
| SITE_CHAR | 4 | 12 | 0.17 | 1.21 | 0.038 |
| SITE_CHAR | 5 | 1 | 0.17 | 1.21 | 0.036 |
| SITE_CHAR | 5 | 2 | 0.17 | 1.21 | 0.034 |
| SITE_CHAR | 5 | 3 | 0.17 | 1.21 | 0.034 |
| SITE_CHAR | 5 | 4 | 0.17 | 1.21 | 0.040 |
| SITE_CHAR | 5 | 5 | 0.17 | 1.21 | 0.052 |
| SITE_CHAR | 5 | 6 | 0.17 | 1.21 | 0.108 |
| SITE_CHAR | 5 | 7 | 0.17 | 1.21 | 0.099 |
| SITE_CHAR | 5 | 8 | 0.17 | 1.21 | 0.094 |
| SITE_CHAR | 5 | 9 | 0.17 | 1.21 | 0.158 |
| SITE_CHAR | 5 | 10 | 0.17 | 1.21 | 0.074 |
| SITE_CHAR | 5 | 11 | 0.17 | 1.21 | 0.054 |
| SITE_CHAR | 5 | 12 | 0.17 | 1.21 | 0.038 |
| SITE_CHAR | 6 | 1 | 0.17 | 0.82 | 0.042 |
| SITE_CHAR | 6 | 2 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 6 | 3 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 6 | 4 | 0.17 | 0.82 | 0.046 |
| SITE_CHAR | 6 | 5 | 0.17 | 0.82 | 0.060 |

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 6 | 6 | 0.17 | 0.82 | 0.120 |
| SITE_CHAR | 6 | 7 | 0.17 | 0.82 | 0.111 |
| SITE_CHAR | 6 | 8 | 0.17 | 0.82 | 0.105 |
| SITE_CHAR | 6 | 9 | 0.17 | 0.82 | 0.171 |
| SITE_CHAR | 6 | 10 | 0.17 | 0.82 | 0.084 |
| SITE_CHAR | 6 | 11 | 0.17 | 0.82 | 0.062 |
| SITE_CHAR | 6 | 12 | 0.17 | 0.82 | 0.044 |
| SITE_CHAR | 7 | 1 | 0.17 | 1.23 | 0.042 |
| SITE_CHAR | 7 | 2 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 7 | 3 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 7 | 4 | 0.17 | 1.23 | 0.046 |
| SITE_CHAR | 7 | 5 | 0.17 | 1.23 | 0.060 |
| SITE_CHAR | 7 | 6 | 0.17 | 1.23 | 0.120 |
| SITE_CHAR | 7 | 7 | 0.17 | 1.23 | 0.111 |
| SITE_CHAR | 7 | 8 | 0.17 | 1.23 | 0.105 |
| SITE_CHAR | 7 | 9 | 0.17 | 1.23 | 0.171 |
| SITE_CHAR | 7 | 10 | 0.17 | 1.23 | 0.084 |
| SITE_CHAR | 7 | 11 | 0.17 | 1.23 | 0.062 |
| SITE_CHAR | 7 | 12 | 0.17 | 1.23 | 0.044 |
| SITE_CHAR | 8 | 1 | 0.17 | 1.23 | 0.042 |
| SITE_CHAR | 8 | 2 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 8 | 3 | 0.17 | 1.23 | 0.040 |
| SITE_CHAR | 8 | 4 | 0.17 | 1.23 | 0.046 |
| SITE_CHAR | 8 | 5 | 0.17 | 1.23 | 0.060 |
| SITE_CHAR | 8 | 6 | 0.17 | 1.23 | 0.120 |
| SITE_CHAR | 8 | 7 | 0.17 | 1.23 | 0.111 |
| SITE_CHAR | 8 | 8 | 0.17 | 1.23 | 0.105 |
| SITE_CHAR | 8 | 9 | 0.17 | 1.23 | 0.171 |
| SITE_CHAR | 8 | 10 | 0.17 | 1.23 | 0.084 |
| SITE_CHAR | 8 | 11 | 0.17 | 1.23 | 0.062 |
| SITE_CHAR | 8 | 12 | 0.17 | 1.23 | 0.044 |
| SITE_CHAR | 9 | 1 | 0.17 | 0.85 | 0.036 |
| SITE_CHAR | 9 | 2 | 0.17 | 0.85 | 0.034 |
| SITE_CHAR | 9 | 3 | 0.17 | 0.85 | 0.035 |
| SITE_CHAR | 9 | 4 | 0.17 | 0.85 | 0.040 |
| SITE_CHAR | 9 | 5 | 0.17 | 0.85 | 0.052 |
| SITE_CHAR | 9 | 6 | 0.17 | 0.85 | 0.108 |
| SITE_CHAR | 9 | 7 | 0.17 | 0.85 | 0.099 |
| SITE_CHAR | 9 | 8 | 0.17 | 0.85 | 0.094 |
| SITE_CHAR | 9 | 9 | 0.17 | 0.85 | 0.158 |
| SITE_CHAR | 9 | 10 | 0.17 | 0.85 | 0.074 |
| SITE_CHAR | 9 | 11 | 0.17 | 0.85 | 0.054 |
| SITE_CHAR | 9 | 12 | 0.17 | 0.85 | 0.038 |
| SITE_CHAR | 10 | 1 | 0.17 | 2.62 | 0.036 |
| SITE_CHAR | 10 | 2 | 0.17 | 2.62 | 0.034 |
| SITE_CHAR | 10 | 3 | 0.17 | 2.62 | 0.035 |
| SITE_CHAR | 10 | 4 | 0.17 | 2.62 | 0.040 |
| SITE_CHAR | 10 | 5 | 0.17 | 2.62 | 0.052 |

mdw2015.txt

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 10 | 6 | 0.17 | 2.62 | 0.108 |
| SITE_CHAR | 10 | 7 | 0.17 | 2.62 | 0.099 |
| SITE_CHAR | 10 | 8 | 0.17 | 2.62 | 0.094 |
| SITE_CHAR | 10 | 9 | 0.17 | 2.62 | 0.158 |
| SITE_CHAR | 10 | 10 | 0.17 | 2.62 | 0.074 |
| SITE_CHAR | 10 | 11 | 0.17 | 2.62 | 0.054 |
| SITE_CHAR | 10 | 12 | 0.17 | 2.62 | 0.038 |
| SITE_CHAR | 11 | 1 | 0.20 | 0.79 | 0.033 |
| SITE_CHAR | 11 | 2 | 0.20 | 0.79 | 0.031 |
| SITE_CHAR | 11 | 3 | 0.20 | 0.79 | 0.033 |
| SITE_CHAR | 11 | 4 | 0.20 | 0.79 | 0.037 |
| SITE_CHAR | 11 | 5 | 0.20 | 0.79 | 0.048 |
| SITE_CHAR | 11 | 6 | 0.20 | 0.79 | 0.102 |
| SITE_CHAR | 11 | 7 | 0.20 | 0.79 | 0.093 |
| SITE_CHAR | 11 | 8 | 0.20 | 0.79 | 0.088 |
| SITE_CHAR | 11 | 9 | 0.20 | 0.79 | 0.151 |
| SITE_CHAR | 11 | 10 | 0.20 | 0.79 | 0.069 |
| SITE_CHAR | 11 | 11 | 0.20 | 0.79 | 0.050 |
| SITE_CHAR | 11 | 12 | 0.20 | 0.79 | 0.035 |
| SITE_CHAR | 12 | 1 | 0.20 | 0.80 | 0.028 |
| SITE_CHAR | 12 | 2 | 0.20 | 0.80 | 0.026 |
| SITE_CHAR | 12 | 3 | 0.20 | 0.80 | 0.027 |
| SITE_CHAR | 12 | 4 | 0.20 | 0.80 | 0.032 |
| SITE_CHAR | 12 | 5 | 0.20 | 0.80 | 0.040 |
| SITE_CHAR | 12 | 6 | 0.20 | 0.80 | 0.089 |
| SITE_CHAR | 12 | 7 | 0.20 | 0.80 | 0.082 |
| SITE_CHAR | 12 | 8 | 0.20 | 0.80 | 0.075 |
| SITE_CHAR | 12 | 9 | 0.20 | 0.80 | 0.136 |
| SITE_CHAR | 12 | 10 | 0.20 | 0.80 | 0.058 |
| SITE_CHAR | 12 | 11 | 0.20 | 0.80 | 0.042 |
| SITE_CHAR | 12 | 12 | 0.20 | 0.80 | 0.030 |

mdw2016.txt

```
** MDW 2016
** Generated by AERSURFACE, dated 13016
** Generated from "illinois.nlcd.tif"
** Center Latitude (decimal degrees):     41.784098
** Center Longitude (decimal degrees):   -87.755142
** Datum: NAD83
** Study radius (km) for surface roughness:   1.0
** Airport? Y, Continuous snow cover? N
** Surface moisture? Average 1 9 10 11 12, Wet 3 5 7 8, Dry 2 4 6 12, Arid region? N
** Month/Season assignments? User-specified
** Late autumn after frost and harvest, or winter with no snow: 12 1 2 3
** Winter with continuous snow on the ground: 0
** Transitional spring (partial green coverage, short annuals): 4 5
** Midsummer with lush vegetation: 6 7 8
** Autumn with unharvested cropland: 9 10 11


   FREQ_SECT  MONTHLY 12
   SECTOR   1    0   30
   SECTOR   2   30   60
   SECTOR   3   60   90
   SECTOR   4   90  120
   SECTOR   5  120  150
   SECTOR   6  150  180
   SECTOR   7  180  210
   SECTOR   8  210  240
   SECTOR   9  240  270
   SECTOR  10  270  300
   SECTOR  11  300  330
   SECTOR  12  330  360
**           Month    Sect    Alb      Bo        Zo
   SITE_CHAR    1       1     0.27     0.90     0.025
   SITE_CHAR    1       2     0.27     0.90     0.023
   SITE_CHAR    1       3     0.27     0.90     0.024
   SITE_CHAR    1       4     0.27     0.90     0.029
   SITE_CHAR    1       5     0.27     0.90     0.036
   SITE_CHAR    1       6     0.27     0.90     0.082
   SITE_CHAR    1       7     0.27     0.90     0.075
   SITE_CHAR    1       8     0.27     0.90     0.068
   SITE_CHAR    1       9     0.27     0.90     0.127
   SITE_CHAR    1      10     0.27     0.90     0.052
   SITE_CHAR    1      11     0.27     0.90     0.038
   SITE_CHAR    1      12     0.27     0.90     0.027
   SITE_CHAR    2       1     0.22     2.18     0.027
   SITE_CHAR    2       2     0.22     2.18     0.025
   SITE_CHAR    2       3     0.22     2.18     0.026
   SITE_CHAR    2       4     0.22     2.18     0.031
   SITE_CHAR    2       5     0.22     2.18     0.040
```

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 2 | 6 | 0.22 | 2.18 | 0.088 |
| SITE_CHAR | 2 | 7 | 0.22 | 2.18 | 0.080 |
| SITE_CHAR | 2 | 8 | 0.22 | 2.18 | 0.073 |
| SITE_CHAR | 2 | 9 | 0.22 | 2.18 | 0.134 |
| SITE_CHAR | 2 | 10 | 0.22 | 2.18 | 0.057 |
| SITE_CHAR | 2 | 11 | 0.22 | 2.18 | 0.041 |
| SITE_CHAR | 2 | 12 | 0.22 | 2.18 | 0.029 |
| SITE_CHAR | 3 | 1 | 0.19 | 0.84 | 0.029 |
| SITE_CHAR | 3 | 2 | 0.19 | 0.84 | 0.027 |
| SITE_CHAR | 3 | 3 | 0.19 | 0.84 | 0.028 |
| SITE_CHAR | 3 | 4 | 0.19 | 0.84 | 0.033 |
| SITE_CHAR | 3 | 5 | 0.19 | 0.84 | 0.042 |
| SITE_CHAR | 3 | 6 | 0.19 | 0.84 | 0.091 |
| SITE_CHAR | 3 | 7 | 0.19 | 0.84 | 0.083 |
| SITE_CHAR | 3 | 8 | 0.19 | 0.84 | 0.076 |
| SITE_CHAR | 3 | 9 | 0.19 | 0.84 | 0.138 |
| SITE_CHAR | 3 | 10 | 0.19 | 0.84 | 0.059 |
| SITE_CHAR | 3 | 11 | 0.19 | 0.84 | 0.044 |
| SITE_CHAR | 3 | 12 | 0.19 | 0.84 | 0.031 |
| SITE_CHAR | 4 | 1 | 0.18 | 2.40 | 0.035 |
| SITE_CHAR | 4 | 2 | 0.18 | 2.40 | 0.033 |
| SITE_CHAR | 4 | 3 | 0.18 | 2.40 | 0.034 |
| SITE_CHAR | 4 | 4 | 0.18 | 2.40 | 0.039 |
| SITE_CHAR | 4 | 5 | 0.18 | 2.40 | 0.051 |
| SITE_CHAR | 4 | 6 | 0.18 | 2.40 | 0.107 |
| SITE_CHAR | 4 | 7 | 0.18 | 2.40 | 0.098 |
| SITE_CHAR | 4 | 8 | 0.18 | 2.40 | 0.093 |
| SITE_CHAR | 4 | 9 | 0.18 | 2.40 | 0.157 |
| SITE_CHAR | 4 | 10 | 0.18 | 2.40 | 0.073 |
| SITE_CHAR | 4 | 11 | 0.18 | 2.40 | 0.053 |
| SITE_CHAR | 4 | 12 | 0.18 | 2.40 | 0.037 |
| SITE_CHAR | 5 | 1 | 0.17 | 0.81 | 0.036 |
| SITE_CHAR | 5 | 2 | 0.17 | 0.81 | 0.034 |
| SITE_CHAR | 5 | 3 | 0.17 | 0.81 | 0.034 |
| SITE_CHAR | 5 | 4 | 0.17 | 0.81 | 0.040 |
| SITE_CHAR | 5 | 5 | 0.17 | 0.81 | 0.052 |
| SITE_CHAR | 5 | 6 | 0.17 | 0.81 | 0.108 |
| SITE_CHAR | 5 | 7 | 0.17 | 0.81 | 0.099 |
| SITE_CHAR | 5 | 8 | 0.17 | 0.81 | 0.094 |
| SITE_CHAR | 5 | 9 | 0.17 | 0.81 | 0.158 |
| SITE_CHAR | 5 | 10 | 0.17 | 0.81 | 0.074 |
| SITE_CHAR | 5 | 11 | 0.17 | 0.81 | 0.054 |
| SITE_CHAR | 5 | 12 | 0.17 | 0.81 | 0.038 |
| SITE_CHAR | 6 | 1 | 0.17 | 2.50 | 0.042 |
| SITE_CHAR | 6 | 2 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 6 | 3 | 0.17 | 2.50 | 0.040 |
| SITE_CHAR | 6 | 4 | 0.17 | 2.50 | 0.046 |
| SITE_CHAR | 6 | 5 | 0.17 | 2.50 | 0.060 |

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 6 | 6 | 0.17 | 2.50 | 0.120 |
| SITE_CHAR | 6 | 7 | 0.17 | 2.50 | 0.111 |
| SITE_CHAR | 6 | 8 | 0.17 | 2.50 | 0.105 |
| SITE_CHAR | 6 | 9 | 0.17 | 2.50 | 0.171 |
| SITE_CHAR | 6 | 10 | 0.17 | 2.50 | 0.084 |
| SITE_CHAR | 6 | 11 | 0.17 | 2.50 | 0.062 |
| SITE_CHAR | 6 | 12 | 0.17 | 2.50 | 0.044 |
| SITE_CHAR | 7 | 1 | 0.17 | 0.82 | 0.042 |
| SITE_CHAR | 7 | 2 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 7 | 3 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 7 | 4 | 0.17 | 0.82 | 0.046 |
| SITE_CHAR | 7 | 5 | 0.17 | 0.82 | 0.060 |
| SITE_CHAR | 7 | 6 | 0.17 | 0.82 | 0.120 |
| SITE_CHAR | 7 | 7 | 0.17 | 0.82 | 0.111 |
| SITE_CHAR | 7 | 8 | 0.17 | 0.82 | 0.105 |
| SITE_CHAR | 7 | 9 | 0.17 | 0.82 | 0.171 |
| SITE_CHAR | 7 | 10 | 0.17 | 0.82 | 0.084 |
| SITE_CHAR | 7 | 11 | 0.17 | 0.82 | 0.062 |
| SITE_CHAR | 7 | 12 | 0.17 | 0.82 | 0.044 |
| SITE_CHAR | 8 | 1 | 0.17 | 0.82 | 0.042 |
| SITE_CHAR | 8 | 2 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 8 | 3 | 0.17 | 0.82 | 0.040 |
| SITE_CHAR | 8 | 4 | 0.17 | 0.82 | 0.046 |
| SITE_CHAR | 8 | 5 | 0.17 | 0.82 | 0.060 |
| SITE_CHAR | 8 | 6 | 0.17 | 0.82 | 0.120 |
| SITE_CHAR | 8 | 7 | 0.17 | 0.82 | 0.111 |
| SITE_CHAR | 8 | 8 | 0.17 | 0.82 | 0.105 |
| SITE_CHAR | 8 | 9 | 0.17 | 0.82 | 0.171 |
| SITE_CHAR | 8 | 10 | 0.17 | 0.82 | 0.084 |
| SITE_CHAR | 8 | 11 | 0.17 | 0.82 | 0.062 |
| SITE_CHAR | 8 | 12 | 0.17 | 0.82 | 0.044 |
| SITE_CHAR | 9 | 1 | 0.17 | 1.30 | 0.036 |
| SITE_CHAR | 9 | 2 | 0.17 | 1.30 | 0.034 |
| SITE_CHAR | 9 | 3 | 0.17 | 1.30 | 0.035 |
| SITE_CHAR | 9 | 4 | 0.17 | 1.30 | 0.040 |
| SITE_CHAR | 9 | 5 | 0.17 | 1.30 | 0.052 |
| SITE_CHAR | 9 | 6 | 0.17 | 1.30 | 0.108 |
| SITE_CHAR | 9 | 7 | 0.17 | 1.30 | 0.099 |
| SITE_CHAR | 9 | 8 | 0.17 | 1.30 | 0.094 |
| SITE_CHAR | 9 | 9 | 0.17 | 1.30 | 0.158 |
| SITE_CHAR | 9 | 10 | 0.17 | 1.30 | 0.074 |
| SITE_CHAR | 9 | 11 | 0.17 | 1.30 | 0.054 |
| SITE_CHAR | 9 | 12 | 0.17 | 1.30 | 0.038 |
| SITE_CHAR | 10 | 1 | 0.17 | 1.30 | 0.036 |
| SITE_CHAR | 10 | 2 | 0.17 | 1.30 | 0.034 |
| SITE_CHAR | 10 | 3 | 0.17 | 1.30 | 0.035 |
| SITE_CHAR | 10 | 4 | 0.17 | 1.30 | 0.040 |
| SITE_CHAR | 10 | 5 | 0.17 | 1.30 | 0.052 |

mdw2016.txt

| | | | | | |
|---|---|---|---|---|---|
| SITE_CHAR | 10 | 6 | 0.17 | 1.30 | 0.108 |
| SITE_CHAR | 10 | 7 | 0.17 | 1.30 | 0.099 |
| SITE_CHAR | 10 | 8 | 0.17 | 1.30 | 0.094 |
| SITE_CHAR | 10 | 9 | 0.17 | 1.30 | 0.158 |
| SITE_CHAR | 10 | 10 | 0.17 | 1.30 | 0.074 |
| SITE_CHAR | 10 | 11 | 0.17 | 1.30 | 0.054 |
| SITE_CHAR | 10 | 12 | 0.17 | 1.30 | 0.038 |
| SITE_CHAR | 11 | 1 | 0.17 | 1.30 | 0.036 |
| SITE_CHAR | 11 | 2 | 0.17 | 1.30 | 0.034 |
| SITE_CHAR | 11 | 3 | 0.17 | 1.30 | 0.035 |
| SITE_CHAR | 11 | 4 | 0.17 | 1.30 | 0.040 |
| SITE_CHAR | 11 | 5 | 0.17 | 1.30 | 0.052 |
| SITE_CHAR | 11 | 6 | 0.17 | 1.30 | 0.108 |
| SITE_CHAR | 11 | 7 | 0.17 | 1.30 | 0.099 |
| SITE_CHAR | 11 | 8 | 0.17 | 1.30 | 0.094 |
| SITE_CHAR | 11 | 9 | 0.17 | 1.30 | 0.158 |
| SITE_CHAR | 11 | 10 | 0.17 | 1.30 | 0.074 |
| SITE_CHAR | 11 | 11 | 0.17 | 1.30 | 0.054 |
| SITE_CHAR | 11 | 12 | 0.17 | 1.30 | 0.038 |
| SITE_CHAR | 12 | 1 | 0.30 | 0.80 | 0.023 |
| SITE_CHAR | 12 | 2 | 0.30 | 0.80 | 0.021 |
| SITE_CHAR | 12 | 3 | 0.30 | 0.80 | 0.023 |
| SITE_CHAR | 12 | 4 | 0.30 | 0.80 | 0.027 |
| SITE_CHAR | 12 | 5 | 0.30 | 0.80 | 0.035 |
| SITE_CHAR | 12 | 6 | 0.30 | 0.80 | 0.080 |
| SITE_CHAR | 12 | 7 | 0.30 | 0.80 | 0.072 |
| SITE_CHAR | 12 | 8 | 0.30 | 0.80 | 0.066 |
| SITE_CHAR | 12 | 9 | 0.30 | 0.80 | 0.124 |
| SITE_CHAR | 12 | 10 | 0.30 | 0.80 | 0.050 |
| SITE_CHAR | 12 | 11 | 0.30 | 0.80 | 0.036 |
| SITE_CHAR | 12 | 12 | 0.30 | 0.80 | 0.025 |

## Table A-1a - Ferrous Material Processing - Metal Emissions in Active Hours (7 AM - 7 PM, Mon-Sat)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | V-1 | V-2 | V-3 | V-4 | V-5 | V-6 | V-7 | V-8 | V-9 | V-10 | V-11 | V-12 | V-13 | RTO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PM (Active) | | 1.1610000 | 0.1400000 | 0.1400000 | 0.0120000 | 0.1881000 | 0.2087000 | 0.1458000 | 0.0244000 | 0.0411000 | 0.2412000 | 0.1996000 | 0.1996000 | 0.5673000 | 2.4704690 |
| Lead[b] | 0.0665% | 0.0007722 | 0.0000931 | 0.0000931 | 0.0000080 | 0.0001251 | 0.0001388 | 0.0000970 | 0.0000162 | 0.0000273 | 0.0001604 | 0.0001328 | 0.0001328 | 0.0003773 | 0.0016432 |
| Manganese | 0.0535% | 0.0006217 | 0.0000750 | 0.0000750 | 0.0000064 | 0.0001007 | 0.0001118 | 0.0000781 | 0.0000131 | 0.0000220 | 0.0001292 | 0.0001069 | 0.0001069 | 0.0003038 | 0.0013229 |
| Mercury | 1.2866% | 0.0149373 | 0.0018012 | 0.0018012 | 0.0001544 | 0.0024201 | 0.0026851 | 0.0018758 | 0.0003139 | 0.0005288 | 0.0031033 | 0.0025680 | 0.0025680 | 0.0072988 | 0.0317848 |
| Nickel | 0.0207% | 0.0002405 | 0.0000290 | 0.0000290 | 0.0000025 | 0.0000390 | 0.0000432 | 0.0000302 | 0.0000051 | 0.0000085 | 0.0000500 | 0.0000413 | 0.0000413 | 0.0001175 | 0.0005118 |
| Antimony | 0.0040% | 0.0000462 | 0.0000056 | 0.0000056 | 0.0000005 | 0.0000075 | 0.0000083 | 0.0000058 | 0.0000010 | 0.0000016 | 0.0000096 | 0.0000079 | 0.0000079 | 0.0000226 | 0.0000983 |
| Arsenic | 0.0015% | 0.0000179 | 0.0000022 | 0.0000022 | 0.0000002 | 0.0000029 | 0.0000032 | 0.0000022 | 0.0000004 | 0.0000006 | 0.0000037 | 0.0000031 | 0.0000031 | 0.0000087 | 0.0000380 |
| Beryllium | 0.0003% | 0.0000036 | 0.0000004 | 0.0000004 | 0.0000000 | 0.0000006 | 0.0000006 | 0.0000005 | 0.0000001 | 0.0000001 | 0.0000007 | 0.0000006 | 0.0000006 | 0.0000018 | 0.0000076 |
| Cadmium | 0.0147% | 0.0001704 | 0.0000205 | 0.0000205 | 0.0000018 | 0.0000276 | 0.0000306 | 0.0000214 | 0.0000036 | 0.0000060 | 0.0000354 | 0.0000293 | 0.0000293 | 0.0000833 | 0.0003625 |
| Chromium[c] | 0.0163% | 0.0001888 | 0.0000228 | 0.0000228 | 0.0000020 | 0.0000306 | 0.0000339 | 0.0000237 | 0.0000040 | 0.0000067 | 0.0000392 | 0.0000325 | 0.0000325 | 0.0000923 | 0.0004018 |
| Cobalt | 0.0014% | 0.0000160 | 0.0000019 | 0.0000019 | 0.0000002 | 0.0000026 | 0.0000029 | 0.0000020 | 0.0000003 | 0.0000006 | 0.0000033 | 0.0000027 | 0.0000027 | 0.0000078 | 0.0000340 |
| Phosphorus | 0.2000% | 0.0023217 | 0.0002800 | 0.0002800 | 0.0000240 | 0.0003761 | 0.0004173 | 0.0002916 | 0.0000488 | 0.0000822 | 0.0004823 | 0.0003991 | 0.0003991 | 0.0011344 | 0.0049402 |
| Selenium | 0.0074% | 0.0000858 | 0.0000103 | 0.0000103 | 0.0000009 | 0.0000139 | 0.0000154 | 0.0000108 | 0.0000018 | 0.0000030 | 0.0000178 | 0.0000148 | 0.0000148 | 0.0000419 | 0.0001826 |
| Zinc | 3.7272% | 0.0432723 | 0.0052180 | 0.0052180 | 0.0004473 | 0.0070108 | 0.0077786 | 0.0054342 | 0.0009094 | 0.0015319 | 0.0089899 | 0.0074394 | 0.0074394 | 0.0211442 | 0.0920783 |
| Barium | 0.0360% | 0.0004182 | 0.0000504 | 0.0000504 | 0.0000043 | 0.0000677 | 0.0000752 | 0.0000525 | 0.0000088 | 0.0000148 | 0.0000869 | 0.0000719 | 0.0000719 | 0.0002043 | 0.0008898 |
| Copper | 0.0266% | 0.0003083 | 0.0000372 | 0.0000372 | 0.0000032 | 0.0000499 | 0.0000554 | 0.0000387 | 0.0000065 | 0.0000109 | 0.0000640 | 0.0000530 | 0.0000530 | 0.0001506 | 0.0006560 |
| Silver | 0.0064% | 0.0000746 | 0.0000090 | 0.0000090 | 0.0000008 | 0.0000121 | 0.0000134 | 0.0000094 | 0.0000016 | 0.0000026 | 0.0000155 | 0.0000128 | 0.0000128 | 0.0000364 | 0.0001587 |
| Thallium | 0.0012% | 0.0000143 | 0.0000017 | 0.0000017 | 0.0000001 | 0.0000023 | 0.0000026 | 0.0000018 | 0.0000003 | 0.0000005 | 0.0000030 | 0.0000025 | 0.0000025 | 0.0000070 | 0.0000305 |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

## Table A-1b - Ferrous Material Processing - Metal Emissions in Inactive Hours (7 PM - 7 AM, Mon-Sat, All Day, Sun)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | V-1 | V-2 | V-3 | V-4 | V-5 | V-6 | V-7 | V-8 | V-9 | V-10 | V-11 | V-12 | V-13 | RTO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PM (Inactive)** | | 0.0794000 | - | - | 0.0012000 | - | 0.0371000 | - | - | 0.0008000 | - | 0.0529000 | 0.0529000 | - | |
| Lead [b] | 0.0665% | 0.0000528 | | | 0.0000008 | | 0.0000247 | | | 0.0000005 | | 0.0000352 | 0.0000352 | | |
| Manganese | 0.0535% | 0.0000425 | | | 0.0000006 | | 0.0000199 | | | 0.0000004 | | 0.0000283 | 0.0000283 | | |
| Mercury | 1.2866% | 0.0010216 | | | 0.0000154 | | 0.0004773 | | | 0.0000103 | | 0.0006806 | 0.0006806 | | |
| Nickel | 0.0207% | 0.0000164 | | | 0.0000002 | | 0.0000077 | | | 0.0000002 | | 0.0000110 | 0.0000110 | | |
| Antimony | 0.0040% | 0.0000032 | | | 0.0000000 | | 0.0000015 | | | 0.0000000 | | 0.0000021 | 0.0000021 | | |
| Arsenic | 0.0015% | 0.0000012 | | | 0.0000000 | | 0.0000006 | | | 0.0000000 | | 0.0000008 | 0.0000008 | | |
| Beryllium | 0.0003% | 0.0000002 | | | 0.0000000 | | 0.0000001 | | | 0.0000000 | | 0.0000002 | 0.0000002 | | |
| Cadmium | 0.0147% | 0.0000117 | | | 0.0000002 | | 0.0000054 | | | 0.0000001 | | 0.0000078 | 0.0000078 | | |
| Chromium [c] | 0.0163% | 0.0000129 | | | 0.0000002 | | 0.0000060 | | | 0.0000001 | | 0.0000086 | 0.0000086 | | |
| Cobalt | 0.0014% | 0.0000011 | | | 0.0000000 | | 0.0000005 | | | 0.0000000 | | 0.0000007 | 0.0000007 | | |
| Phosphorus | 0.2000% | 0.0001588 | | | 0.0000024 | | 0.0000742 | | | 0.0000016 | | 0.0001058 | 0.0001058 | | |
| Selenium | 0.0074% | 0.0000059 | | | 0.0000001 | | 0.0000027 | | | 0.0000001 | | 0.0000039 | 0.0000039 | | |
| Zinc | 3.7272% | 0.0029594 | | | 0.0000447 | | 0.0013828 | | | 0.0000298 | | 0.0019717 | 0.0019717 | | |
| Barium | 0.0360% | 0.0000286 | | | 0.0000004 | | 0.0000134 | | | 0.0000003 | | 0.0000191 | 0.0000191 | | |
| Copper | 0.0266% | 0.0000211 | | | 0.0000003 | | 0.0000099 | | | 0.0000002 | | 0.0000140 | 0.0000140 | | |
| Silver | 0.0064% | 0.0000051 | | | 0.0000001 | | 0.0000024 | | | 0.0000001 | | 0.0000034 | 0.0000034 | | |
| Thallium | 0.0012% | 0.0000010 | | | 0.0000000 | | 0.0000005 | | | 0.0000000 | | 0.0000007 | 0.0000007 | | |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| | 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-1 | 55 | | Truck Dumping of Raw Feed | Unprepared | 5.4 | a2 | Outside | N | - | 0% | 0% | Drop | 300 | 0.00127 | c | 0.3797 |
| V-1 | 56 | | Raw Feed from Ground after Truck Dumping | Unprepared | 5.4 | a2 | Outside | N | - | 0% | 0% | Drop | 300 | 0.00127 | c | 0.3797 |
| V-1 | 59 | Magnet/ Clam | Drop Raw Scrap to Infeed Conveyor | Unprepared | N | a4 | Outside | N | - | NA | 0% | D | 500 | 0.00020 | f | 0.1022 |
| | | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.8616** |
| V-2 | 37 | E-01 | Drop Raw Scrap onto Shredder Feed Chute | Unprepared | Y | a4 | Outside | N | - | NA | 0% | A | 500 | 0.00014 | d | 0.0700 |
| V-2 | 40 | E-05 | Shredder Under Mill Vibratory Conveyor | Shred | Y | 0 | Inside | N | - | NA | 0% | A | 500 | 0.00014 | d | 0.0700 |
| V-2 | 79 | E-02 | Shredder Bottom Discharge | Shred | Y | 0 | shredder emissions | 0 | - | 0% | 0% | A | 500 | Emissions captured and controlled by shredder emission | | |
| V-2 | 81 | E-02 | Shredder Chute | Unprepared | Y | 0 | shredder emissions | 0 | - | 0% | 0% | A | 500 | Emissions captured and controlled by shredder emission | | |
| | | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.1400** |
| V-3 | 4 | C-001 | Shredded Material Transfer Conveyor | Shred | Y | 0 | Outside | N | - | NA | 0% | A | 500 | 0.00014 | d | 0.0700 |
| V-3 | 5 | C-002 | Shredded Material Transfer Conveyor | Shred | Y | 0 | Outside | N | - | NA | 0% | A | 1 | 0.00014 | d | 0.0001 |
| V-3 | 6 | C-002 | Mat'l Not Removed by Poker Picker | Shred | Y | 0 | Outside | N | - | NA | 0% | A | 499 | 0.00014 | d | 0.0699 |
| | | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.1400** |
| V-4 | 58 | - | Poker Loadout | Pokers | N | 0 | Outside | N | - | 0% | 0% | D | 1 | 0.00020 | f | 0.0002 |
| V-4 | 62 | E-06 | Poker Picker Chute to Stockpile | Shred | 1.5% | a1 | Outside | N | - | 0% | 0% | Drop | 1 | 0.00761 | c | 0.0076 |
| | | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.0078** |

R 009838

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-5 | 7 | C-003 | Ferrous Transfer Conveyor | Residue | Y [o] | Outside | N | - | NA | 0% | A | 130 | 0.00014 [d] | | 0.0182 |
| V-5 | 8 | C-003 | Ferrous Transfer Conveyor | Ferrous | Y [o] | Outside | N | - | NA | 0% | A | 369 | 0.00014 [d] | | 0.0517 |
| V-5 | 31 | C-032 | ASR Transfer Conveyor | Residue | Y [o] | Outside | N | - | NA | 0% | A | 4 | 0.00014 [d] | | 0.0006 |
| V-5 | 32 | C-033 | Magnetic Material | Shred | Y [o] | Outside | N | - | NA | 0% | A | 5 | 0.00014 [d] | | 0.0007 |
| V-5 | 33 | C-033 | ASR Not Removed by Magnet E-12 | Residue | Y [o] | Outside | N | - | NA | 0% | A | 129 | 0.00014 [d] | | 0.0181 |
| V-5 | 34 | C-034 | Ferrous Transfer Conveyor | Shred | Y [o] | Outside | N | - | NA | 0% | A | 5 | 0.00014 [d] | | 0.0007 |
| V-5 | 35 | C-035 | Ferrous Transfer Conveyor | Shred | Y [o] | Outside | N | - | NA | 0% | A | 5 | 0.00014 [d] | | 0.0007 |
| V-5 | 36 | C-036 | ASR Transfer Conveyor | Residue | Y [o] | Outside | N | - | NA | 0% | A | 129 | 0.00014 [d] | | 0.0181 |
| V-5 | 41 | E-07 | Magnet Discharge to Chute | Shred | Y [o] | Outside | N | - | NA | 0% | A | 187 | 0.00014 [d] | | 0.0262 |
| V-5 | 42 | E-07 | Magnet Discharge to Chute | Shred | Y [o] | Outside | N | - | NA | 0% | A | 187 | 0.00014 [d] | | 0.0262 |
| V-5 | 49 | E-12 | Ferrous Removed by Magnet | Ferrous | Y [o] | Outside | N | - | NA | 0% | A | 5 | 0.00014 [d] | | 0.0007 |
| V-5 | 53 | E-7 | ASR Not Removed by Magnet | Shred | Y [a3] | Outside | N | - | NA | 0% | A | 2 | 0.00014 [d] | | 0.0003 |
| V-5 | 54 | E-7 | Ferrous Removed by Magnet E-7 | Residue | Y [o] | Outside | N | - | NA | 0% | A | 185 | 0.00014 [d] | | 0.0259 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.1881** |
| V-6 | 61 | C-037 | ASR Transfer Conveyor to Stockpile | Residue | 10 [a3] | Outside | N | - | 0% | 0% | Drop | 129 | 0.00053 [c] | | 0.0689 |

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-7 | 9 | C-006 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | Y | Z-Box Air Loop | 100% | 100% | A | 183 | 0.00014 | [d] | 0.0000 |
| V-7 | 10 | C-007 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | Y | Z-Box Air Loop | 100% | 100% | A | 183 | 0.00014 | [d] | 0.0000 |
| V-7 | 21 | C-022 | Ferrous Transfer Conveyor | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 22 | C-023 | Ferrous Transfer Conveyor | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 23 | C-024 | Non-metallic transfer conveyor | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 4 | 0.00014 | [d] | 0.0006 |
| V-7 | 30 | C-031 | ASR Transfer Conveyor | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 4 | 0.00014 | [d] | 0.0006 |
| V-7 | 38 | E-015 | Z-Box Separator Cyclone | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 | [d] | 0.0003 |
| V-7 | 39 | E-016 | Z-Box Separator Cyclone | Ferrous | Y | [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 | [d] | 0.0003 |
| V-7 | 43 | E-08 | ASR Not Removed by Magnet | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 | [d] | 0.0003 |
| V-7 | 44 | E-08 | Ferrous Removed by Magnet E-7 | Residue | Y | [0] | Outside | N | - | NA | 0% | A | 185 | 0.00014 | [d] | 0.0259 |
| V-7 | 45 | E-10 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 | [d] | 0.0179 |
| V-7 | 46 | E-11 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 128 | 0.00014 | [d] | 0.0179 |
| V-7 | 47 | E-11 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 48 | E-11 | Ferrous Removed by Magnet | Shred | Y | [a2] | Outside | N | - | NA | 0% | A | 55 | 0.00014 | [d] | 0.0077 |
| V-7 | 64 | SC-001 | Supplemental Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 183 | 0.00014 | [d] | 0.0256 |
| V-7 | 66 | SC-002 | Supplemental Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 183 | 0.00014 | [d] | 0.0256 |
| V-7 | 70 | C-004 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 185 | Emissions captured by inward air flow at inlet to Z-Box separator | | |
| V-7 | 72 | C-005 | Ferrous Transfer Conveyor | Shred | Y | [0] | Outside | N | - | NA | 0% | A | 185 | Emissions captured by inward air flow at inlet to Z-Box separator | | |
| | | | | | | | | | | | | **Total Filterable PM Emissions** | | | | **0.1458** |

R 009840

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-8 | 24 | C-025 | Non-metallic not removed by magnet E-13 | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 [d] | | 0.0003 |
| V-8 | 25 | C-025 | material removed by first magnet to second magnet | Ferrous | Y [a2] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 26 | C-026 | Ferrous Transfer Conveyor | Ferrous | Y [a2] | 0 | 0 | - | 0% | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 27 | C-027 | Ferrous Transfer Conveyor | Ferrous | Y [a2] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 28 | C-028 | Non-metallic Transfer Conveyor | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 29 | C-029 | Non-metallic Transfer Conveyor | Ferrous | Y [0] | 0 | 0 | - | 0% | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 50 | E-13 | Ferrous Removed by E-13 | Ferrous | Y [a2] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 51 | E-13 | Ferrous Removed by E-13 | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 1 | 0.00014 [d] | | 0.0001 |
| V-8 | 52 | E-14 | Mat'l Not removed by Separator | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 0.25 | 0.00014 [d] | | 0.0000 |
| V-8 | 60 | C-030 | Mat'l not Removed by Separator | Ferrous | 1.5 [a1] | Outside | Y | Cover | 0% | 0% | Drop | 2.25 | 0.00761 [c] | | 0.0171 |
| V-8 | 63 | E-14 | Final Discharge from Mat'l Separator | Ferrous | 1.5 [a1] | Outside | N | - | 0% | 0% | Drop | 0.75 | 0.00761 [c] | | 0.0057 |
| V-8 | 65 | SC-009 | Supplemental Conveyor | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 [d] | | 0.0003 |
| V-8 | 67 | SC-010 | Supplemental Conveyor | Ferrous | Y [0] | Outside | N | - | NA | 0% | A | 2 | 0.00014 [d] | | 0.0003 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.0244** |
| V-9 | 57 | - | Non-metallic Loadout | Non-metallic | N [0] | Outside | N | - | 0% | 0% | D | 187 | 0.00020 [f] | | **0.0382** |

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | Filterable PM Emissions lb/hr |
| V-10 | 11 | C-008 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 56 | 0.00014 [d] | 0.0078 |
| V-10 | 12 | C-009 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | 0.0179 |
| V-10 | 13 | C-010 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | 0.0179 |
| V-10 | 14 | C-011 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 55 | 0.00014 [d] | 0.0077 |
| V-10 | 15 | C-012 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 56 | 0.00014 [d] | 0.0078 |
| V-10 | 16 | C-013 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | 0.0179 |
| V-10 | 17 | C-014 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | 0.0179 |
| V-10 | 18 | C-015 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 55 | 0.00014 [d] | 0.0077 |
| V-10 | 19 | C-016 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | 0.0514 |
| V-10 | 20 | C-020 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | 0.0514 |
| V-10 | 68 | SC-005 | Supplemental Conveyor | Shred | Y [0] | | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | 0.0179 |
| V-10 | 69 | SC-008 | Supplemental Conveyor | Shred | Y [0] | | Outside | N | - | NA | 0% | A | 128 | 0.00014 [d] | 0.0179 |
| V-10 | 71 | C-014 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | Alternate to C-014 to C-016. Emissions from 100% of material | |
| V-10 | 73 | C-012 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | Alternate to C-012 to C-016. Emissions from 100% of material | |
| V-10 | 74 | C-015 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | Alternate to C-015 to C-016. Emissions from 100% of material | |
| V-10 | 75 | C-019 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | Alternate to C-016 top C-017. Emissions from 100% of material | |
| V-10 | 76 | C-013 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | Alternate to C-013 to C-016. Emissions from 100% of material | |
| V-10 | 77 | C-017 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | Alternate to C-020/C-021 or C-017/C-018. | |
| V-10 | 78 | C-020 | Ferrous Transfer Conveyor | Shred | Y [a2] | | Outside | N | - | NA | 0% | A | 367 | Alternate to C-017 to C-018. Emissions from 100% of material | |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.2412** |

R 009842

# Table A-2 - Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| 1 | 2 | 3 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 18 | 19 | 22 | # | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Volume Source Grouping | Row No. | Equipment Generating Emissions ID # | Equipment Generating Emissions Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Emission Factor Source | Material Throughput Rates tph | PM Emissions lb/ton | | Filterable PM Emissions lb/hr |
| V-11 | 82 | C-018 | Ferrous Transfer Conveyor to stockpile | Shred | 5.4% [a2] | Outside | N | - | NA | 0% | Drop | 367 | Alternate to C-021 to S Ferrous Stockpile or Barge 2 to Barge. | | |
| | | | | | | | | | | | | | | | |
| V-12 | 80 | C-21 | Ferrous Transfer Conveyor to stockpile | Shred | 5.4% [a2] | Outside | N | - | NA | 0% | Drop | 367 | Alternate to C-018 to N Ferrous Stockpile or Barge 2 to Barge. | | |
| | | | | | | | | | | | | | | | |
| V-13 | 1 | Barge 1 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | | 0.0514 |
| V-13 | 2 | Barge 2 | Ferrous Transfer Conveyor | Shred | Y [a2] | Outside | N | - | NA | 0% | A | 367 | 0.00014 [d] | | 0.0514 |
| V-13 | 3 | Barge 3 | Ferrous Transfer Conveyor to barge (stockpile) | Shred | 5.4% [a2] | Outside | N | - | 0% | 0% | Drop | 367 | 0.00127 [c] | | 0.4645 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | | **0.5673** |

a1 Controlled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying used based on conservative assumption that moisture content i

a2 Material moisture was assumed to be the mean of material moisture contents identified in AP42, Table 13.2.4-1.

a3 Northern Metals (Minneapolis, MN) found moisture content of ASR in the range of 20 to 30%; from MPCA Construction Permit Technical Support Document for Northern Metals in Becker MN, Stream COMG-2. Calculations for the ASR stacking conveyor drop point conservatively assumes 10% moisture.

a4 Moisture content of raw materials is assumed to be >1.5% based on application of water from water atomization cannons used for fugitive dust control.

b Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3. Emissions calculated with control Eff. factor included for source being inside of a building.

c Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3.

d Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying. If moisture content is greater than 1.5% by weight, controlled emission factors are used.

e Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for screening. If moisture content is greater than 1.5% by weight, controlled emission factors are used.

f Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for truck loading of curshed stone. Use uncontrolled emisson factor to be conservative.

g Particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying. For sources controlled by a dust collector the emission factor is multiplied by the identified capture Eff. and then by the quantity of 1-control Eff.. Dust collectors vent back into to the building. These emission calculations conservatively assume dust collector emission are vented to the atmosphere.

h Metal HAPs as percent of total PM measured at the discharge of the existing roll media filter in June 2018.

# Table A-3 Ferrous Plant Stockpile - Particulate Emissions
# General III, LLC - Chicago, Illinois

| Volume Source Grouping | Stock Pile | Stock Pile Area Acres | Control Factor[b] | Inactive Emissions[a,d] PM lb/hr | Active Emissions[a,d] PM lb/hr |
|---|---|---|---|---|---|
| V-1 | Raw Material Truck Dumping (Drop 1) | 0.3630 | 1.00 | 0.0529 | 0.1996 |
| V-1 | Raw Material Movement from Truck Dumping Area to Stockpile (Drop 2) | 0.1815 | 1.00 | 0.0265 | 0.0998 |
| | | | Total | 0.0794 | 0.2994 |
| V-4 | Poker North | 0.0115 | 0.33 | 0.0006 | 0.0021 |
| V-4 | Poker South | 0.0115 | 0.33 | 0.0006 | 0.0021 |
| | | | Total | 0.0012 | 0.0042 |
| V-6 | ASR | 0.2541 | 1.00 | 0.0371 | 0.1398 |
| V-9 | Fluff (Bin) | 0.0161 | 0.33 | 0.0008 | 0.0029 |
| V-11 | Ferrous North | 0.3630 | 1.00 | 0.0529 | 0.1996 |
| V-12 | Ferrous South | 0.3630 | 1.00 | 0.0529 | 0.1996 |

a. Stockpile emissions calculation from TCEQ for crushed stone downloaded August 2019.
https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx

b. Control Factor of 0.1 (90% control) for partial enclosure consisting of walls on three sides of bin. Control Factor of 1.0 for no control.

c. Assume number of active days to be 6 days per week and 52 weeks per year and inactive days to be 1 day per week and 52 weeks per year.

d. From TCEQ Guidance

Stockpile emission calculation:

PM Emission Rate (tpy) = [(inactive day PM EF x No. of inactive days) x stockpile area/2000 x control factor] +
[(active day PM EF x No. of active days) x (stockpile area/2000) x control factor]

Inactive Day PM Emission Factor = 3.50 lb-PM/acre-day

Active Day PM Emission Factor = 13.20 lb-PM/acre-day

## Table A-4 - Ferrous Material Processing - PM Emission Summary
## General III, LLC - Chicago, Illinois

| | Filterable PM Emissions | | | | | |
|---|---|---|---|---|---|---|
| | Matl Handling | | Stockpile | | Total | |
| Volume Source | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr |
| V-1 | 0.8616 | | 0.2994 | 0.0794 | 1.1610 | 0.0794 |
| V-2 | 0.1400 | | | | 0.1400 | |
| V-3 | 0.1400 | | | | 0.1400 | |
| V-4 | 0.0078 | | 0.0042 | 0.0012 | 0.0120 | 0.0012 |
| V-5 | 0.1881 | | | | 0.1881 | |
| V-6 | 0.0689 | | 0.1398 | 0.0371 | 0.2087 | 0.0371 |
| V-7 | 0.1458 | | | | 0.1458 | |
| V-8 | 0.0244 | | | | 0.0244 | |
| V-9 | 0.0382 | | 0.0029 | 0.0008 | 0.0411 | 0.0008 |
| V-10 | 0.2412 | | | | 0.2412 | |
| V-11 | 0.0000 | | 0.1996 | 0.0529 | 0.1996 | 0.0529 |
| V-12 | 0.0000 | | 0.1996 | 0.0529 | 0.1996 | 0.0529 |
| V-13 | 0.5673 | | | | 0.5673 | |
| **Totals** | **2.42330** | | **0.84550** | **0.22430** | **3.26880** | **0.22430** |

Revised November 21, 2019 to Update Stockpile Emissions

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-1 | 113 | C-001 | Conveyor | Residue | Y [o] | Outside | Y | N | NA | | 0% | 70 | 0.000140 [d] | 0.0098 |
| VN-1 | 114 | C-002 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 68 | 0.003000 [o] | 0.2037 |
| VN-1 | 115 | C-002 | Conveyor | Ferrous | N [o] | Outside | Y | N | NA | | 0% | 2 | 0.003000 [o] | 0.0063 |
| VN-1 | 116 | C-003 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 67.90 | 0.003000 [o] | 0.2037 |
| VN-1 | 117 | C-004 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 60.90 | 0.003000 [o] | 0.1827 |
| VN-1 | 118 | C-005 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 30.45 | 0.003000 [o] | 0.0914 |
| VN-1 | 119 | C-006 | Conveyor | Residue | N [o] | Outside | | N | NA | | 0% | 30.45 | 0.003000 [o] | 0.0914 |
| VN-1 | 122 | C-009 | Conveyor | Residue | N [o] | Outside | | N | NA | | 0% | 9.14 | 0.003000 [o] | 0.0274 |
| VN-1 | 123 | C-010 | Conveyor | Residue | N [o] | Outside | | N | NA | | 0% | 9.14 | 0.003000 [o] | 0.0274 |
| VN-1 | 124 | C-011 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 8.40 | 0.003000 [o] | 0.0252 |
| VN-1 | 129 | C-016 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 2.7 | 0.003000 [o] | 0.0081 |
| VN-1 | 174 | E-01 | Vibratory Batch Feeder | Residue | Y [o] | Outside | | N | NA | | 0% | 70 | 0.000140 [d] | 0.0098 |
| VN-1 | 175 | E-03 | Screener | Residue | Y [o] | Outside | | N | NA | | 0% | 60.90 | 0.002200 [e] | 0.1340 |
| VN-1 | 176 | E-03 | Screener | Residue | Y [o] | Outside | | N | NA | | 0% | 6.80 | 0.002200 [e] | 0.0150 |
| VN-1 | 177 | E-03 | Screener | Residue | Y [o] | Outside | | N | NA | | 0% | 2.70 | 0.002200 [e] | 0.0059 |
| VN-1 | 178 | E-04 | Screener | Residue | Y [o] | Outside | | N | NA | | 0% | 15.75 | 0.002200 [e] | 0.0347 |
| VN-1 | 179 | E-04 | Screener | Residue | Y [o] | Outside | | N | NA | | 0% | 9.14 | 0.002200 [e] | 0.0201 |
| VN-1 | 180 | E-04 | Screener | Residue | Y [o] | Outside | | N | NA | | 0% | 4.20 | 0.002200 [e] | 0.0092 |
| VN-1 | 190 | E-11 | Screener | Residue | N [o] | Outside | | N | NA | | 0% | 15.75 | 0.025000 [d] | 0.3938 |
| VN-1 | 191 | E-11 | Screener | Residue | N [o] | Outside | | N | NA | | 0% | 9.14 | 0.025000 [d] | 0.2285 |
| VN-1 | 192 | E-11 | Screener | Residue | N [o] | Outside | | N | NA | | 0% | 4.20 | 0.025000 [d] | 0.1050 |
| VN-1 | 244 | End Loader | Drop ASR into feed hopper | Residue into Hopper | N [o] | Outside | | Y | Cover | | 0% | 70.00 | 0.000204 [d] | 0.0143 |
| VN-1 | 246 | SC-001 | Supplemental Conveyor | Residue | 0 [o] | 0 | | 0 | 0 | | 0% | 15.75 | 0.003000 | 0.0473 |
| VN-1 | 247 | SC-002 | Supplemental Conveyor | Residue | 0 [o] | 0 | | 0 | 0 | | 0% | 16 | 0.003000 | 0.0473 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **1.9420** |

GIII Air Dispersion Modeling to Assess for Metal Emission Impacts

R 009846

Revised November 21, 2019 to Update Stockpile Emissions

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-2 | 120 | C-007 | Conveyor | Residue | N [o] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 15.75 | 0.003000 [o] | 0.0095 |
| VN-2 | 121 | C-008 | Conveyor | Residue | N [o] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 15.75 | 0.003000 [o] | 0.0095 |
| VN-2 | 125 | C-012 | Conveyor | Residue | N [o] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 9.14 | 0.003000 [o] | 0.0055 |
| VN-2 | 126 | C-013 | Conveyor | Residue | N [o] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 9.14 | 0.003000 [o] | 0.0055 |
| VN-2 | 127 | C-014 | Conveyor | Residue | N [o] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 8.40 | 0.003000 [o] | 0.0050 |
| VN-2 | 128 | C-015 | Conveyor | Ferrous | N [o] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | .25 | 0.003000 [o] | 0.0002 |
| VN-2 | 130 | C-017 | Conveyor | Ferrous | N [o] | Outside | | N | NA | | 0% | 1.75 | 0.003000 [o] | 0.0053 |
| VN-2 | 131 | C-018 | Conveyor | Ferrous | N [o] | Outside | Y | N | NA | | 0% | 1.75 | 0.003000 [o] | 0.0053 |
| VN-2 | 132 | C-019 | Conveyor | Lights | N [o] | Outside | Y | N | NA | | 0% | 0.25 | 0.003000 [o] | 0.0008 |
| VN-2 | 133 | C-020 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 11.12 | 0.003000 [o] | 0.0334 |
| VN-2 | 134 | C-021 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 11.12 | 0.003000 [o] | 0.0334 |
| VN-2 | 135 | C-022 | Conveyor to Wind Sifter | Mixed Non-Ferrous | N [o] | Outside | Y | Y | Wind Sifter | 100% | 100% | 0.80 | 0.003000 [o] | 0.0024 |
| VN-2 | 136 | C-023 | Conveyor to Wind Sifter | Residue | N [o] | Outside | Y | Y | Wind Sifter | 100% | 100% | 7.29 | 0.000140 [o] | 0.0010 |
| VN-2 | 137 | C-024 | Conveyor to Wind Sifter | Residue | N [o] | Outside | Y | Y | Wind Sifter | 100% | 100% | 7.29 | 0.000140 [o] | 0.0010 |
| VN-2 | 139 | C-035 | Conveyor | Residue | N [o] | Inside | Y | N | ECS Enclosure | 100% | Bldg Eff. | 2.7 | 0.003000 [o] | 0.0016 |
| VN-2 | 147 | C-044 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 24.87 | 0.003000 [o] | 0.0746 |
| VN-2 | 181 | E-05 | Magnetic Separation | Residue | N [o] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 14.87 | 0.003000 | 0.0089 |
| VN-2 | 182 | E-05 | Magnetic Separation | Residue | N [o] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 9.87 | 0.003000 | 0.0059 |
| VN-2 | 183 | E-05 | Magnetic Separation | Ferrous | N [o] | Inside | | N | NA | | 0% | 0.88 | 0.003000 | 0.0026 |
| VN-2 | 184 | E-05 | Magnetic Separation | Ferrous | N [o] | Inside | | N | NA | | 0% | 5.00 | 0.003000 | 0.0150 |
| VN-2 | 185 | E-06 | Eddy Current Separator | Residue | N [o] | Outside | | N | NA | | 0% | 6.12 | 0.003000 [d] | 0.0184 |
| VN-2 | 186 | E-06 | Eddy Current Separator | Mids | N [o] | Outside | | N | NA | | 0% | 3.50 | 0.003000 [d] | 0.0105 |
| VN-2 | 187 | E-06 | Eddy Current Separator | Zorba | N [o] | Outside | | N | NA | | 0% | 0.25 | 0.003000 [d] | 0.0008 |
| VN-2 | 188 | E-07 | Wind Sifter | Lights | N [o] | Outside | | Y | Cover | | 0% | 0.25 | 0.002200 [d] | 0.0006 |
| VN-2 | 189 | E-07 | Wind Sifter | Heavies | 1.5 [a] | Outside | | Y | Wind Sifter | 90% | 100% | 1.50 | 0.007606 [c] | 0.0103 |

GIII Air Dispersion Modeling to Assess for Metal Emission Impacts

R 009847

Revised November 21, 2019 to Update Stockpile Emissions

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-2 | 193 | E-12 | Magnetic Separation | Residue | N [b] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 14.87 | 0.003000 | 0.0089 |
| VN-2 | 194 | E-12 | Magnetic Separation | Residue | N [b] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 9.87 | 0.003000 | 0.0059 |
| VN-2 | 195 | E-12 | Magnetic Separation | Ferrous | N [b] | Inside | | N | NA | | 0% | 0.88 | 0.003000 | 0.0026 |
| VN-2 | 196 | E-12 | Magnetic Separation | Ferrous | N [b] | Inside | | N | NA | | 0% | 5.00 | 0.003000 | 0.0150 |
| VN-2 | 197 | E-12 | Magnetic Separation | Zorba | N [b] | Outside | | N | NA | | 0% | 0.25 | 0.003000 [d] | 0.0008 |
| VN-2 | 198 | E-13 | Eddy Current Separator | Residue | N [b] | Outside | | N | NA | | 0% | 6.12 | 0.003000 [d] | 0.0184 |
| VN-2 | 199 | E-13 | Eddy Current Separator | Mids | N [b] | Outside | | N | NA | | 0% | 3.50 | 0.003000 [d] | 0.0105 |
| VN-2 | 200 | E-14 | Wind Sifter | Lights | N [b] | Outside | | Y | Cover | | 0% | 0.20 | 0.002200 [d] | 0.0004 |
| VN-2 | 201 | E-14 | Wind Sifter | Heavies | 1.5 [a] | Outside | | Y | Wind Sifter | 100% | 100% | 0.60 | 0.007606 [c] | 0.0046 |
| VN-2 | 202 | E-15 | Magnetic Separation | Residue | N [b] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 9.09 | 0.003000 | 0.0055 |
| VN-2 | 203 | E-15 | Magnetic Separation | Residue | N [b] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.29 | 0.003000 | 0.0050 |
| VN-2 | 204 | E-15 | Magnetic Separation | Ferrous | N [b] | Outside | | N | NA | | 0% | 0.05 | 0.003000 [d] | 0.0002 |
| VN-2 | 205 | E-15 | Magnetic Separation | Mixed Non-Ferrous | N [b] | Outside | | N | NA | | 0% | 0.40 | 0.003000 [d] | 0.0012 |
| VN-2 | 206 | E-16 | Eddy Current Separator | Residue | N [b] | Outside | | N | NA | | 0% | 7.29 | 0.003000 [d] | 0.0219 |
| VN-2 | 207 | E-16 | Eddy Current Separator | Zorba | N [b] | Outside | | N | NA | | 0% | 1.00 | 0.003000 [d] | 0.0030 |
| VN-2 | 208 | E-17 | Wind Sifter | Lights | N [b] | Outside | | Y | Cover | | 0% | 1.09 | 0.002200 [d] | 0.0024 |
| VN-2 | 209 | E-17 | Wind Sifter | Residue | N [b] | Outside | | Y | Wind Sifter | 100% | 100% | 6.20 | 0.002200 [d] | 0.0136 |
| VN-2 | 210 | E-21 | Magnetic Separation | Residue | N [b] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.29 | 0.003000 | 0.0050 |
| VN-2 | 211 | E-21 | Magnetic Separation | Ferrous | N [b] | Outside | | N | NA | | 0% | 0.05 | 0.003000 [d] | 0.0002 |
| VN-2 | 212 | E-21 | Magnetic Separation | Mixed Non-Ferrous | N [b] | Outside | | N | NA | | 0% | 0 | 0.003000 [d] | 0.0012 |
| VN-2 | 213 | E-22 | Eddy Current Separator | Zorba | N [b] | Outside | | N | NA | | 0% | 1.00 | 0.003000 [d] | 0.0030 |
| VN-2 | 214 | E-22 | Eddy Current Separator | Residue | N [b] | Outside | | N | NA | | 0% | 7.29 | 0.003000 [d] | 0.0219 |
| VN-2 | 215 | E-23 | Wind Sifter | Lights | N [b] | Outside | | Y | Cover | | 0% | 1 | 0.002200 [d] | 0.0024 |
| VN-2 | 216 | E-23 | Wind Sifter | Residue | N [b] | Outside | | Y | Wind Sifter | 100% | 100% | 6.20 | 0.002200 [d] | 0.0136 |
| VN-2 | 217 | E-27 | Magnetic Separation | Residue | N [b] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.15 | 0.003000 | 0.0049 |

GIII Air Dispersion Modeling to Assess for Metal Emission Impacts

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-2 | 219 | E-28 | Eddy Current Separator | Residue | N [o] | Outside | | N | NA | | 0% | 7.15 | 0.003000 [d] | 0.0215 |
| VN-2 | 221 | E-34 | Magnetic Separation | Residue | N [o] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 6.55 | 0.003000 | 0.0039 |
| VN-2 | 222 | E-34 | Magnetic Separation | Residue | N [o] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 6.55 | 0.003000 | 0.0039 |
| VN-2 | 224 | E-35 | Eddy Current Separator | Residue | N [o] | Outside | | N | NA | | 0% | 5.05 | 0.003000 [d] | 0.0152 |
| VN-2 | 231 | E-43 | Vibratory Feeder | Residue | N [o] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 2.70 | 0.003000 | 0.0016 |
| VN-2 | 232 | E-44 | Eddy Current Separator drop to stockpile | Zorba | 1.5 [a] | Inside | | N | NA | | 0% | 0.50 | 0.007600 | 0.0038 |
| VN-2 | 240 | E-49 | Transfer Conveyor | Residue onto ECS | N [o] | Inside | | N | ECS Enclosure | 100% | Bldg Eff. | 8.15 | 0.003000 | 0.0049 |
| VN-2 | 242 | ECS | Eddy Current Separator drop to container | Zorba | 1.5 [a] | Inside | | N | NA | | 0% | 0.04 | 0.007600 | 0.0003 |
| VN-2 | 243 | ECS | Eddy Current Separator drop to container | Zorba | 1.5 [a] | Inside | | N | NA | | 0% | 0.18 | 0.007600 | 0.0014 |
| VN-2 | 248 | SC-003 | Supplemental Conveyor | Residue | 0 [o] | 0 | | 0 | 0 | | 0% | 7.34 | 0.003000 | 0.0220 |
| VN-2 | 249 | SC-004 | Supplemental Conveyor | Residue | 0 [o] | 0 | | 0 | 0 | | 0% | 7.34 | 0.003000 | 0.0220 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **0.5395** |

R 009849

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-3 | 138 | C-034 | Conveyor | Material Separator | N [o] | Outside | Y | N | NA | | 0% | 0.55 | 0.003000 [o] | 0.0017 |
| VN-3 | 140 | C-039 | Conveyor | Mixed Non-Ferrous | N [o] | Outside | | N | NA | | 0% | 0.80 | 0.003000 [o] | 0.0024 |
| VN-3 | 141 | C-040 | Conveyor | Residue | N [o] | Outside | | N | NA | | 0% | 2.80 | 0.003000 [o] | 0.0084 |
| VN-3 | 142 | C-040 | Conveyor | Mids | N [o] | Outside | | N | NA | | 0% | 7 | 0.003000 [o] | 0.0210 |
| VN-3 | 143 | C-040 | Conveyor | Residue | N [o] | Outside | | N | NA | | 0% | 4.20 | 0.003000 [o] | 0.0126 |
| VN-3 | 144 | C-041 | Conveyor | Zorba | N [o] | Outside | | N | NA | | 0% | 0.50 | 0.003000 [o] | 0.0015 |
| VN-3 | 145 | C-042 | Conveyor | Zorba | N [o] | Outside | | N | NA | | 0% | 1.50 | 0.003000 [o] | 0.0045 |
| VN-3 | 146 | C-043 | Conveyor | Zorba | N [o] | Outside | | N | NA | | 0% | 3 | 0.003000 [o] | 0.0090 |
| VN-3 | 148 | C-044 | Conveyor | Lights Zuric | N [o] | Outside | Y | N | NA | | 0% | 0.30 | 0.003000 [o] | 0.0009 |
| VN-3 | 149 | C-045 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 24.87 | 0.003000 [o] | 0.0746 |
| VN-3 | 150 | C-047 | Conveyor | To SSI | N [o] | Outside | | N | NA | | 0% | 0.55 | 0.003000 [o] | 0.0017 |
| VN-3 | 151 | C-048 | Conveyor | Out of SSI | N [o] | Outside | | N | NA | | 0% | 0.55 | 0.003000 [o] | 0.0017 |
| VN-3 | 152 | C-050 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 25.07 | 0.003000 [o] | 0.0752 |
| VN-3 | 153 | C-052 | Conveyor | Residue | N [o] | Outside | | N | NA | | 0% | 2 | 0.003000 [o] | 0.0068 |
| VN-3 | 154 | C-055 | Conveyor | Wire | N [o] | Outside | Y | N | NA | | 0% | 1.00 | 0.003000 [o] | 0.0030 |
| VN-3 | 155 | C-058 | Conveyor | Zuric drops | N [o] | Outside | Y | N | NA | | 0% | 0.30 | 0.003000 [o] | 0.0009 |
| VN-3 | 156 | C-060 | Conveyor | Zone | N [o] | Outside | Y | N | NA | | 0% | 1.20 | 0.003000 [o] | 0.0036 |
| VN-3 | 162 | C-064 | Conveyor drop to container | Zorba | 1.5 [a] | Outside | | N | NA | | 0% | 0.70 | 0.007606 [c] | 0.0053 |
| VN-3 | 163 | C-065 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 2.2 | 0.003000 [d] | 0.0066 |
| VN-3 | 164 | C-066 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 54.39 | 0.003000 [d] | 0.1632 |
| VN-3 | 165 | C-067 | Conveyor | Residue | N [o] | Outside | Y | N | NA | | 0% | 54.39 | 0.003000 [d] | 0.1632 |
| VN-3 | 168 | C-071 | Conveyor | Lights | N [o] | Outside | Y | Y | Cover | | 0% | 0.03 | 0.000140 [d] | 0.0000 |
| VN-3 | 169 | C-072 | Conveyor | Lights | N [o] | Outside | Y | Y | Cover | | 0% | 0 | 0.000140 [d] | 0.0000 |
| VN-3 | 170 | DC-01 Cyc | DC-01 fines discharge to covered coneyor | Lights | N [o] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |
| VN-3 | 171 | DC-02 Cyc | DC-02 fines discharge to covered coneyor | Lights | N [o] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-3 | 172 | DC-03 Cyc | DC-03 fines discharge to covered coneyor | Lights | N [o] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |
| VN-3 | 173 | DC-04 Cyc | DC-04 fines discharge to covered coneyor | Lights | N [o] | Outside | | Y | Cover | | 0% | 0.01 | 0.000140 [d] | 0.0000 |
| VN-3 | 218 | E-27 | Magnetic Separation | Ferrous | N [o] | Outside | | N | NA | | 0% | 0.25 | 0.003000 [d] | 0.0008 |
| VN-3 | 220 | E-28 | Eddy Current Separator | Zorba | N [o] | Outside | | N | NA | | 0% | 1.00 | 0.003000 [d] | 0.0030 |
| VN-3 | 223 | E-35 | Eddy Current Separator | Zorba | N [o] | Outside | | N | NA | | 0% | 1.50 | 0.003000 [d] | 0.0045 |
| VN-3 | 225 | E-40 | Separator | Lights Zuric | N [o] | Outside | | N | NA | | 0% | 0.24 | 0.025000 [d] | 0.0060 |
| VN-3 | 226 | E-40 | Separator | Heavies Zuric | N [o] | Outside | | N | NA | | 0% | 0.96 | 0.025000 [d] | 0.0240 |
| VN-3 | 227 | E-40 | Separator | Lights Zuric | N [o] | Outside | | N | NA | | 0% | 0.35 | 0.025000 [d] | 0.0088 |
| VN-3 | 228 | E-41 | Separator | Lights | N [o] | Outside | | N | NA | | 0% | 0.95 | 0.025000 [d] | 0.0238 |
| VN-3 | 229 | E-41 | Separator drop to container | Heavies | 1.5 [a] | Outside | | N | NA | | 0% | 0.05 | 0.007606 [c] | 0.0004 |
| VN-3 | 230 | E-42 | Low speed shredder for size reduction | Out of SSI | N [o] | Outside | | N | NA | | 0% | 0.55 | 0.003000 [d] | 0.0017 |
| VN-3 | 234 | E-46 | Separator | Heavier Zorba | N [o] | Outside | | N | NA | | 0% | 1.25 | 0.02500 [d] | 0.0313 |
| VN-3 | 235 | E-46 | Separator | Lights Zorba | N [o] | Outside | | N | NA | | 0% | 0.25 | 0.02500 [d] | 0.0063 |
| VN-3 | 236 | E-47 | Separator | Zorba | N [o] | Outside | | N | NA | | 0% | 2.70 | 0.02500 [d] | 0.0675 |
| VN-3 | 237 | E-47 | Separator | Heavies Zorba | N [o] | Outside | | N | NA | | 0% | 0.85 | 0.02500 [d] | 0.0213 |
| VN-3 | 238 | E-47 | Separator | Lights Zorba | N [o] | Outside | | N | NA | | 0% | 0.15 | 0.02500 [d] | 0.0038 |
| VN-3 | 239 | E-47 | Separator | Light Zorba | N [o] | Outside | | N | NA | | 0% | 0.30 | 0.02500 [d] | 0.0075 |
| VN-3 | 241 | E-50 | Air Vibe | To Infeed SSI | N [o] | Outside | | Y | Cover | | 0% | 0.55 | 0.00014 [d] | 0.0001 |
| VN-3 | 250 | SC-005 | Supplemental Conveyor | Residue | 0.0% [o] | 0 | | 0 | 0 | | 0% | 54.39 | 0.00300 | 0.1632 |
| VN-3 | 251 | SC-006 | Supplemental Conveyor | Residue | 0.0% [o] | 0 | | 0 | 0 | | 0% | 54.39 | 0.00300 | 0.1632 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **1.1050** |

# Table B-1 - Non-Ferrous Material Processing - Particulate Emissions
## General III, LLC - Chicago, Illinois

| Grouping | Row No. | Equipment Generating Emissions ID# | Description | Material Conveyed | Moisture > 1.5% Y/N | Transfer Point Location (Inside / Outside) | Conveyor Covered Y/N | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Pickup Capture Eff. (%) | Dust Control Eff. (%) | Material Throughput Rates tph | PM Emissions Factor lb/ton | Filterable PM Emissions lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VN-4 | 159 | C-062 | Conveyor | Heavier Zorba | N [o] | Outside | | N | NA | | 0% | 1.25 | 0.003000 [d] | 0.0038 |
| VN-4 | 160 | C-063 | Conveyor drop to stockpile | Zorba | 1.5 [a] | Outside | | N | NA | | 0% | 2.70 | 0.007606 [c] | 0.0205 |
| VN-4 | 161 | C-063 | Conveyor drop to stockpile | Heavies Zorba | 1.5% [a] | Outside | | N | NA | | 0% | 0.85 | 0.00761 [c] | 0.0065 |
| VN-4 | 233 | E-44 | Eddy Current Separator | Residue | N [o] | Outside | | N | NA | | 0% | 2.2 | 0.00300 [d] | 0.0066 |
| | | | | | | | | | | | | | **Total Filterable PM Emissions** | **0.0374** |
| VN-5 | 157 | C-061 | Conveyor drop to stockpile | Heavies Zuric | 1.5% [a] | Outside | | N | NA | | 0% | 0.96 | 0.00761 [c] | 0.0073 |
| VN-5 | 158 | C-061 | Conveyor drop to stockpile | Heavies Zuric | 1.5% [a] | Outside | | N | NA | | 0% | 0.30 | 0.00761 [c] | 0.0023 |
| VN-5 | 167 | C-070 | Conveyor drop to stockpile | Waste to Stockpile | 1.5% [a] | Outside | | N | NA | | 0% | 0.55 | 0.00761 [c] | 0.0042 |
| | | | | | | | | | | | | | **Total** | **0.0138** |
| VN-6 | 166 | C-068 | Conveyor drop to stockpile | Residue | 1.5 [a] | Outside | Y | N | NA | | 0% | 54.39 | 0.007606 [c] | 0.4137 |
| VN-6 | 245 | End Loader | load waste to truck | Waste | N [o] | Outside | | N | NA | | 0% | 54.39 | 0.00020 [o] | 0.0111 |
| | | | | | | | | | | | | | **Total** | **0.4248** |

a Material moisture content (%) for light materials - AP-42, Table 13.2.4-1 for crushed limestone -

b Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3.
Emissions calculated with control Eff. factor included for source being inside of a building.

c Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3.

d Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying. If moisture is greater than 1.5% by weight, use controlled emission factors.

e Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for screening. If moisture is greater than 1.5% by weight, use controlled emission factors.

f Sources located inside the Fines Building emit to the atmosphere through Dust Collection DC-01. Emissions are estimated by 12,000

g Metal HAPs as percent of total PM measured at the discharge of the existing roll media filter in June 2018.

# Table B-2 - Non-Ferrous Plant Stockpile - Particulate Emissions
# General III, LLC - Chicago, Illinois

| Volume Source Grouping | Stock Pile | Stock Pile Area Acres | Control Factor[b] | Inactive Emissions[a,d] PM lb/hr | Active Emissions[a,d] PM lb/hr |
|---|---|---|---|---|---|
| VN-1 | FE from E-02 | 0.0047 | 0.33 | 0.0002 | 0.0009 |
| VN-4 | 5" + Zorba | 0.0189 | 0.33 | 0.0009 | 0.0034 |
| VN-4 | 2-1/2" - 5" Zorba | 0.0189 | 0.33 | 0.0009 | 0.0034 |
| VN-4 | 5/8" - 2-1/2" Zorba | 0.0189 | 0.33 | 0.0009 | 0.0034 |
| | | | Total | 0.0027 | 0.0102 |
| VN-5 | Tailings | 0.0195 | 0.33 | 0.0009 | 0.0035 |
| VN-5 | Open | 0.0195 | 0.33 | 0.0009 | 0.0035 |
| VN-5 | Wire | 0.0195 | 0.33 | 0.0009 | 0.0035 |
| VN-5 | Wire Rich Solids | 0.0195 | 0.33 | 0.0009 | 0.0035 |
| VN-5 | Zurick | 0.0195 | 0.33 | 0.0009 | 0.0035 |
| | | | Total | 0.0045 | 0.0175 |
| VN-6 | Waste | 0.0868 | 0.33 | 0.0042 | 0.0158 |

a. Stockpile emissions calculation from TCEQ for crushed stone downloaded August 2019.
https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx

b. Control Factor of 0.1 (90% control) for partial enclosure consisting of walls on three sides of bin. Control Factor of 1.0 for no control.

c. Assume number of active days to be 6 days per week and 52 weeks per year and inactive days to be 1 day per week and 52 weeks per year.

d. From TCEQ Guidance

Stockpile emission calculation:

PM Emission Rate (tpy) = [(inactive day PM EF x No. of inactive days) x stockpile area/2000 x control factor] +
[(active day PM EF x No. of active days) x (stockpile area/2000) x control factor]

Inactive Day PM Emission Factor = 3.50 lb-PM/acre-day

Active Day PM Emission Factor = 13.20 lb-PM/acre-day

## Table B-3 - Non-Ferrous Material Processing - PM Emission Summary
## General III, LLC - Chicago, Illinois

| Srouces | PM Emission | | | | | |
|---|---|---|---|---|---|---|
| | Matl Handling | | Stockpile | | Tot | |
| | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr | Active lb/hr | Inactive lb/hr |
| VN-1 | 1.9420 | 1.9420 | 0.0009 | 0.0002 | 1.9429 | 1.9422 |
| VN-2 | 0.5395 | 0.5395 | | | 0.5395 | 0.5395 |
| VN-3 | 1.1050 | 1.1050 | | | 1.1050 | 1.1050 |
| VN-4 | 0.0374 | 0.0374 | 0.0102 | 0.0027 | 0.0476 | 0.0401 |
| VN-5 | 0.0138 | 0.0138 | 0.0175 | 0.0045 | 0.0313 | 0.0183 |
| VN-6 | 0.4248 | 0.4248 | 0.0158 | 0.0042 | 0.4406 | 0.4290 |

## Table B-4a - Non-Ferrous Material Processing - Metal Emissions in Active Hours
## (7 AM - 7 PM, Mon-Sat)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | VN-1 | VN-2 | VN-3 | VN-4 | VN-5 | VN-6 | DC-1 |
|---|---|---|---|---|---|---|---|---|
| PM | | 1.9429000 | 0.5395280 | 1.1050000 | 0.0476000 | 0.0313000 | 0.4406000 | 0.5143000 |
| Lead [b] | 0.0665% | 0.001292281 | 0.000358856 | 0.000734968 | 0.000031660 | 0.000020819 | 0.000293056 | 0.000342076 |
| Manganese | 0.0535% | 0.001040403 | 0.000288912 | 0.000591716 | 0.000025489 | 0.000016761 | 0.000235937 | 0.000275402 |
| Mercury | 1.2866% | 0.024997148 | 0.006941511 | 0.014216815 | 0.000612417 | 0.000402703 | 0.005668714 | 0.006616930 |
| Nickel | 0.0207% | 0.000402466 | 0.000111762 | 0.000228898 | 0.000009860 | 0.000006484 | 0.000091269 | 0.000106536 |
| Antimony | 0.0040% | 0.000077332 | 0.000021475 | 0.000043982 | 0.000001895 | 0.000001246 | 0.000017537 | 0.000020470 |
| Arsenic | 0.0015% | 0.000029906 | 0.000008305 | 0.000017009 | 0.000000733 | 0.000000482 | 0.000006782 | 0.000007916 |
| Beryllium | 0.0003% | 0.000006006 | 0.000001668 | 0.000003416 | 0.000000147 | 0.000000097 | 0.000001362 | 0.000001590 |
| Cadmium | 0.0147% | 0.000285122 | 0.000079176 | 0.000162160 | 0.000006985 | 0.000004593 | 0.000064658 | 0.000075474 |
| Chromium [c] | 0.0163% | 0.000315977 | 0.000087744 | 0.000179708 | 0.000007741 | 0.000005090 | 0.000071655 | 0.000083641 |
| Cobalt | 0.0014% | 0.000026720 | 0.000007420 | 0.000015196 | 0.000000655 | 0.000000430 | 0.000006059 | 0.000007073 |
| Phosphorus | 0.2000% | 0.003885228 | 0.001078897 | 0.002209675 | 0.000095186 | 0.000062591 | 0.000881070 | 0.001028449 |
| Selenium | 0.0074% | 0.000143577 | 0.000039870 | 0.000081658 | 0.000003518 | 0.000002313 | 0.000032560 | 0.000038006 |
| Zinc | 3.7272% | 0.072414963 | 0.020109064 | 0.041185102 | 0.001774127 | 0.001166601 | 0.016421861 | 0.019168776 |
| Barium | 0.0360% | 0.000699786 | 0.000194325 | 0.000397995 | 0.000017144 | 0.000011274 | 0.000158694 | 0.000185239 |
| Copper | 0.0266% | 0.000515872 | 0.000143254 | 0.000293396 | 0.000012639 | 0.000008311 | 0.000116987 | 0.000136555 |
| Silver | 0.0064% | 0.000124774 | 0.000034649 | 0.000070963 | 0.000003057 | 0.000002010 | 0.000028295 | 0.000033028 |
| Thallium | 0.0012% | 0.000024013 | 0.000006668 | 0.000013657 | 0.000000588 | 0.000000387 | 0.000005446 | 0.000006356 |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

## Table B-4b - Non-Ferrous Material Processing - Metal Emissions in Inactive Hours
## (7 PM - 7 AM, Mon-Sat, All Day, Sun)
## General III, LLC - Chicago, Illinois

| Volume Source | Metal as % of Total PM[a] | VN-1 | VN-2 | VN-3 | VN-4 | VN-5 | VN-6 | DC-1 |
|---|---|---|---|---|---|---|---|---|
| PM | | 1.9422000 | 0.5395280 | 1.1050000 | 0.0401000 | 0.0183000 | 0.4290000 | 0.5143000 |
| Lead [b] | 0.0665% | 0.001291815 | 0.000358856 | 0.000734968 | 0.000026672 | 0.000012172 | 0.000285341 | 0.000342076 |
| Manganese | 0.0535% | 0.001040028 | 0.000288912 | 0.000591716 | 0.000021473 | 0.000009799 | 0.000229725 | 0.000275402 |
| Mercury | 1.2866% | 0.024988142 | 0.006941511 | 0.014216815 | 0.000515922 | 0.000235446 | 0.005519469 | 0.006616930 |
| Nickel | 0.0207% | 0.000402321 | 0.000111762 | 0.000228898 | 0.000008307 | 0.000003791 | 0.000088866 | 0.000106536 |
| Antimony | 0.0040% | 0.000077305 | 0.000021475 | 0.000043982 | 0.000001596 | 0.000000728 | 0.000017075 | 0.000020470 |
| Arsenic | 0.0015% | 0.000029896 | 0.000008305 | 0.000017009 | 0.000000617 | 0.000000282 | 0.000006603 | 0.000007916 |
| Beryllium | 0.0003% | 0.000006004 | 0.000001668 | 0.000003416 | 0.000000124 | 0.000000057 | 0.000001326 | 0.000001590 |
| Cadmium | 0.0147% | 0.000285020 | 0.000079176 | 0.000162160 | 0.000005885 | 0.000002686 | 0.000062956 | 0.000075474 |
| Chromium [c] | 0.0163% | 0.000315863 | 0.000087744 | 0.000179708 | 0.000006522 | 0.000002976 | 0.000069769 | 0.000083641 |
| Cobalt | 0.0014% | 0.000026710 | 0.000007420 | 0.000015196 | 0.000000551 | 0.000000252 | 0.000005900 | 0.000007073 |
| Phosphorus | 0.2000% | 0.003883829 | 0.001078897 | 0.002209675 | 0.000080188 | 0.000036595 | 0.000857874 | 0.001028449 |
| Selenium | 0.0074% | 0.000143525 | 0.000039870 | 0.000081658 | 0.000002963 | 0.000001352 | 0.000031702 | 0.000038006 |
| Zinc | 3.7272% | 0.072388873 | 0.020109064 | 0.041185102 | 0.001494591 | 0.000682070 | 0.015989510 | 0.019168776 |
| Barium | 0.0360% | 0.000699534 | 0.000194325 | 0.000397995 | 0.000014443 | 0.000006591 | 0.000154516 | 0.000185239 |
| Copper | 0.0266% | 0.000515686 | 0.000143254 | 0.000293396 | 0.000010647 | 0.000004859 | 0.000113907 | 0.000136555 |
| Silver | 0.0064% | 0.000124729 | 0.000034649 | 0.000070963 | 0.000002575 | 0.000001175 | 0.000027550 | 0.000033028 |
| Thallium | 0.0012% | 0.000024004 | 0.000006668 | 0.000013657 | 0.000000496 | 0.000000226 | 0.000005302 | 0.000006356 |

a. Percentage of metal as % of total PM caculated based on measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.

b. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.

c. Chromium (metal) and compounds other than Chromium VI

## Layman, Robb

**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Monday, November 25, 2019 9:36 AM
**To:** Sprague, Jeff
**Cc:** Barria, German; Bernoteit, Bob; Layman, Robb
**Subject:** [External] RE: Modeling Protocol - General III, LLC
**Attachments:** 2019-11-21 GIII Modeling Protocol Revised Tables - Appendicies A & B.pdf

Jeff,

Thank you for the prompt review of the modeling protcol. You will find our response (in blue text below) immediately following each of your

Please forward any comments or questions you have to my attention.

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com



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**From:** Sprague, Jeff <Jeff.Sprague@Illinois.gov>
**Sent:** Wednesday, November 20, 2019 3:35 PM
**To:** John Pinion <jpinion@rka-inc.com>
**Cc:** Barria, German <German.Barria@Illinois.gov>; Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>; Layman, Robb <Robb.Layman@Illinois.gov>; Sprague, Jeff <Jeff.Sprague@Illinois.gov>
**Subject:** RE: Modeling Protocol - General III, LLC

John,
I've reviewed the electronic version of the modeling protocol, as well as the non-redacted hardcopy version, and have the following remarks for your consideration:

1.) The June-September, 2017 surface meteorological observations for the Midway Airport Station show considerable wind direction/wind speed data missing. If you choose to use the Midway site, I am recommending that you use the data for years 2012-2016. Furthermore, I am recommending that you use the coincident upper air sounding data for Davenport, Iowa in preparing the AERMOD-ready meteorological inputs. To facilitate your efforts, I have attached the surface characteristics files for Midway for your AERMET Stage 3 processing.

RKA will order the 2012 through 2016 met data from Midway Airport and will process the met data using the coincident upper air sounding data for Davenport, Iowa, and the surface roughness files you provided.

2.) The write-up was essentially silent on the issue of ambient air boundaries. It's important that documentation be provided (that is acceptable to IEPA) which demonstrates that the general public is effectively precluded from accessing General III LLC property where receptors have been excluded from the modeling.

There is security fencing on the north boundary and the northern part of the east boundary that leads to a guard shack with gates (occupied or closed when unoccupied). The southern boundary is a combination of fencing and berm, while the west boundary is the river. No Trespassing signs are posted around the boundary and no part of the boundary is adjacent to any public right away, which will limit casual access to the site by the general public.

3.) Building downwash parameters developed for structures other than those owned by General III LLC (i.e. for Reserve Marine Terminals, Regency Technologies, Napuck Salvage of Waupaca, and/or South Shore Recycling) should be based upon dimensional data obtained directly from the other facilities. This is especially true for building height measurements. Relying exclusively upon Google Earth for developing building dimension data can have significant shortcomings.

Drawings of the building with exact dimensions are not available. The coordinates of the building corners were determined using Google Earth. A site representative measured the height of the highest roof top on the two existing buildings south of the proposed GIII location. For the purposes of modeling, the highest roof top height measured for the north and south buildings will be assigned as the roof height for the entire building, which will provide conservative results from the downwash analysis.

4.) If maximum modeled impacts occur within that portion of the receptor grid where initial receptor spacing is greater than 100 meters, then a "sub-grid" of receptors with 100 meter spacing should be incorporated to delineate the "true" peak impact location.

Initial results show that the maximum off site impact occurs in the 100-meter portion of the receptor grid. If the final modeling runs identify impacts beyond the 100-meter receptor grid, a sub grid will be added to the area surrounding the point of maximum impact and the model will be re-run.

5.) Though Wisconsin's NR 445 Air Toxics Rule does not have annual non-carcinogenic ambient air standards for cobalt, cadmium, and nickel, there are "chronic" ATSDR Minimal Risk Levels for these substances, and the modeling analysis should address the maximum modeled concentrations against these levels. Additionally, there is a "chronic" ATSDR Minimal Risk Level for mercury that is tighter than the NR 445 standard, and should preferentially be considered.

The modeling results will consider the ATSDR Minimum Risk Levels for cobalt, cadmium, nickel, and mercury

6.) What are the emission units in Table A-1a and in subsequent tables? Do the values reflect a single hourly value, or do they reflect an aggregate value for all "active hours" (7 AM – 7 PM), "inactive hours" (7 PM – 7 AM), etc., specific to that table? For emissions from stockpiles that are assumed to be active for 12 hours per

day, are you distributing these emissions over 24 hours in developing your modeled emission rate, or are you applying an "active" hourly emission rate to all hours in a day?

The units of the metal emission rates in Tables A-1a, A-1b, B-4a and B-4b are in pounds/hour, based on the design hourly material handling rates.

Active and inactive stockpile emissions represent wind erosion emissions calculated using the spreadsheet available from the following Texas Commission on Environmental Quality (TCEQ) link:

https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx

Both the active and inactive stockpile emissions (wind erosion) are calculated as daily emission rates. The daily emission rates are divided by 24 hours per day to obtain hourly emission rates for modeling.

The emission rates for active periods represent normal operation of the site including emissions from all material handling emission points and wind erosion emissions from active stockpiles. The active stockpile emission rate is assigned to the stockpiles during periods when material is being added to, or removed from, a stockpile.

The emission rate for inactive periods represent emissions when material handling equipment is not operating, and emissions are limited to wind erosion emissions from inactive stockpiles. The inactive stockpile emission rate is assigned to the stockpiles during periods when no material is being added to, or removed from, a stockpile.

7.) Please provide a citation/reference for the use of 90% control of stockpile particulate emissions when the stockpile is in a partial enclosure of walls on three sides.

The TCEQ website (see link in the response to Item 6 above) identifies the following control efficiencies applicable to stockpiles. For three sided partial enclosures, the identified control efficiency ranges from 50 to 85% and the average value for this range 67.5% is applied for stockpiles with partial walls on three sides (partial enclosure).

| Control Method | Control Eff. (%) | Control Factor (1 - ctrl eff) |
|---|---|---|
| None | 0 | 1 |
| Wet material | 50 | 0.5 |
| Water | 70 | 0.3 |
| Chemicals/foam | 80 | 0.2 |
| Partial Enclosure* | 50-85 | 0.5-0.15 |
| Full enclosure* | 90 | 0.1 |
| Enclosed by building* | 90 | 0.1 |
| Washed Sand/gravel | 95 | 0.05 |
| Washed Sand/gravel with water spray | 98.5 | 0.015 |
| Manufacturer Rating | 0 | 0 |

The stockpile data provided in the initial protocol incorrectly assigned a control value of 0.1 for stockpiles with partial enclosures (partition walls on three sides). An updated set of Appendix A and Appendix B emission tables are attached to this response to identify the updated metal emission rates that incorporate the updated stockpile emission estimates that will be used in the modeling.

8.) Figure A-1 shows two separate volume sources for the “Pokers”, yet only one volume source (V-4) representing “Poker Loadout” and “Poker Picker Chute to Stockpile” appears in Table A-2. Similarly, the “Poker North” and “Poker South” stockpile emissions are only represented by volume source V-4 in Table A-3. Will the model have two separate volume sources representing these emissions (for example, V-4a and V-4b), or are the emissions combined into just one volume source (V-4)?

Poker stockpile wind erosion emission are calculated for both the north and south Poker stockpiles. Total Poker stockpile emissions were assigned to a volume source V4 that spatially represents only the north Poker stockpile.

9.) Figures A-1 and B-1 show geometric shapes indicated by dashed and stippled red lines representing an area of emissions that will constitute volume sources. Most of these geometric shapes cannot by themselves represent the final shape and dimensions of volume sources, because volume sources are constrained to be the same length in the “x” and “y” directions. Please provide a table specifying the model inputs for each of the volume sources created and explanatory remarks regarding the release heights of the volume sources and the derivation of initial lateral and vertical dimensions.

The Volume Source outlines on Figures A-1 and B-1 identify the individual emission units that comprise the total volume source emission rate. The model input requires the x and y dimension to be the same and have been input accordingly.

The height of the individual emission units that comprise each volume source is reviewed, and the maximum height is selected as the height of the volume source. The length of the group of sources is selected as the length of the volume source. The volume source parameters to enter in the model were derived as follows:

- Release Height = Volume Source Height divided by 2.0
- Initial Lateral Dimensions = Volume Source Length divided by 4.3
- Initial Vertical Dimensions = Volume Source Height divided by 2.15

The following table provides a summary of the volume source dimensions used as model inputs.

| Volume Source | Height of Emission Sources (ft) | Length of Source Group (ft) | Release Height (ft) | Initial Lateral Dimensions (ft) ($\sigma_{yo}$) | Initial Vertical Dimensions (ft) ($\sigma_{zo}$) |
|---|---|---|---|---|---|
| V1 | 4 | 10 | 2.00 | 2.3256 | 1.8605 |
| V2 | 60 | 84 | 30.00 | 19.5349 | 27.9070 |
| V3 | 4 | 6 | 2.00 | 1.3953 | 1.8605 |
| V4 | 25 | 50 | 12.50 | 11.6279 | 11.6279 |
| V5 | 25 | 20 | 12.50 | 4.6512 | 11.6279 |
| V6 | 35 | 60 | 17.50 | 13.9535 | 16.2791 |
| V7 | 30 | 20 | 15.00 | 4.6512 | 13.9535 |
| V8 | 30 | 20 | 15.00 | 4.6512 | 13.9535 |
| V9 | 25 | 25 | 12.50 | 5.8140 | 11.6279 |
| V10 | 6 | 20 | 3.00 | 4.6512 | 2.7907 |
| V11 | 35 | 120 | 17.50 | 27.9070 | 16.2791 |
| V12 | 35 | 120 | 17.50 | 27.9070 | 16.2791 |
| V13 | 6 | 20 | 3.00 | 4.6512 | 2.7907 |
| VN1 | 40 | 100 | 20.00 | 23.2558 | 18.6047 |
| VN2 | 40 | 100 | 20.00 | 23.2558 | 18.6047 |
| VN3 | 25 | 100 | 12.50 | 23.2558 | 11.6279 |
| VN4 | 25 | 100 | 12.50 | 23.2558 | 11.6279 |
| VN5 | 25 | 100 | 12.50 | 23.2558 | 11.6279 |
| VN6 | 25 | 40 | 12.50 | 9.3023 | 11.6279 |

If you should have any questions in regard to these comments, please feel free to contact me.

Best regards,

Jeff

Jeffrey Sprague
Modeling Unit, Manager
Air Quality Planning Section
Bureau of Air
Illinois Environmental Protection Agency

(217) 524-4692
Jeff.Sprague@Illinois.gov

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**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Tuesday, November 19, 2019 9:35 AM
**To:** Sprague, Jeff <Jeff.Sprague@Illinois.gov>; Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>
**Cc:** 'Freeborn & Peters LLP; Zwick, Ann (azwick@freeborn.com)' <azwick@freeborn.com>; GII, LLC; Labkon, Adam (adamlabkon@general-iron.com) <AdamLabkon@General-Iron.com>; GII, LLC; Kallas, Jim (jimkallas@general-iron.com) <jimkallas@general-iron.com>
**Subject:** [WARNING: ATTACHMENT UNSCANNED][External] Modeling Protocol - General III, LLC

Jeff,

Please find attached a copy of the modeling protocol for metal emission impacts from the proposed General III, LLC scrap metal recycling facility at 11600 South Burley Avenue in Chicago.

Please note that the attached copy has Figures A-1, A-2, B-1 and B-2, that depict the Ferrous Material Processing System and Non-Ferrous Material Processing Facilities, are redacted and marked as Trade Secret.

We will be submitting two hard copies of the protocol to your attention, one will be the attached redacted copy and the other will be an unredacted copy containing the above referenced figures marked as Trade Secret. A Justification for Trade Secret information will also be submitted with the hard copies.

The Trade Secret figures are essentially identical to the figures submitted to IEPA on November 14, 2019, with Justification for designation as Trade Secret. The only difference is that Figures A-1 and B-1 show the limits of the multiple volume sources used for modeling.

The tables, in Appendix A and B, that identify the individual emission sources included in each proposed volume sources are not claimed as Trade Secret.

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com

## Layman, Robb

**From:** Dennis Stropko <DennisStropko@reserve-group.com>
**Sent:** Wednesday, December 18, 2019 12:04 PM
**To:** Barria, German
**Cc:** Bernoteit, Bob; Jones, Eric E.
**Subject:** [External] RE: SCPM - ID #031600GYI - PAN:12020006

Thanks German,
We are reviewing and will begin working on a draft plan. Do you have a time frame in which we need to get this to you?
Dennis

_____
DENNIS STROPKO / RESERVE MANAGEMENT GROUP
DENNISSTROPKO@RESERVE-GROUP.COM
4550 DARROW RD, STOW, OH 44224
(O) 440-287-7216 (C) 440-742-3467

**a reserve management group company**
providing safe, responsible + sustainable recycling solutions for
our customers and the environment.
RMG

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**From:** Barria, German [mailto:German.Barria@Illinois.gov]
**Sent:** Tuesday, December 17, 2019 3:02 PM
**To:** Dennis Stropko <DennisStropko@reserve-group.com>
**Cc:** Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>; Jones, Eric E. <Eric.E.Jones@Illinois.gov>
**Subject:** RE: SCPM - ID #031600GYI - PAN:12020006

Dennis ,

Actually there is one more item, we need to deem the application complete, We will need a fugitive dust plan. The fugitive dust plan is needed since the facility is subject to Title 35 Illinois Administrative Code 212.302. The facility can use the form APC 391 to aid in developing a plan but the plan must include the information detailed in Title 35 Illinois Administrative Code 212.310. Also there are items listed in form APC 391 # 6b that should be submitted on an attached sheet. This information can be sent to me by email. If you have any questions feel free to call or email.

Thank you.

*German Barria*
Enviromental Protection Specialist,
IEPA, Bureau of Air, Permit Section, FESOP/LOP Unit
Phone: 217-785-0767
Illinois Environmental Protection Agency

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**From:** Dennis Stropko <DennisStropko@reserve-group.com>
**Sent:** Monday, December 16, 2019 8:13 AM
**To:** Barria, German <German.Barria@Illinois.gov>

**Cc:** Hal Tolin <HalTolin@reserve-group.com>; Steve Joseph <SteveJoseph@reserve-group.com>; Mark Weintraub <markweintraub@reserve-group.com>
**Subject:** [External] RE: SCPM - ID #031600GYI - PAN:12020006

Good morning German,
Per our conversation last week, please find attached the executed name change document from Napuck Salvage of Waupaca, LLC to South Chicago Property Management, LTD. Please advise if you require any additional information. A hard copy is also being mailed to your attention.
Thank you and take care,
Dennis

DENNIS STROPKO / RESERVE MANAGEMENT GROUP
DENNISSTROPKO@RESERVE-GROUP.COM
4550 DARROW RD, STOW, OH 44224
(O) 440-287-7216 (C) 440-742-3467

**a reserve management group company**
providing safe, responsible + sustainable recycling solutions for our customers and the environment.
RMG

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**From:** Barria, German [mailto:German.Barria@Illinois.gov]
**Sent:** Friday, December 13, 2019 12:17 PM
**To:** Dennis Stropko <DennisStropko@reserve-group.com>
**Subject:** RE: SCPM - ID #031600GYI - PAN:12020006

https://www2.illinois.gov/epa/topics/forms/air-forms/Pages/state.aspx

here you

*German Barria*
Enviromental Protection Specialist,
IEPA, Bureau of Air, Permit Section, FESOP/LOP Unit
Phone: 217-785-0767
Illinois Environmental Protection Agency

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**From:** Dennis Stropko <DennisStropko@reserve-group.com>
**Sent:** Friday, December 13, 2019 9:26 AM
**To:** Barria, German <German.Barria@Illinois.gov>
**Cc:** Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>
**Subject:** [External] RE: SCPM - ID #031600GYI - PAN:12020006

Good morning German,
I just left you a message and would like to discuss this with you to get your direction/guidance on how best to proceed,
Thanks
Dennis Stropko

DENNIS STROPKO / RESERVE MANAGEMENT GROUP

DENNISSTROPKO@RESERVE-GROUP.COM
4550 DARROW RD, STOW, OH 44224
(O) 440-287-7216 (C) 440-742-3467

**a reserve management group company**
providing safe, responsible + sustainable recycling solutions for
our customers and the environment.
RMG

**From:** Barria, German [mailto:German.Barria@Illinois.gov]
**Sent:** Thursday, December 12, 2019 3:05 PM
**To:** Dennis Stropko <DennisStropko@reserve-group.com>
**Cc:** Bernoteit, Bob <Bob.Bernoteit@Illinois.gov>
**Subject:** SCPM - ID #031600GYI - PAN:12020006

Mr. Stropko,

Per my call and message that I left you today, we need SCPM to submit a name and/or ownership change form.

Thank you.

*German Barria*
Enviromental Protection Specialist,
IEPA, Bureau of Air, Permit Section, FESOP/LOP Unit
Phone: 217-785-0767
Illinois Environmental Protection Agency

# Bureau of Air Permit Section

## File Organization Cover Sheet

| | |
|---|---|
| Source Name: | Holcim (US) Inc |
| ID No.: | 031600FHQ |
| Application No.: | 09100031 |
| Category: | 03K Air Permit - Final |
| Item Date: | 6/11/19 |
| Keyword: | |
| Comment: | |
| Part: | of |

Submitted by: MLM

**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY**
1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397
JB PRITZKER, GOVERNOR JOHN J. KIM, DIRECTOR

217/785-1705

FEDERALLY ENFORCEABLE STATE OPERATING PERMIT (FESOP)

PERMITTEE

Holcim (US), Inc.
Attn: Peter Kossis - Plant Manager
2150 E. 130th St.
Chicago, Illinois 60633

Application No.: 09100031 I.D. No.: 031600FHQ
Applicant's Designation: Date Received: October 21, 2009
Subject: Ground Slag Processing and Cement Distribution Terminal
Date Issued: June 11, 2019 Expiration Date: June 11, 2029
Location: 2150 East 130th Street, Chicago, Cook County 60633

This permit is hereby granted to the above-designated Permittee to OPERATE emission unit(s) and/or air pollution control equipment consisting of:

Granulated Slag Grinding and Drying Operation with Loadout Operation:

Wet Slag Processing:
Truck Unloading Hopper (P01A) Venting to P02;
Wet Slag Processing:
Hopper Belt (P02) Venting to P03;
Bucket Elevator (P03) Venting to P04;
Day Bin (P04) Venting to Stack 01;
Day Bin Weigh Belt (P05) Venting to P08A/P09A;
Day Bin Transition Hopper (P06) Feeding Dryer Feed Belt (P07A) Venting to P08A/P09A;
Dryer Feed Belt (P07A) Venting to P08A/P09A;
40 mmBtu/hour Natural Gas Slag Dryer (P08A) and Dryer Shaft (P09A) controlled by Dust Collector (416DC04) Venting to Stack S02;

Ground Dry Slag Processing and Lime Addition:

Rejected Slag Chute (P09B) Venting to Indoor Fugitive;
Dryer Cyclone Separator (P10) controlled by Dust Collector (416DC04) Venting to Stack S02;
Ball Mill Feed Chute (P11) Venting to P12A;
Ball Mill / Mill Sweep (P12A) controlled by Dust Collector (416DC01) Venting to Stack S03;
Bucket Elevator (P12D) controlled by Dust Collector (416DC03) Venting to Stack S04;
HES Separator (P13) controlled by Dust Collector (416DC02) Venting to Stack S05;
Slag Storage Silo (P14) controlled by Dust Collector (418DC01) Venting to Stack S06;
Surge Bin (P15A) controlled by Dust Collector (570DC01) Venting to Stack S08 and Pressure Relief Vent Stack S07;

Loading from Surge Bin (P15A) to Vessel (P16) controlled by Dust Collector (574DC01) Venting to Stack S09;
Loading from Main Distribution Silo (P23) to Barge (P20) controlled by Dust Collector (573DC01) Venting to Stack S011;
Loading from Surge Bin (P15A/P21) to Main Distribution Silo (P23) Controlled by Dust Collector (DC01) Venting to Stack S10;
Loading from Main Distribution Silo (P23) to Surge Bin (P15A/P22) for Loading to Vessel (P16) Controlled by Surge Bin Dust Collector (570DC01) Venting to Stack S08 and Vessel Loading Dust Collector (574DC01) Venting to Stack S09;
Truck Loading/Unloading Scale 1 (P24A) controlled by Dust Collector (DC03) Venting to Stack S12; and Truck Loading/Unloading Scale 2 (P24B) controlled by Dust Collector (DC04) Venting to Stack S13;
30 ton/hour Portable Wet Granulated Slag Delumper (Electric Delumper); and
6.6 ton Lime Storage Tank (Lime Day Bin) with Feeding System Controlled by Dust Collector (416DC02)

Cement Distribution Terminal:

Cement Distribution:
Unload cement from Vessel/Barge (P17/P18) to Main Distribution Silo (P23) controlled by Dust Collector (DC01) Venting to Stack S10;
Truck Loading/Unloading Scale 1 (P24A) controlled by Dust Collector (DC03) Venting to Stack S12; and Truck Loading/Unloading Scale 2 (P24B) controlled by Dust Collector (DC04) Venting to Stack S13;
Load cement from Main Distribution Silo (P23) to Barge (P19) controlled by Dust Collector (573DC01) Venting to Stack S11.

pursuant to the above-referenced application. This permit is subject to standard conditions attached hereto and the following special condition(s):

1a. This Federally Enforceable State Operating Permit (FESOP) is issued:

i. To limit the emissions of air pollutants from the source to less than major source thresholds (i.e., 100 tons/year for Particulate Matter less than 10 microns ($PM_{10}$)). As a result, the source is excluded from the requirements to obtain a Clean Air Act Permit Program (CAAPP) permit. The maximum emissions of this source, as limited by the conditions of this permit, are described in Attachment A.

ii. To limit the potential emissions of VOM from the source to less than 25 tons/year. As a result, the source is excluded from the requirements of 35 Ill. Adm. Code Part 205 (Emission Reduction Market System). The maximum emissions of this source, as limited by the conditions of this permit, are described in Attachment A.

iii. To establish federally enforceable production and operating limitations, which restrict the potential to emit for Volatile Organic Material (VOM) to less than 25 tons per year so that the source is not subject to the requirements of 35 Ill. Adm. Code Part 218 Subpart TT (Other Emission Units).

b. Prior to issuance, a draft of this permit has undergone a public notice

and comment period.

c. This permit supersedes all operating permit(s) for this location.

2a. The Granulated Blast Furnace Slag Grinding and Drying Operation with Loadout Operation, Wet Slag Processing, Ground Dry Slag Processing and Lime Addition, and Cement Distribution Terminal are subject to 35 Ill. Adm. Code Part 212 Subpart B (Visible Emissions). Pursuant to 35 Ill. Adm. Code 212.123(a), no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to 35 Ill. Adm. Code 212.122.

b. Pursuant to 35 Ill. Adm. Code 212.123(b), the emission of smoke or other particulate matter from any such emission unit may have an opacity greater than 30 percent but not greater than 60 percent for a period or periods aggregating 8 minutes in any 60 minute period provided that such opaque emissions permitted during any 60 minute period shall occur from only one such emission unit located within a 305 m (1000 ft) radius from the center point of any other such emission unit owned or operated by such person, and provided further that such opaque emissions permitted from each such emission unit shall be limited to 3 times in any 24 hour period.

c. This source is subject to 35 Ill. Adm. Code Part 212 Subpart K (Fugitive Particulate Matter). Pursuant to 35 Ill. Adm. Code 212.301, no person shall cause or allow the emission of fugitive particulate matter from any process, including any material handling or storage activity, that is visible by an observer looking generally toward the zenith at a point beyond the property line of the source.

d. Pursuant to 35 Ill. Adm. Code 212.302(a), 35 Ill. Adm. Code 212.304 through 212.310 and 212.312 shall apply to all mining operations (SIC major groups 10 through 14), manufacturing operations (SIC major groups 20 through 39 except for those operations subject to 35 Ill. Adm. Code Part 212 Subpart S (Grain-Handling and Grain-Drying Operations) that are outside the areas defined in 35 Ill. Adm. Code 212.324(a)(1)), and electric generating operations (SIC group 491), which are located in the areas defined by the boundaries of the following townships, notwithstanding any political subdivisions contained therein, as the township boundaries were defined on October 1, 1979, in the following counties:

Cook: All townships

e. Pursuant to 35 Ill. Adm. Code 212.313, if particulate collection equipment is operated pursuant to 35 Ill. Adm. Code 212.304 through 212.310 and 212.312, emissions from such equipment shall not exceed 68 mg/dscm (0.03 gr/dscf).

f. Pursuant to 35 Ill. Adm. Code 212.316(b), no person shall cause or allow fugitive particulate matter emissions generated by the crushing or screening of slag, stone, coke or coal to exceed an opacity of 10 percent.

g. The Granulated Blast Furnace Slag Grinding and Drying Operation with Loadout Operation, Wet Slag Processing, Ground Dry Slag Processing and Lime Addition, and Cement Distribution Terminal are subject to 35 Ill. Adm. Code Part 212 Subpart L (Particulate Matter Emissions from Process Emission Units). Pursuant to 35 Ill. Adm. Code 212.321(a), except as further provided in 35 Ill. Adm. Code Part 212, no person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission unit which, either alone or in combination with the emission of particulate matter from all other similar process emission units for which construction or modification commenced on or after April 14, 1972, at a source or premises, exceeds the allowable emission rates specified in 35 Ill. Adm. Code 212.321(c).

h. Pursuant to 35 Ill. Adm. Code 212.321(b), interpolated and extrapolated values of the data in 35 Ill. Adm. Code 212.321(c) shall be determined by using the equation:

$$E = A(P)^B$$

where:

P = Process weight rate; and
E = Allowable emission rate; and,

i. Up to process weight rates of 408 Mg/hr (450 T/hr):

| | Metric | English |
|---|---|---|
| P | Mg/hr | T/hr |
| E | kg/hr | lbs/hr |
| A | 1.214 | 2.54 |
| B | 0.534 | 0.534 |

ii. For process weight rate greater than or equal to 408 Mg/hr (450 T/hr):

| | Metric | English |
|---|---|---|
| P | Mg/hr | T/hr |
| E | kg/hr | lbs/hr |
| A | 11.42 | 24.8 |
| B | 0.16 | 0.16 |

i. Pursuant to 35 Ill. Adm. Code 212.321(c), Limits for Process Emission Units for Which Construction or Modification Commenced on or After April 14, 1972:

| Metric | | English | |
|---|---|---|---|
| P | E | P | E |
| Mg/hr | kg/hr | T/hr | lbs/hr |
| 0.05 | 0.25 | 0.05 | 0.55 |
| 0.1 | 0.29 | 0.10 | 0.77 |
| 0.2 | 0.42 | 0.20 | 1.10 |
| 0.3 | 0.64 | 0.30 | 1.35 |
| 0.4 | 0.74 | 0.40 | 1.58 |
| 0.5 | 0.84 | 0.50 | 1.75 |
| 0.7 | 1.00 | 0.75 | 2.40 |
| 0.9 | 1.15 | 1.00 | 2.60 |

| Metric | | English | |
|---|---|---|---|
| P | E | P | E |
| Mg/hr | kg/hr | T/hr | lbs/hr |
| 1.8 | 1.66 | 2.00 | 3.70 |
| 2.7 | 2.1 | 3.00 | 4.60 |
| 3.6 | 2.4 | 4.00 | 5.35 |
| 4.5 | 2.7 | 5.00 | 6.00 |
| 9. | 3.9 | 10.00 | 8.70 |
| 13. | 4.8 | 15.00 | 10.80 |
| 18. | 5.7 | 20.00 | 12.50 |
| 23. | 6.5 | 25.00 | 14.00 |
| 27. | 7.1 | 30.00 | 15.60 |
| 32. | 7.7 | 35.00 | 17.00 |
| 36. | 8.2 | 40.00 | 18.20 |
| 41. | 8.8 | 45.00 | 19.20 |
| 45. | 9.3 | 50.00 | 20.50 |
| 90. | 13.4 | 100.00 | 29.50 |
| 140. | 17.0 | 150.00 | 37.00 |
| 180. | 19.4 | 200.00 | 43.00 |
| 230. | 22. | 250.00 | 48.50 |
| 270. | 24. | 300.00 | 53.00 |
| 320. | 26. | 350.00 | 58.00 |
| 360. | 28. | 400.00 | 62.00 |
| 408. | 30.1 | 450.00 | 66.00 |
| 454. | 30.4 | 500.00 | 67.00 |

where:

P = Process weight rate in metric or T/hr, and
E = Allowable emission rate in kg/hr or lbs/hr.

j. The Granulated Blast Furnace Slag Grinding and Drying Operation with Loadout Operation, Wet Slag Processing, Ground Dry Slag Processing and Lime Addition, and Cement Distribution Terminal are subject to 35 Ill. Adm. Code 212.324 (Process Emission Units in Certain Areas). Pursuant to 35 Ill. Adm. Code 212.324(b), no person shall cause or allow the emission into the atmosphere, of $PM_{10}$ from any process emission unit to exceed 68.7 mg/scm (0.03 gr/scf) during any one hour period, except as otherwise provided in 35 Ill. Adm. Code 212.324.

k. This source is subject to 35 Ill. Adm. Code Part 212 Subpart U (Additional Control Measures). Pursuant to 35 Ill. Adm. Code 212.700(a), 35 Ill. Adm. Code 212 Subpart U (Additional Control Measures) shall apply to those sources in the areas designated in and subject to 35 Ill. Adm. Code 212.324(a)(1) or 212.423(a) and that have actual annual source-wide emissions of $PM_{10}$ of at least fifteen (15) tons per year.

3. The Slag Dryer (P08A) is subject to 35 Ill. Adm. Code Part 214 Subpart K (Process Emission Sources). Pursuant to 35 Ill. Adm. Code 214.301, except as further provided by 35 Ill. Adm. Code Part 214, no person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission source to exceed 2000 ppm.

4. The Slag Dryer P08A/P09A and Ball Mill/Mill Sweep (P12A) are subject to 35 Ill. Adm. Code Part 218 Subpart G (Use of Organic Material). Pursuant to 35 Ill. Adm. Code 218.301, no person shall cause or allow the discharge of more than 3.6 kg/hr (8 lbs/hr) of organic material

into the atmosphere from any emission unit, except as provided in 35 Ill. Adm. Code 218.302, 218.303, or 218.304 and the following exception: If no odor nuisance exists the limitation of 35 Ill. Adm. Code Part 218 Subpart G shall only apply to photochemically reactive material.

5a. This permit is issued based on the Granulated Blast Furnace Slag Grinding and Drying Operation, Wet Slag Processing, Ground Dry Slag Processing and Lime Addition, and Cement Distribution Terminal at this source not being subject to the New Source Performance Standards (NSPS) for Metallic Mineral Processing Plants, 40 CFR 60 Subpart LL because this source does not produce metallic mineral concentrates from ore.

b. This permit is issued based on the Granulated Blast Furnace Slag Grinding and Drying Operation with Loadout Operation, Wet Slag Processing, Ground Dry Slag Processing and Lime Addition, and Cement Distribution Terminal at this source not being subject to the NSPS for Nonmetallic Mineral Processing Plants, 40 CFR 60, Subparts OOO because the source does not crush, screen, or convey nonmetallic mineral at this source.

6a. Pursuant to 35 Ill. Adm. Code 212.314, 35 Ill. Adm. Code 212.301 shall not apply and spraying pursuant to 35 Ill. Adm. Code 212.304 through 212.310 and 35 Ill. Adm. Code 212.312 shall not be required when the wind speed is greater than 40.2 km/hour (25 mph). Determination of wind speed for the purposes of 35 Ill. Adm. Code 212.314 shall be by a one-hour average or hourly recorded value at the nearest official station of the U.S. Weather Bureau or by wind speed instruments operated on the site. In cases where the duration of operations subject to 35 Ill. Adm. Code 212.314 is less than one hour, wind speed may be averaged over the duration of the operations on the basis of on-site wind speed instrument measurements.

b. Pursuant to 35 Ill. Adm. Code 212.324(d), the mass emission limits contained in 35 Ill. Adm. Code 212.324(b) and (c) shall not apply to those emission units with no visible emissions other than fugitive particulate matter; however, if a stack test is performed, 35 Ill. Adm. Code 212.324(d) is not a defense finding of a violation of the mass emission limits contained in 35 Ill. Adm. Code 212.324(b) and (c).

7. This permit is issued based on the Ball Mill/Mill Sweep (P12A) at this source not being subject to 35 Ill. Adm. Code Part 218 Subpart TT (Other Emission Units). This is a result of federally enforceable limitations of this permit which restrict the potential to emit for VOM to less than 25 tons per year.

8a. Pursuant to 35 Ill. Adm. Code 212.306, all normal traffic pattern access areas surrounding storage piles specified in 35 Ill. Adm. Code 212.304 and all normal traffic pattern roads and parking facilities which are located on mining or manufacturing property shall be paved or treated with water, oils or chemical dust suppressants. All paved areas shall be cleaned on a regular basis. All areas treated with water, oils or chemical dust suppressants shall have the treatment applied on a regular basis, as needed, in accordance with the operating program required by 35 Ill. Adm. Code 212.309, 212.310 and 212.312

b. Pursuant to 35 Ill. Adm. Code 212.307, all unloading and transporting operations of materials collected by pollution control equipment shall be enclosed or shall utilize spraying, pelletizing, screw conveying or other equivalent methods.

c. Pursuant to 35 Ill. Adm. Code 212.308, crushers, grinding mills, screening operations, bucket elevators, conveyor transfer points, conveyors, bagging operations, storage bins and fine product truck and railcar loading operations shall be sprayed with water or a surfactant solution, utilize choke-feeding or be treated by an equivalent method in accordance with an operating program.

d. Pursuant to 35 Ill. Adm. Code 212.309(a), the emission units described in 35 Ill. Adm. Code 212.304 through 212.308 and 35 Ill. Adm. Code 212.316 shall be operated under the provisions of an operating program, consistent with the requirements set forth in 35 Ill. Adm. Code 212.310 and 212.312, and prepared by the owner or operator and submitted to the Illinois EPA for its review. Such operating program shall be designed to significantly reduce fugitive particulate matter emissions.

e. Pursuant to 35 Ill. Adm. Code 212.310, at a minimum the operating program shall include the following:

i. The name and address of the source;

ii. The name and address of the owner or operator responsible for execution of the operating program;

iii. A map or diagram of the source showing approximate locations of storage piles, conveyor loading operations, normal traffic pattern access areas surrounding storage piles and all normal traffic patterns within the source;

iv. Location of unloading and transporting operations with pollution control equipment;

v. A detailed description of the best management practices utilized to achieve compliance with 35 Ill. Adm. Code Part 212 Subpart K, including an engineering specification of particulate collection equipment, application systems for water, oil, chemicals and dust suppressants utilized and equivalent methods utilized;

vi. Estimated frequency of application of dust suppressants by location of materials; and

vii. Such other information as may be necessary to facilitate the Illinois EPA's review of the operating program.

f. The Fugitive Particulate Operating Program (i.e. operating program), as submitted by the Permittee pursuant to 35 Ill. Adm. Code 212.309 on April 4, 2019 is incorporated herein by reference. The source shall be operated under and shall comply with the provisions of this Fugitive Particulate Operating Program and any amendments to the Fugitive Particulate Operating Program submitted pursuant to Condition 8(d).

g. Pursuant to 35 Ill. Adm. Code 212.312, the operating program shall be amended from time to time by the owner or operator so that the operating program is current. Such amendments shall be consistent with 35 Ill. Adm. Code Part 212 Subpart K and shall be submitted to the Illinois EPA within thirty (30) days of such amendment. Any future revision to the Fugitive Particulate Operating Program made by the Permittee during the permit term is automatically incorporated by reference provided the revision is not expressly disapproved, in writing, by the Illinois EPA. In the event that the Illinois EPA notifies the Permittee of a deficiency with any revision to the Fugitive Particulate Operating Program, the Permittee shall be required to revise and resubmit the Fugitive Particulate Operating Program within thirty (30) days of receipt of notification to address the deficiency.

9a. Pursuant to 35 Ill. Adm. Code 212.324(f), for any process emission unit subject to 35 Ill. Adm. Code 212.324(a), the owner or operator shall maintain and repair all air pollution control equipment in a manner that assures that the emission limits and standards in 35 Ill. Adm. Code 212.324 shall be met at all times. 35 Ill. Adm. Code 212.324(f) shall not affect the applicability of 35 Ill. Adm. Code 201.149. Proper maintenance shall include the following minimum requirements:

i. Visual inspections of air pollution control equipment;

ii. Maintenance of an adequate inventory of spare parts; and

iii. Expeditious repairs, unless the emission unit is shutdown.

b. Pursuant to 35 Ill. Adm. Code 212.701(a), those sources subject to 35 Ill. Adm. Code Part 212 Subpart U shall prepare contingency measure plans reflecting the $PM_{10}$ emission reductions set forth in 35 Ill. Adm. Code 212.703. These plans shall become federally enforceable permit conditions. Such plans shall be submitted to the Illinois EPA by November 15, 1994. Notwithstanding the foregoing, sources that become subject to the provisions of 35 Ill. Adm. Code Part 212 Subpart U after July 1, 1994, shall submit a contingency measure plan to the Illinois EPA for review and approval within ninety (90) days after the date such source or sources became subject to the provisions of 35 Ill. Adm. Code Part 212 Subpart U or by November 15, 1994, whichever is later. The Illinois EPA shall notify those sources requiring contingency measure plans, based on the Illinois EPA's current information; however, the Illinois EPA's failure to notify any source of its requirement to submit contingency measure plans shall not be a defense to a violation of 35 Ill. Adm. Code Part 212 Subpart U and shall not relieve the source of its obligation to timely submit a contingency measure plan.

c. Pursuant to 35 Ill. Adm. Code 212.703(a), all sources subject to 35 Ill. Adm. Code Part 212 Subpart U shall submit a contingency measure plan. The contingency measure plan shall contain two levels of control measures:

i. Level I measures are measures that will reduce total actual annual source-wide fugitive emissions of $PM_{10}$ subject to control

under 35 Ill. Adm. Code 212.304, 212.305, 212.306, 212.308, 212.316(a) through (e), 212:424 or 212.464 by at least 15%.

ii. Level II measures are measures that will reduce total actual annual source-wide fugitive emissions of $PM_{10}$ subject to control under 35 Ill. Adm. Code 212.304, 212.305, 212.306, 212.308, 212.316(a) through (e), 212.424 or 212.464 by at least 25%.

d. Pursuant to 35 Ill. Adm. Code 212.703(b), a source may comply with 35 Ill. Adm. Code Part 212 Subpart U through an alternative compliance plan that provides for reductions in emissions equal to the level of reduction of fugitive emissions as required at 35 Ill. Adm. Code 212.703(a) and which has been approved by the Illinois EPA and USEPA as federally enforceable permit conditions. If a source elects to include controls on process emission units, fuel combustion emission units, or other fugitive emissions of $PM_{10}$ not subject to 35 Ill. Adm. Code 212.304, 212.305, 212.306, 212.308, 212.316(a) through (e), 212.424 or 212.464 at the source in its alternative control plan, the plan must include a reasonable schedule for implementation of such controls, not to exceed two (2) years. This implementation schedule is subject to Illinois EPA review and approval.

e. Pursuant to 35 Ill. Adm. Code 212.704(b), if there is a violation of the ambient air quality standard for $PM_{10}$ as determined in accordance with 40 CFR Part 50, Appendix K, the Illinois EPA shall notify the source or sources the Illinois EPA has identified as likely to be causing or contributing to one or more of the exceedances leading to such violation, and such source or sources shall implement Level I or Level II measures, as determined pursuant to 35 Ill. Adm. Code 212.704(e). The source or sources so identified shall implement such measures corresponding to fugitive emissions within ninety (90) days after receipt of a notification and shall implement such measures corresponding to any nonfugitive emissions according to the approved schedule set forth in such source's alternative control plan. Any source identified as causing or contributing to a violation of the ambient air quality standard for $PM_{10}$ may appeal any finding of culpability by the Illinois EPA to the Illinois Pollution Control Board pursuant to 35 Ill. Adm. Code 106 Subpart J.

f. Pursuant to 35 Ill. Adm. Code 212.704(e), the Illinois EPA shall require that sources comply with the Level I or Level II measures of their contingency measure plans, pursuant 35 Ill. Adm. Code 212.704(b), as follows:

i. Level I measures shall be required when the design value of a violation of the 24-hour ambient air quality standard, as computed pursuant to 40 CFR 50, Appendix K, is less than or equal to 170 $ug/m^3$.

ii. Level II measures shall be required when the design value of a violation of the 24-hour ambient air quality standard, as computed pursuant to 40 CFR 50, Appendix K, exceeds 170 $ug/m^3$.

10a. In the event that the operation of this source results in an odor nuisance, the Permittee shall take appropriate and necessary actions to

minimize odors, including but not limited to, changes in raw material or installation of controls, in order to eliminate the nuisance.

b. Each dust collector shall be in operation at all times when each associated emission unit is in operation and emitting air contaminants.

c. The Permittee shall maintain and operate an alarm on each dust collector to indicate any malfunction of these dust collectors.

d. The Permittee shall, in accordance with the manufacturer(s) and/or vendor(s) recommendations, perform periodic maintenance on the Dust Collector 416DC04 associated with Dryer Cyclone Separator P10, Slag Dryer (P09A) and Dryer Shaft (P09A), Dust Collector 416DC01 associated with Ball Mill/Mill Sweep (P12A), Dust Collector 416DC03 associated with Bucket Elevator P12D, Dust Collector 416DC02 associated with HES Separator P13 and Lime Day Bin, by Dust Collector 418DC01 associated with Slag Storage Silo P14, Dust Collector 570DC01 associated with Surge Bin P15A, Dust Collector 574DC01 associated with Vessel Loading from Surge Bin to Vessel P16, Dust Collector DC01 associated with Cement Silo Loading from Surge Bin (P21) and Vessel (P17)/Barge (P18) to Main Silo, by Dust Collector 573DC01 associated with Barge Loading from Main Silo to Barge P19 and P20, Dust Collector DC03 associated with Truck Loading/Unloading Scale 1 P24A, and Dust Collector DC04 associated with Truck Loading/Unloading Scale 2 P24B such that Dust Collectors 416DC04, 416DC01, 416DC03, 416DC02, 418DC01, 570DC01, 574DC01, DC01, 573DC01, DC03, and DC04 are kept in proper working condition and not cause a violation of the Illinois Environmental Protection Act or regulations promulgated therein.

e. The Permittee shall do the following:

   i. Maintain total enclosure on any conveyors which are outside the slag processing building.

   ii. Operate and maintain the material at the dump hopper and delumper such that it is sufficiently wet that no visible emissions occur. Operate and maintain the Lime Addition Process in totally enclosed systems so that no visible emissions occur.

   iii. Maintain plant roads which go to the truck dump hopper, lime storage trailers, and product storage silos.

f. The Permittee shall sweep, flush, or clean in an equivalent manner, the paved plant roads and parking areas according to the Permittee's approved operating program or more often if requested by the Illinois EPA.

g. Any operations generating fugitive emissions shall be operated in a manner consistent with those in the current operating program submitted to the Illinois EPA, or in a manner which results in less fugitive emissions.

h. The Slag Dryer (P08A) shall only be operated with natural gas as the fuel. The use of any other fuel in the Slag Dryer (P08A) may require that the Permittee first obtain a construction permit from the Illinois

EPA and perform stack testing to verify compliance with all applicable requirements.

11a. Emissions from and operation of the Main Distribution Silo (P23) Unloading/Loading operations shall not exceed the following limits:

| Emission Unit | Material Throughput (T/Mo) | Material Throughput (T/Yr) | Emission Factor (lb/Ton) PM | Emission Factor (lb/Ton) $PM_{10}$ | EMISSIONS PM (lb/Mo) | EMISSIONS PM (T/Yr) | EMISSIONS $PM_{10}$ (lb/Mo) | EMISSIONS $PM_{10}$ (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Loading Slag from Surge Bin (P15A/P21) to Main Distribution Silo (P23) | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.54 | 2.37 |
| Unload cement from Vessel/Barge (P17/P18) to Main Distribution Silo (P23) | 120,724 | 965,790 | 0.00099 | 0.00034 | 119.52 | 0.48 | 41.05 | 0.16 |
| | | | | | Totals: | 4.78 | | 2.53 |

These limits are based on the maximum cement throughput and standard controlled emission factors (Table 11.12-2, AP-42, Fifth Edition, Volume I, June 2006). Monthly material throughputs and emission limits based on seasonal 8-month period.

b. Emissions from and operation of the truck loading/unloading operations shall not exceed the following limits:

| Emission Unit | Material Throughput (T/Mo) | Material Throughput (T/Yr) | Emission Factor (lb/Ton) PM | Emission Factor (lb/Ton) $PM_{10}$ | EMISSIONS PM (lb/Mo) | EMISSIONS PM (T/Yr) | EMISSIONS $PM_{10}$ (lb/Mo) | EMISSIONS $PM_{10}$ (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Slag Unloading Hopper P01A | 120,724 | 965,790 | 0.00116 | 0.000549 | 140.04 | 0.56 | 66.28 | 0.26 |
| Slag Unloading to Slag Pile 3 | 120,724 | 965,790 | 0.00116 | 0.000549 | 140.04 | 0.56 | 66.28 | 0.26 |
| Slag Transfer From Pile 3 to Hopper | 120,724 | 965,790 | 0.00116 | 0.000549 | 140.04 | 0.56 | 66.28 | 0.26 |
| Slag and Cement Truck Loading Scales 1 & 2 P24A/B* (slag) | 120,724 | 965,790 | 0.00181 | 0.000724 | 218.51 | 0.87 | 87.40 | 0.35 |
| Slag and Cement Truck Loading Scales 1 & 2 P24A/B* (cement) | 120,724 | 965,790 | 0.00181 | 0.000724 | 218.51 | 0.87 | 87.40 | 0.35 |
| | | | | | Totals: | 3.42 | | 1.48 |

* 90% Particulate matter control due to dust collector.

These limits are based on the maximum material throughput and an emission factor derived using Equation 1 of Section 13.2.4, AP-42, Fifth Edition, Volume I, November 2006 for the unloading hopper where K= 0.74PM/0.35$PM_{10}$, U= 16.34 and M= 10.0% and an emission factor derived using Equation 11.12-1 of Section 11.12, AP-42, Fifth Edition, Volume I, June 2006 for the truck loading scales where K= 0.8, U=1.0, A= 1.75, M= 0.1, B= 0.3, and C= 0.013 for PM and where K= 0.32, U=1.0, A= 1.75,

M= 0.1, B= 0.3, and C= 0.0052 for $PM_{10}$. Monthly material throughputs and emission limits based on seasonal 8-month period.

c. Emissions from and operation of the slag processing operations shall not exceed the following limits:

| Emission Unit | Material Throughput (T/Mo) | Material Throughput (T/Yr) | Emission Factor (lb/Ton) PM | Emission Factor (lb/Ton) $PM_{10}$ | EMISSIONS PM (lb/Mo) | EMISSIONS PM (T/Yr) | EMISSIONS $PM_{10}$ (lb/Mo) | EMISSIONS $PM_{10}$ (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Hopper Belt P02 | 120,724 | 965,790 | 0.0000432 | 0.0000204 | 5.21 | 0.02 | 2.46 | 0.01 |
| Day Bin P04 | 120,724 | 965,790 | 0.0000432 | 0.0000204 | 5.21 | 0.02 | 2.46 | 0.01 |
| Day Bin Weigh Belt P05 | 120,724 | 965,790 | 0.0000432 | 0.0000204 | 5.21 | 0.02 | 2.46 | 0.01 |
| Dryer Feed Belt P07A | 120,724 | 965,790 | 0.0000432 | 0.0000204 | 5.21 | 0.02 | 2.46 | 0.01 |
| Rejected Slag Chute P09B | 120,724 | 965,790 | 0.000114 | 0.0000539 | 16.90 | 0.06 | 6.51 | 0.03 |
| Ball Mill/Mill Sweep P12A | 120,724 | 965,790 | 0.008 | 0.004 | 965.79 | 3.86 | 482.90 | 1.93 |
| Bucket Elevator P12D | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.54 | 2.37 |
| HES Separator P13 | 120,724 | 965,790 | 0.0280 | 0.0140 | 3,380.27 | 13.52 | 1,690.13 | 6.76 |
| Slag Storage Silo P14 | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.54 | 2.37 |
| Surge Bin P15A | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.54 | 2.37 |
| | | | | | Totals: | 30.42 | | 15.87 |

These limits are based on the maximum slag throughput and an emission factor derived using Equation 1 of Section 13.2.4, AP-42, Fifth Edition, Volume I, November 2006 where K= $0.74PM/0.35PM_{10}$, U= 1.3, and M=10.0% for the hopper belt, day bin, weigh belt, and dryer feed belt and where K= $0.74PM/0.35PM_{10}$, U= 1.3, and M= 5.0% for the rejected slag chute, and standard controlled emission factors (Table 11.6-4, AP-42, Fifth Edition, Volume I, January 1995 for the ball mill/Mill Sweep and HES separator and Table 11.12-2, AP-42, Fifth Edition, Volume I, June 2006 for the bucket elevator, slag storage silo and surge bin). Monthly material throughputs and emission limits based on seasonal 8-month period.

d. Emissions from and operation of the Electric Delumper shall not exceed the following limits:

| Emission Unit | Material Throughput (T/Mo) | Material Throughput (T/Yr) | Emission Factor (lb/Ton) PM | Emission Factor (lb/Ton) $PM_{10}$ | EMISSIONS PM (lb/Mo) | EMISSIONS PM (T/Yr) | EMISSIONS $PM_{10}$ (lb/Mo) | EMISSIONS $PM_{10}$ (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Electric Delumper | 1,250 | 10,000 | 0.00116 | 0.00055 | 5.75 | 0.023 | 2.75 | 0.011 |

These limits are based on the maximum slag throughput and emission factors derived using Equation 1 of Section 13.2.4, AP-42, Fifth Edition, Volume I, November 2006 for aggregate handling and storage piles (fugitive emission), K= 0.74 for PM & K= 0.35 for $PM_{10}$, M=10%, and U = 16.34, and 4 drop points. Monthly material throughputs and emission limits based on seasonal 8-month period.

e. Emissions from and operation of the lime addition process to slag processing operations shall not exceed the following limits:

| Emission Unit | Material Throughput (T/Mo) | Material Throughput (T/Yr) | Emission Factor (lb/Ton) PM | Emission Factor (lb/Ton) $PM_{10}$ | EMISSIONS PM (lb/Mo) | EMISSIONS PM (T/Yr) | EMISSIONS $PM_{10}$ (lb/Mo) | EMISSIONS $PM_{10}$ (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Lime Truck to Pig Trailer Vented to Slag Storage Silo | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| 6.6 Ton Lime Day Bin | 6,250 | 50,000 | 0.019 | 0.0095 | 118.75 | 0.48 | 62.50 | 0.24 |
| Lime Day Bin Weigh Belt | 6,250 | 50,000 | 0.019 | 0.0095 | 118.75 | 0.48 | 62.50 | 0.24 |
| Lime Day Bin Chute to Ball Mill | 6,250 | 50,000 | 0.019 | 0.0095 | 118.75 | 0.48 | 62.50 | 0.24 |
| Ball Mill/Mill Sweep P12A | 6,250 | 50,000 | 0.008 | 0.004 | 50 | 0.20 | 25 | 0.10 |
| Bucket Elevator P12D | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| HES Separator P13 | 6,250 | 50,000 | 0.028 | 0.014 | 175.00 | 0.70 | 87.50 | 0.35 |
| Slag Storage Silo P14 | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| Surge Bin P15A | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| Loading from Surge Bin (P15A & P21A) to Main Distribution Silo (P23) | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| Truck Loading Scales 1 & 2 (P24A & B)* | 6,250 | 50,000 | 0.00181 | 0.000724 | 12.50 | 0.05 | 5.00 | 0.02 |
| Loading from Main Distribution Silo (P23) to Surge Bin (P15A & P22) for Loading to Vessel (P16) | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| Loading from Main Distribution Silo (P23) to Barge (P20) | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| Loading from Surge Bin (P15A) to Vessel (P16) | 6,250 | 50,000 | 0.0089 | 0.0049 | 55.00 | 0.22 | 30.00 | 0.12 |
| | | | | | Totals: | 4.15 | | 2.15 |

* 90% Particulate matter control due to dust collector.

These limits are based on the maximum lime throughput and standard controlled emission factors (Table 11.6-4, AP-42, Fifth Edition, Volume I, January 1995 for the lime day bin, lime day bin weigh belt, lime day bin chute, ball mill/Mill Sweep and HES Seperator and Table 11.12-2, AP-42, Fifth Edition, Volume I, June 2006 controlled emission factors for lime truck to pig trailer & slag silo, bucket elevator, storage silo, surge bin, and loading operations). Monthly material throughputs and emission limits based on seasonal 8-month period.

f. Emissions from and operation of the Slag Dryer (P08A/P09A) shall not exceed the following limits: Monthly material throughputs and emission limits based on seasonal 8-month period.

i. Dry Slag output: 120,724 tons/month and 965,790 tons/year;

ii. Slag Dryer (P08A/P09A) Process emissions:

| Pollutant | Emission Factor (lbs/Ton Slag) | E M I S S I O N S (Tons/Month) | (Tons/Year) |
|---|---|---|---|
| PM | 0.033 | 1.99 | 15.94 |
| $PM_{10}$ | 0.023 | 1.39 | 11.11 |

These limits are based on the maximum slag processing rates, controlled standard emission factors (Section 11:1-3, AP-42, Fifth Edition, Volume I, Update 2004, April 2004) and continuous operation.

iii. Natural gas usage: 47.09 $mmft^3$/month and 376.7 $mmft^3$/year.

iv. Emissions resulting from the combustion of natural gas:

| Pollutant | Emission Factor ($lbs/mmft^3$) | E M I S S I O N S (Tons/Month) | (Tons/Year) |
|---|---|---|---|
| CO | 84.0 | 1.98 | 15.82 |
| $NO_x$ | 50.0 | 1.18 | 9.42 |
| PM* | 0.76 | 0.02 | 0.14 |
| $SO_2$ | 0.6 | 0.01 | 0.11 |
| VOM | 5.5 | 0.13 | 1.04 |

* 90% Particulate matter control due to dust collector.

These limits are based on the maximum firing rates, standard emission factors (Table 1.4-1 and Table 1.4-2, AP-42, Fifth Edition, Volume I, Supplement D, July 1998), Low NOx Burner, Average Natural Gas Heat Content of 930.18 BTU/CF3, and 8,760 hours/year of operation. Monthly material throughputs and emission limits based on seasonal 8-month period.

v. Emissions from and operation of the dryer cyclone separator (P10):

| Emission Unit | Material Throughput (T/Mo) | (T/Yr) | Emission Factor (lb/Ton) PM | $PM_{10}$ | EMISSIONS PM (lb/Mo) | (T/Yr) | $PM_{10}$ (lb/Mo) | (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Dryer Cyclone Separator P10 | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.55 | 2.37 |

These limits are based on the maximum slag throughput and controlled standard emission factors (Table 11.12-2, AP-42, Fifth Edition, Volume I, June 2006). Monthly material throughputs and emission limits based on seasonal 8-month period.

g. Emissions from and operation of the barge loading shall not exceed the following limits:

| Material Throughput | Emission Factor (lb/Ton) | EMISSIONS PM | $PM_{10}$ |
|---|---|---|---|

| Emission Unit | (T/Mo) | (T/Yr) | PM | $PM_{10}$ | (lb/Mo) | (T/Yr) | (lb/Mo) | (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Loading Slag from Main Distribution Silo (P23) to Barge (P20) | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.55 | 2.37 |
| Load Cement from Main Distribution Silo (P23) to Barge P19 | 120,724 | 965,790 | 0.00099 | 0.00034 | 119.52 | 0.48 | 41.05 | 0.16 |
| | | | | | Totals: | 4.78 | | 2.53 |

These limits are based on the maximum material throughput and controlled standard emission factors (Table 11.12-2, AP-42, Fifth Edition, Volume I, June 2006). Monthly material throughputs and emission limits based on seasonal 8-month period.

h. Emissions from and operation of the vessel loading shall not exceed the following limits:

| Emission Unit | Material Throughput (T/Mo) | Material Throughput (T/Yr) | Emission Factor (lb/Ton) PM | Emission Factor (lb/Ton) $PM_{10}$ | EMISSIONS PM (lb/Mo) | EMISSIONS PM (T/Yr) | EMISSIONS $PM_{10}$ (lb/Mo) | EMISSIONS $PM_{10}$ (T/Yr) |
|---|---|---|---|---|---|---|---|---|
| Slag Loading from Surge Bin (P15A) to Vessel (P16) | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.55 | 2.37 |
| Slag Loading from Main Distribution Silo (P23) to Surge Bin (P15A/P22) for Loading to Vessel (P16) | 120,724 | 965,790 | 0.0089 | 0.0049 | 1,074.44 | 4.30 | 591.55 | 2.37 |
| | | | | | | 8.60 | | 4.74 |

These limits are based on the maximum slag throughput and controlled standard emission factors (Table 11.12-2, AP-42, Fifth Edition, Volume I, June 2006). Monthly material throughputs and emission limits based on seasonal 8-month period.

i. Emissions of VOM and usage of grinding aid in the Ball Mill/Mill Sweep (P12A) shall not exceed the following limits:

| Material Usage (Tons/Month) | Material Usage (Tons/Year) | VOM Emissions (Tons/Month) | VOM Emissions (Tons/Year) |
|---|---|---|---|
| 27.46 | 219.65 | 0.58 | 4.61 |

These limits are based on the maximum material usage and a VOM content for the grinding aid and VOM emissions controlled by 90% retainment in the slag (2006 Portland Cement Association Study "Life Cycle Inventory of Portland Cement Manufacture) PCA R&D Serial No. 2095b. Monthly material throughputs and emission limits based on seasonal 8-month period.

j. Compliance with the annual limits of this permit shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

12a. Pursuant to 35 Ill. Adm. Code 201.282, every emission source or air

pollution control equipment shall be subject to the following testing requirements for the purpose of determining the nature and quantities of specified air contaminant emissions and for the purpose of determining ground level and ambient air concentrations of such air contaminants:

i. Testing by Owner or Operator. The Illinois EPA may require the owner or operator of the emission source or air pollution control equipment to conduct such tests in accordance with procedures adopted by the Illinois EPA, at such reasonable times as may be specified by the Illinois EPA and at the expense of the owner or operator of the emission source or air pollution control equipment. The Illinois EPA may adopt procedures detailing methods of testing and formats for reporting results of testing. Such procedures and revisions thereto, shall not become effective until filed with the Secretary of State, as required by the APA Act. All such tests shall be made by or under the direction of a person qualified by training and/or experience in the field of air pollution testing. The Illinois EPA shall have the right to observe all aspects of such tests.

ii. Testing by the Illinois EPA. The Illinois EPA shall have the right to conduct such tests at any time at its own expense. Upon request of the Illinois EPA, the owner or operator of the emission source or air pollution control equipment shall provide, without charge to the Illinois EPA, necessary holes in stacks or ducts and other safe and proper testing facilities, including scaffolding, but excluding instruments and sensing devices, as may be necessary.

b. Testing required by Condition 13 shall be performed upon a written request from the Illinois EPA by a qualified independent testing service.

13. Pursuant to 35 Ill. Adm. Code 212.110(c), upon a written notification by the Illinois EPA, the owner or operator of a particulate matter emission unit subject to 35 Ill. Adm. Code Part 212 shall conduct the applicable testing for particulate matter emissions, opacity, or visible emissions at such person's own expense, to demonstrate compliance. Such test results shall be submitted to the Illinois EPA within thirty (30) days after conducting the test unless an alternative time for submittal is agreed to by the Illinois EPA.

14a. Pursuant to 35 Ill. Adm. Code 212.110(e), the owner or operator of an emission unit subject to 35 Ill. Adm. Code Part 212 shall retain records of all tests which are performed. These records shall be retained for at least three (3) years after the date a test is performed.

b. i. Pursuant to 35 Ill. Adm. Code 212.316(g)(1), the owner or operator of any fugitive particulate matter emission unit subject to 35 Ill. Adm. Code 212.316 shall keep written records of the application of control measures as may be needed for compliance with the opacity limitations of 35 Ill. Adm. Code 212.316 and

shall submit to the Illinois EPA an annual report containing a summary of such information.

ii. Pursuant to 35 Ill. Adm. Code 212.316(g)(2), the records required under 35 Ill. Adm. Code 212.316(g) shall include at least the following:

A. The name and address of the source;

B. The name and address of the owner and/or operator of the source;

C. A map or diagram showing the location of all emission units controlled, including the location, identification, length, and width of roadways;

D. For each application of water or chemical solution to roadways by truck: the name and location of the roadway controlled, application rate of each truck, frequency of each application, width of each application, identification of each truck used, total quantity of water or chemical used for each application and, for each application of chemical solution, the concentration and identity of the chemical;

E. For application of physical or chemical control agents: the name of the agent, application rate and frequency, and total quantity of agent, and, if diluted, percent of concentration, used each day; and

F. A log recording incidents when control measures were not used and a statement of explanation.

iii. Pursuant to 35 Ill. Adm. Code 212.316(g)(3), copies of all records required by 35 Ill. Adm. Code 212.316 shall be submitted to the Illinois EPA within ten (10) working days after a written request by the Illinois EPA and shall be transmitted to the Illinois EPA by a company-designated person with authority to release such records.

iv. Pursuant to 35 Ill. Adm. Code 212.316(g)(4), the records required under 35 Ill. Adm. Code 212.316 shall be kept and maintained for at least three (3) years and shall be available for inspection and copying by Illinois EPA representatives during working hours.

c. i. Pursuant to 35 Ill. Adm. Code 212.324(g)(1), written records of inventory and documentation of inspections, maintenance, and repairs of all air pollution control equipment shall be kept in accordance with 35 Ill. Adm. Code 212.324(f).

ii. Pursuant to 35 Ill. Adm. Code 212.324(g)(2), the owner or operator shall document any period during which any process emission unit was in operation when the air pollution control equipment was not in operation or was malfunctioning so as to cause an emissions level in excess of the emissions limitation.

These records shall include documentation of causes for pollution control equipment not operating or such malfunction and shall state what corrective actions were taken and what repairs were made.

iii. Pursuant to 35 Ill. Adm. Code 212.324(g)(3), a written record of the inventory of all spare parts not readily available from local suppliers shall be kept and updated.

iv. Pursuant to 35 Ill. Adm. Code 212.324(g)(4), copies of all records required by 35 Ill. Adm. Code 212.324 shall be submitted to the Agency within ten (10) working days after a written request by the Agency.

v. Pursuant to 35 Ill. Adm. Code 212.324(g)(5), the records required under 35 Ill. Adm. Code 212.324 shall be kept and maintained for at least three (3) years and shall be available for inspection and copying by Illinois EPA representatives during working hours.

15a. The Permittee shall maintain records of the following items so as to demonstrate compliance with the conditions of this permit:

i. The Permittee shall keep a copy of the Fugitive Particulate Operating Program, any amendments or revisions to the Fugitive Particulate Operating Program, and the Permittee shall also keep a record of activities completed according to the Fugitive Particulate Operating Program.

ii. Records addressing use of good operating practices for the Dust Collector 416DC04 associated with Dryer Cyclone Separator P10, Slag Dryer (P09A) and Dryer Shaft (P09A), Dust Collector 416DC01 associated with Ball Mill/Mill Sweep (P12A), Dust Collector 416DC03 associated with Bucket Elevator P12D, Dust Collector 416DC02 associated with HES Separator P13 and Lime Day Bin, by Dust Collector 418DC01 associated with Slag Storage Silo P14, Dust Collector 570DC01 associated with Surge Bin P15A, Dust Collector 574DC01 associated with Vessel Loading from Surge Bin to Vessel P16, Dust Collector DC01 associated with Cement Silo Loading from Surge Bin (P21) and Vessel (P17)/Barge (P18) to Main Silo, by Dust Collector 573DC01 associated with Barge Loading from Main Silo to Barge P19 and P20, Dust Collector DC03 associated with Truck Loading/Unloading Scale 1 P24A, and Dust Collector DC04 associated with Truck Loading/Unloading Scale 2 P24B:

A. Operating logs for the dust collectors, including operating data (pressure drop or stack condition), daily upon startup;

B. Records for periodic inspection of the dust collectors with date, individual performing the inspection, and nature of inspection; and

C. Records for prompt repair of defects, with identification and description of defect, effect on emissions, date

identified, date repaired, and nature of repair.

iii. Slag Throughput (tons/month and tons/year);

iv. Cement Throughput (tons/month and tons/year);

v. Lime Mixture Throughput (tons/month and tons/year);

vi. Baghouse Leak Detection Monitor data (if installed);

vii. Natural gas usage ($mmft^3$/month and $mmft^3$/year);

viii. Grinding aid usage for the Ball Mill/Mill Sweep (P12A) (tons/month and tons/year);

ix. VOM content of the grinding aid (% by weight); and

x. Monthly and annual emissions of CO, $NO_x$, PM, $PM_{10}$, $SO_2$, and VOM from the source, with supporting calculations (tons/month and tons/year).

b. All records and logs required by Condition 15(a) of this permit shall be retained at a readily accessible location at the source for at least five (5) years from the date of entry and shall be made available for inspection and copying by the Illinois EPA or USEPA upon request. Any records retained in an electronic format (e.g., computer storage device) shall be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA or USEPA request for records during the course of a source inspection.

16a. Pursuant to 35 Ill. Adm. Code 212.110(d), a person planning to conduct testing for particulate matter emissions to demonstrate compliance shall give written notice to the Illinois EPA of that intent. Such notification shall be given at least thirty (30) days prior to the initiation of the test unless a shorter period is agreed to by the Illinois EPA. Such notification shall state the specific test methods from 35 Ill. Adm. Code 212.110 that will be used.

b. Pursuant to 35 Ill. Adm. Code 212.316(g)(5), a quarterly report shall be submitted to the Illinois EPA stating the following: the dates any necessary control measures were not implemented, a listing of those control measures, the reasons that the control measures were not implemented, and any corrective actions taken. This information includes, but is not limited to, those dates when controls were not applied based on a belief that application of such control measures would have been unreasonable given prevailing atmospheric conditions, which shall constitute a defense to the requirements of 35 Ill. Adm. Code 212.316. This report shall be submitted to the Illinois EPA thirty (30) calendar days from the end of a quarter. Quarters end March 31, June 30, September 30, and December 31.

c. Pursuant to 35 Ill. Adm. Code 212.324(g)(6), upon written request by the Illinois EPA, a report shall be submitted to the Illinois EPA for any period specified in the request stating the following: the dates

during which any process emission unit was in operation when the air pollution control equipment was not in operation or was not operating properly, documentation of causes for pollution control equipment not operating or not operating properly, and a statement of what corrective actions were taken and what repairs were made.

17. Pursuant to 35 Ill. Adm. Code 218.990, upon request by the Illinois EPA, the owner or operator of an emission unit which is exempt from the requirements of 35 Ill. Adm. Code Part 218 Subparts PP, QQ, RR, TT or 35 Ill. Adm. Code 218.208(b) shall submit records to the Illinois EPA within 30 calendar days from the date of the request that document that the emission unit is exempt from those requirements.

18a. If there is an exceedance of or a deviation from the requirements of this permit as determined by the records required by this permit or otherwise, the Permittee shall submit a report to the Illinois EPA's Bureau of Air Compliance Section in Springfield, Illinois within thirty (30) days after the exceedance or deviation. The report shall identify the duration and the emissions impact of the exceedance or deviation, a copy of the relevant records and information to resolve the exceedance or deviation, and a description of the efforts to reduce emissions from, and the duration of exceedance or deviation, and to prevent future occurrences of any such exceedance or deviation.

b. One (1) copy of required reports and notifications shall be sent to:

Illinois Environmental Protection Agency
Bureau of Air
Compliance Section (#40)
P.O. Box 19276
Springfield, Illinois 62794-9276

If you have any questions on this permit, please contact German Barria at 217/785-1705.

Raymond E. Pilapil
Manager, Permit Section
Bureau of Air

REP:GB:jlp

## Attachment A - Emission Summary

This attachment provides a summary of the maximum emissions from the Ground Slag Processing and Cement Distribution Terminal operating in compliance with the requirements of this federally enforceable permit. In preparing this summary, the Illinois EPA used the annual operating scenario which results in maximum emissions from such a plant. The resulting maximum emissions are below the levels, (e.g., 100 tons/year for $PM_{10}$) at which this source would be considered a major source for purposes of the Clean Air Act Permit Program. Actual emissions from this source will be less than predicted in this summary to the extent that less material is handled, and control measures are more effective than required in this permit.

| | E M I S S I O N S (Tons/Year) | | | | | |
|---|---|---|---|---|---|---|
| Emission Unit | CO | $NO_x$ | PM | $PM_{10}$ | $SO_2$ | VOM |
| Main Dist. Silo Unloading: | | | | | | |
| Loading Slag from Surge Bin (P15A/P21) to Main Distribution Silo (P23) | | | 4.30 | 2.37 | | |
| Unload cement from Vessel/Barge (P17/P18) to Main Distribution Silo (P23) | | | 0.48 | 0.16 | | |
| Truck Loading/Unloading: | | | | | | |
| Slag Unloading Hopper P01A | | | 0.56 | 0.26 | | |
| Slag Unloading to Slag Pile 3 | | | 0.56 | 0.26 | | |
| Slag Transfer from Pile 3 to Hopper | | | 0.56 | 0.26 | | |
| Slag and Cement Truck Loading Scales 1 & 2 P24A/B (slag) | | | 0.87 | 0.35 | | |
| Slag and Cement Truck Loading Scales 1 & 2 P24A/B (cement) | | | 0.87 | 0.35 | | |
| Slag Processing: | | | | | | |
| Hopper Belt P02 | | | 0.02 | 0.01 | | |
| Day Bin P04 | | | 0.02 | 0.01 | | |
| Day Bin Weigh Belt P05 | | | 0.02 | 0.01 | | |
| Dryer Feed Belt P07A | | | 0.02 | 0.01 | | |
| Reject Slag Chute P09B | | | 0.06 | 0.03 | | |
| Ball Mill/Mill Sweep (P12A) | | | 3.86 | 1.93 | | 4.61 |
| Bucket Elevator P12D | | | 4.30 | 2.37 | | |
| HES Separator P13 | | | 13.52 | 6.76 | | |
| Slag Storage Silo P14 | | | 4.30 | 2.37 | | |
| Surge Bin P15A | | | 4.30 | 2.37 | | |
| Portable Delumper | | | 0.02 | 0.01 | | |
| Lime Addition Process: | | | | | | |
| Lime Truck to Pig Trailer Vented to Slag Storage Silo | | | 0.22 | 0.12 | | |
| 6.6 Ton Lime Day Bin | | | 0.48 | 0.24 | | |
| Lime Day Bin Weigh Belt | | | 0.48 | 0.24 | | |
| Lime Day Bin Chute to Ball Mill | | | 0.48 | 0.24 | | |
| Ball Mill/Mill Sweep P12A | | | 0.20 | 0.10 | | |
| Bucket Elevator P12D | | | 0.22 | 0.12 | | |

| Emission Unit | CO | $NO_x$ | PM | $PM_{10}$ | $SO_2$ | VOM |
|---|---|---|---|---|---|---|
| | | | E M I S S I O N S (Tons/Year) | | | |
| HES Separator P13 | | | 0.70 | 0.35 | | |
| Slag Storage Silo P14 | | | 0.22 | 0.12 | | |
| Surge Bin P15A | | | 0.22 | 0.12 | | |
| Loading from Surge Bin (P15A & P21A) to Main Distribution Silo (P23) | | | 0.22 | 0.12 | | |
| Truck Loading Scales 1 & 2 (P24A & B) | | | 0.05 | 0.02 | | |
| Loading from Main Distribution Silo (P23) to Surge Bin (P15A & P22) for Loading to Vessel (P16) | | | 0.22 | 0.12 | | |
| Loading from Main Distribution Silo (P23) to Barge (P20) | | | 0.22 | 0.12 | | |
| Loading from Surge Bin (P15A) to Vessel (P16) | | | 0.22 | 0.12 | | |
| Slag Drying: | | | | | | |
| Slag Dryer (P08A) | 15.82 | 9.42 | 1.43 | 1.43 | 0.11 | 1.04 |
| Slag Dryer (P08A/P09A) Process | | | 15.94 | 11.11 | | |
| Dryer Cyclone Separator P10 | | | 4.30 | 2.37 | | |
| Barge Loading: | | | | | | |
| Loading Slag from Main Distribution Silo (P23) to Barge (P20) | | | 4.30 | 2.37 | | |
| Loading Cement from Main Distribution Silo (P23) to Barge P19 | | | 0.48 | 0.16 | | |
| Vessel Loading: | | | | | | |
| Slag Loading from Surge Bin (P15A) to Vessel (P16) | | | 4.30 | 2.37 | | |
| Slag Loading from Main Distribution Silo (P23) to Surge Bin (P15A/P22) for Loading to Vessel (P16) | -- | -- | 4.30 | 2.37 | -- | -- |
| Totals | 15.82 | 9.42 | 77.84 | 44.22 | 0.11 | 5.65 |

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
P. O. BOX 19506
SPRINGFIELD, ILLINOIS 62794-9506

# STANDARD CONDITIONS FOR OPERATING PERMITS

May, 1993

The Illinois Environmental Protection Act (Illinois Revised Statutes, Chapter 111-1/2, Section 1039) grants the Environmental Protection Agency authority to impose conditions on permits which it issues.

The following conditions are applicable unless superseded by special condition(s).

1. The issuance of this permit does not release the Permittee from compliance with state and federal regulations which are part of the Illinois State Implementation Plan, as well as with other applicable statutes and regulations of the Unites States or the State of Illinois or with applicable local laws, ordinances and regulations.

2. The Illinois EPA has issued this permit based upon the information submitted by the Permittee in the permit application. Any misinformation, false statement or misrepresentation in the application shall be grounds for revocation under 35 Ill. Adm. Code 201.166.

3. a. The Permittee shall not authorize, cause, direct or allow any modification, as defined in 35 Ill. Adm. Code 201.102, of equipment, operations or practices which are reflected in the permit application as submitted unless a new application or request for revision of the existing permit is filed with the Illinois EPA and unless a new permit or revision of the existing permit(s) is issued for such modification.

   b. This permit only covers emission sources and control equipment while physically present at the indicated plant location(s). Unless the permit specifically provides for equipment relocation, this permit is void for an item of equipment on the day it is removed from the permitted location(s) or if all equipment is removed, notwithstanding the expiration date specified on the permit.

4. The Permittee shall allow any duly authorized agent of the Illinois EPA, upon the presentation of credentials, at reasonable times:

   a. To enter the Permittee's property where actual or potential effluent, emission or noise sources are located or where any activity is to be conducted pursuant to this permit;

   b. To have access to and to copy any records required to be kept under the terms and conditions of this permit;

   c. To inspect, including during any hours of operation of equipment constructed or operated under this permit, such equipment and any equipment required to be kept, used, operated, calibrated and maintained under this permit;

   d. To obtain and remove samples of any discharge or emission of pollutants; and

   e. To enter and utilize any photographic, recording, testing, monitoring or other equipment for the purpose of preserving, testing, monitoring or recording any activity, discharge or emission authorized by this permit.

5. The issuance of this permit:

   a. Shall not be considered as in any manner affecting the title of the premises upon which the permitted facilities are located;

b. Does not release the Permittee from any liability for damage to person or property caused by or resulting from the construction, maintenance, or operation of the facilities;

c. Does not take into consideration or attest to the structural stability of any unit or part of the project; and

d. In no manner implies or suggests that the Illinois EPA (or its officers, agents, or employees) assumes any liability, directly or indirectly, for any loss due to damage, installation, maintenance, or operation of the proposed equipment or facility.

6. The facilities covered by this permit shall be operated in such a manner that the disposal of air contaminants collected by the equipment shall not cause a violation of the Environmental Protection Act or regulations promulgated thereunder.

7. The Permittee shall maintain all equipment covered under this permit in such a manner that the performance of such equipment shall not cause a violation of the Environmental Protection Act or regulations promulgated thereunder.

8. The Permittee shall maintain a maintenance record on the premises for each item of air pollution control equipment. These records shall be made available to any agent of the Environmental Protection Agency at any time during normal working hours and/or operating hours. At a minimum, this record shall show the dates of performance and nature of preventative maintenance activities.

9. No person shall cause or allow continued operation during malfunction, breakdown or startup of any emission source or related air pollution control equipment if such operation would cause a violation of an applicable emission standard or permit limitation. Should a malfunction, breakdown or startup occur, which results in emissions in excess of any applicable standard or permit limitation, the Permittee shall:

   a. Immediately report the incident to the Illinois EPA's Regional Field Operations Section Office by telephone, telegraph or other method as constitutes the fastest available alternative, and shall comply with all reasonable directives of the Illinois EPA with respect to the incident;

   b. Maintain the following records for a period of no less than two (2) years:

      i. Date and duration of malfunction, breakdown, or startup,

      ii. Full and detailed explanation of the cause,

      iii. Contaminants emitted and an estimate of quantity of emissions,

      iv. Measures taken to minimize the amount of emissions during the malfunction, breakdown or startup, and

      v. Measures taken to reduce future occurrences and frequency of incidents.

10. If the permit application contains a compliance program and project completion schedule, the Permittee shall submit a project completion status report within thirty (30) days of any date specified in the compliance program and project completion schedule or at six month intervals, whichever is more frequent.

11. The Permittee shall submit an Annual Emission Report as required by 35 Ill. Adm. Code 201.302 and 35 Ill. Adm. Code Part 254.

## Pb Inventory Data for Holcim US

| Source ID | Stack No | Stack ID |
|---|---|---|
| 031600FHQ | 1 | 121260 |
| 031600FHQ | 2 | 121261 |


## Comparision of Estimated Pb

| Parameter |
|---|
| Inventory Source Description: |

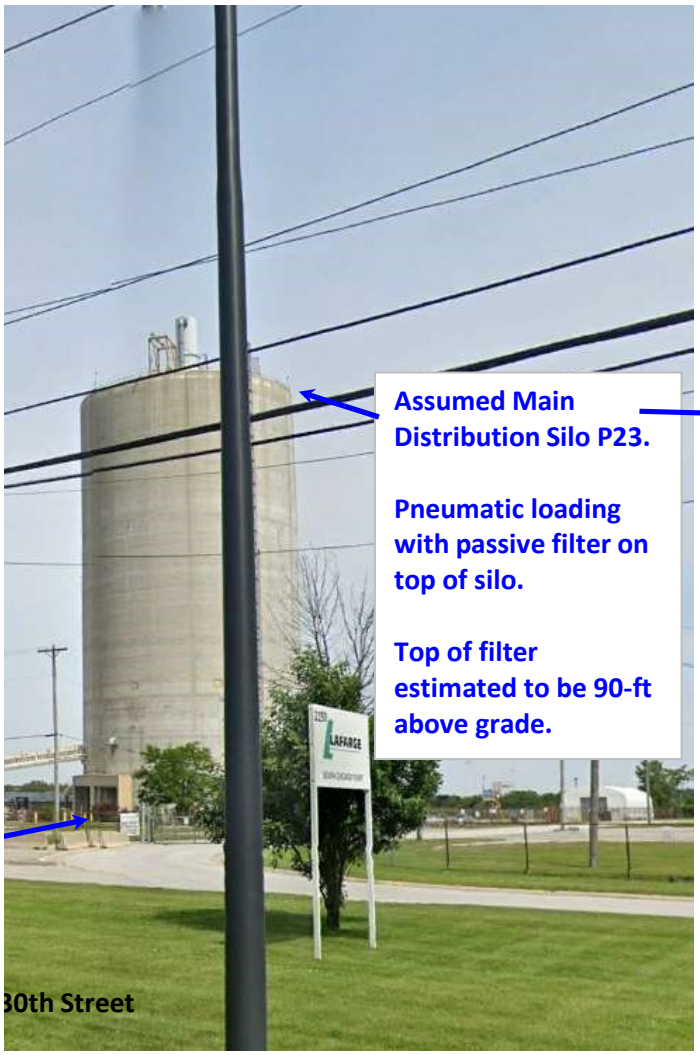
| Source Description: |
|---|
| |
| **FESOP Condition:** |
| Corresponding source description: |
| Cement Throughput tpy: |
| Annual Operating Hours: |
| Cement Throughput (tph): |
| Controlled Pb EF from fabric filter (AP 42; Table 11.12-8; June 2006): |
| Estimated Pb Emissions (lb/hr): |
| Pb emission rate provided in inventory: |
| Estimated Stack Height (ft) based on Google Earth Street View of Main Cement Silo: |
| Stack Height (ft) Provided in Inventory: |

TABLE 11.12-2 (ENGLISH UNITS)
EMISSION FACTORS FOR CONCRETE BATCHINC

| Source (SCC) | Uncontrolled | | | | |
|---|---|---|---|---|---|
| | Total PM | Emission Factor Rating | Total $PM_{10}$ | Emission Factor Rating | Total |
| Aggregate transfer [b] (3-05-011-04,-21,23) | 0.0069 | D | 0.0033 | D | ND |
| Sand transfer [b] (3-05-011-05,22,24) | 0.0021 | D | 0.00099 | D | ND |
| Cement unloading to elevated storage silo (pneumatic)[c] (3-05-011-07) | 0.73 | E | 0.47 | E | 0.000 |
| Cement supplement unloading to elevated storage silo (pneumatic)[d] (3-05-011-17) | 3.14 | E | 1.10 | E | 0.00 |
| Weigh hopper loading [e] (3-05-011-08) | 0.0048 | D | 0.0028 | D | 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 | 0.01 or Ec 11.12 |
| Truck loading (truck mix)[g] (3-05-011-10) | 1.118 | B | 0.310 | B | 0.09 or Ec 11.12 |
| Vehicle traffic (paved roads) | See AP-42 Section 13.2.1, Pa | | | | |
| Vehicle traffic (unpaved roads) | See AP-42 Section 13.2.2, Unp | | | | |
| Wind erosion from aggregate and sand storage piles | See AP-42 Section 13.2.5, Industri | | | | |

FESOP

| Description | lead lb/hr | Stack Ht |
|---|---|---|
| Portland cement termnal - Cement terminal: Cement silo loading | 0.000368 | 50 |
| Portland cement termnal - Cement terminal: Truck Loading/Unloading | 0.002208 | 20 |





Google Earth View
2150 E 130th Street

## Emission Rate to Inventoried Pb Emission Rate

| Holcium FESOP 6-11-19<br>FESOP 09100031; Source ID 031600FHQ | |
|---|---|
| Portland Cement Termnal - Cement Terminal: Cement Silo Loading | Portland Cement Termnal - Cement Terminal: Truck Loading/Unloading |

| From Pg 2 of FESOP:<br>Unload cement from Vessel/Barge (P17/P18) to Main Distribution Silo (P34) controlled by Dust Collector (DC01) Venting to Stack S10 | From Pg 2 of FESOP:<br>Truck Loading/Unloading Scale 1 (P24a) controlled by Dust Collector (DC03) Venting to Stack S12 and Truck Loading/Unloading Scale 2 (P24B) controlled by Dust Collector DC04 Venting to Stack S13 |
|---|---|
| **11a (Page 11)** | **11a (Page 11)** |
| Unload cement from Vessel/Barge (P17/P18) to Main distribution Silo P23 | Truck Loading Scales 1 & 2 P24A/B (cement) |
| 965,790 | 965,790 |
| 5,840 based on a 8 mo season | 5,840 based on a 8 mo season |
| 165 | 165 |
| 1.09E-08 lb/ton | 1.53E-06 lb/ton |
| 1.80E-06 | 2.53E-04 |
| 0.000368<br>**Inventory Pb emission rate is over 200 x greater than estimated Pb emission rate.** | 0.002208<br>**Inventory Pb emission rate is over 87 x greater than estimated Pb emission rate** |
| 90 | Location of filter for truck unloading is not obvious in photos below. |
| 50 | 20 |

| Controlled | | | |
|---|---|---|---|
| PM | Emission Factor Rating | Total $PM_{10}$ | Emission Factor Rating |
| ) | | ND | |
| ) | | ND | |
| )99 | D | 0.00034 | D |
| 89 | D | 0.0049 | E |
| ) | | ND | |
| 84<br>gn.<br>2-1 | B | 0.0055<br>or Eqn.<br>11.12-1 | B |
| 8<br>gn.<br>2-1 | B | 0.0263<br>or Eqn.<br>11.12-1 | B |
| ved Roads | | | |
| paved Roads | | | |
| al Wind Erosion | | | |

TABLE 11.12-8 (ENG
CONCRETE BATCH PLANT MET

| | Arsenic | Beryllium | Cadmium | Total Chromium | Le |
|---|---|---|---|---|---|
| Cement Silo Filling [b]<br>(SCC 3-05-011-07)<br>w/ Fabric Filter | 1.68e-06<br>4.24e-09 | 1.79e-08<br>4.86e-10 | 2.34e-07<br>ND | 2.52e-07<br>2.90e-08 | 7.36<br>1.09 |
| Cement Supplement Silo Filling [c]<br>(SCC 3-05-011-17)<br>w/ Fabric Filter | ND<br>1.00e-06 | ND<br>9.04e-08 | ND<br>1.98e-10 | ND<br>1.22e-06 | N<br>5.20 |
| Central Mix Batching [d]<br>(SCC 3-05-011-09)<br>w/ Fabric Filter | 8.38e-06<br>2.96e-07 | ND<br>ND | 1.18e-08<br>7.10e-10 | 1.42e-06<br>1.27e-07 | 3.82<br>3.66 |
| Truck Loading [c]<br>(SCC 3-05-011-10)<br>w/ Fabric Filter | 1.22e-05<br>6.02e-07 | 2.44e-07<br>1.04e-07 | 3.42e-08<br>9.06e-09 | 1.14e-05<br>4.10e-06 | 3.62<br>1.53 |

ND=No data

[a] All emission factors are in lb of pollutant per ton of material loaded unless not cement, cement supplement and the surface moisture associated with these mat presented in references 9 and 10 was 1865 lbs course aggregate, 1428 lbs sand, gallons of water was added to this solid material to produce 4024 lbs (one cubic

[b] The uncontrolled emission factors were developed from Reference 9. The cor Although controlled emissions of phosphorous compounds were below detectio the average effectiveness (98%) for the other metals.

[c] Reference 10.

[d] Reference 9. The emission factor units are lb of pollutant per ton of cement a typical central mix operation. The average estimate of the percent of emissions

[e] Reference 9 and 10. The emission factor units are lb of pollutant per ton of ce two typical truck mix loading operations. Based upon visual observations of ev capture efficiency during the testing was 71%.

| E | N |
|---|---|
| 452489 | 41612185 |
| | |


**of Holcim US**
**: - Chicago, Illinoist**

LISH UNITS)
AL EMISSION FACTORS [a]

| ad | Manganese | Nickel | Total Phosphorus | Selenium | Emission Factor Rating |
|---|---|---|---|---|---|
| e-07<br>e-08 | 2.02e-04<br>1.17e-07 | 1.76e-05<br>4.18e-08 | 1.18e-05<br>ND | ND<br>ND | E<br>E |
| D<br>e-07 | ND<br>2.56e-07 | ND<br>2.28e-06 | ND<br>3.54e-06 | ND<br>7.24e-08 | E<br>E |
| e-07<br>e-08 | 6.12e-05<br>3.78e-06 | 3.28e-06<br>2.48e-07 | 2.02e-05<br>1.20e-06 | ND<br>ND | E<br>E |
| e-06<br>e-06 | 6.12e-05<br>2.08e-05 | 1.19e-05<br>4.78e-06 | 3.84e-05<br>1.23e-05 | 2.62e-06<br>1.13e-07 | E<br>E |

ted otherwise. Loaded material includes course aggregate, sand,
erials. The average material composition of concrete batches
491 lbs cement and 73 lbs cement supplement. Approximately 20
yard) of concrete.
ntrolled emission factors were developed form Reference 9 and 10.
on, it is reasonable to assume that the effectiveness is comparable to

nd cement supplement. Emission factors were developed from a
captured during each test run is 94%.
ment and cement supplement. Emission factors were developed from
very loading operation during the two test programs, the average


source coord given in Pb inventory

## Layman, Robb

**From:** Sprague, Jeff
**Sent:** Thursday, January 9, 2020 2:26 PM
**To:** John Pinion
**Cc:** Sprague, Jeff; Bernoteit, Bob; Layman, Robb; Barria, German; Patel, Minesh; Romaine, Chris
**Subject:** RE: Downwash data
**Attachments:** HorseheadCorp.PIP; HorseheadCorp.SO; HorseheadCorp.SUM; HorseheadCorp.TAB

Yes, I'm forwarding the BPIP-PRIME input and output files (see attached) with this response. The direction-specific building data inputs for Kiln #1 can be ignored. Note, however, that the Kiln #2 stack height (31.089 meters) and diameter (2.133 meters) should be increased, and the exit velocity decreased (0.543 meters/second), based upon information that we found on file for this facility. The location coordinates for all three of the American Zinc Recycling sources should be adjusted based upon the coordinates assigned to them in the BPIP-PRIME input file.

Jeff

Jeffrey Sprague
Modeling Unit, Manager
Air Quality Planning Section
Bureau of Air
Illinois Environmental Protection Agency

(217) 524-4692
Jeff.Sprague@Illinois.gov

---

**From:** John Pinion <jpinion@rka-inc.com>
**Sent:** Thursday, January 9, 2020 12:22 PM
**To:** Sprague, Jeff <Jeff.Sprague@Illinois.gov>
**Subject:** [External] Downwash data

Any word on the downwash data?

If you have any questions, please do not hesitate to contact me.

**Regards,**
John Pinion

**RK & Associates, Inc.**
2 South 631 Route 59, Suite B
Warrenville, Illinois 60555

Phone: 630-393-9000 x 208
Fax: 630-393-9111
Cell: 630-917-1455
E-mail: jpinion@rka-inc.com

HorseheadCorp.PIP

```
'N:\BOA\aqp\CARI\Lead Projects\Horsehead Corp\rectangular
buildings\HorseheadCorp2.BST BEESTWin BPIP-Prime Files 1/9/2020 1:22:26 PM'
'P'
'METERS'      1.0
'UTMY'        0
 6
'4'            1            178.29
 4            20.2692
453749        4615241.25
453718.5      4615241.25
453718.5      4615179.5
453749        4615179.5
'11'           2            178.29
 4            15.24
453800.25     4615198
453800.25     4615230
453812.5      4615230
453812.5      4615198
 4            21.336
453801.5      4615198
453801.5      4615230
453811.5      4615230
453811.5      4615198
'13'           1            178.29
 4            19.812
453801.83     4615145.8
453817.83     4615154.55
453830.83     4615130.55
453814.83     4615121.8
'37'           2            178.29
 4            30.48
453962.25     4615314.4
453981.9      4615314.4
453981.9      4615220.5
453962.25     4615220.5
 4            35.052
453968.1      4615314.4
453975        4615314.4
453975        4615220.5
453968.1      4615220.5
'22'           3            178.29
 4            16.764
453814.5      4615280.75
453831        4615280.75
453831        4615265
453814.5      4615265
 4            21.336
453820.3      4615278.6
```

```
453825.2      4615278.6
453825.2      4615266.6
453820.3      4615266.6
 4            16.764
453828.3      4615276.6
453833.3      4615276.6
453833.3      4615268.6
453828.3      4615268.6
'4b'          4            178.29
 4            16.1544
453749        4615186.1
453755.25     4615186.1
453755.25     4615192.4
453749        4615192.4
 4            20.2692
453755.25     4615192.4
453755.25     4615228.9
453749        4615228.9
453749        4615192.4
 4            22.86
453755.25     4615200.5
453755.25     4615209.5
453749        4615209.5
453749        4615200.5
 4            22.86
453755.25     4615211
453755.25     4615220
453749        4615220
453749        4615211
 4
'KILN2       '              178.29        31.0896      453769.8      4615223.5
'KILN1       '              178.29        31.0896      453770.2      4615238.0
'BIN         '              178.29        29.87        453756.94     4615210.52
'FEED        '              178.29        22.86        453837.86     4615177.27
```

HorseheadCorp.SUM
N:\BOA\aqp\CARI\Lead Projects\Horsehead Corp\rectangular buildings\HorseheadCo

BPIP (Dated: 04274)
DATE : 1/ 9/2020
TIME : 13:22:26
N:\BOA\aqp\CARI\Lead Projects\Horsehead Corp\rectangular buildings\HorseheadCo

==========
BPIP PROCESSING INFORMATION:
==========

The P flag has been set for preparing downwash related data
for a model run utilizing the PRIME algorithm.

Inputs entered in METERS will be converted to meters using
a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in
UTM coordinates. BPIP will move the UTM origin to the first pair of
UTM coordinates read. The UTM coordinates of the new origin will
be subtracted from all the other UTM coordinates entered to form
this new local coordinate system.

Plant north is set to 0.00 degrees with respect to True North.

N:\BOA\aqp\CARI\Lead Projects\Horsehead Corp\rectangular buildings\HorseheadCo

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

| Stack Name | Stack Height | Stack-Building Base Elevation Differences | GEP** EQN1 | Preliminary* GEP Stack Height Value |
|---|---|---|---|---|
| KILN2 | 31.09 | 0.00 | 53.34 | 65.00 |
| KILN1 | 31.09 | 0.00 | 53.34 | 65.00 |
| BIN | 29.87 | 0.00 | 53.34 | 65.00 |
| FEED | 22.86 | 0.00 | 87.63 | 87.63 |

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP
Technical Support Document. Determinant 3 may be investigated for
additional stack height credit. Final values result after
Determinant 3 has been taken into consideration.
** Results were derived from Equation 1 on page 6 of GEP Technical

Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 04274)

DATE : 1/ 9/2020
TIME : 13:22:26

N:\BOA\aqp\CARI\Lead Projects\Horsehead Corp\rectangular buildings\HorseheadCo

BPIP output is in meters

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SO | BUILDHGT | KILN2 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 21.34 |
| SO | BUILDHGT | KILN2 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | KILN2 | 21.34 | 21.34 | 20.27 | 0.00 | 0.00 | 0.00 |
| SO | BUILDHGT | KILN2 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 21.34 |
| SO | BUILDHGT | KILN2 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | KILN2 | 21.34 | 21.34 | 20.27 | 19.81 | 0.00 | 0.00 |
| SO | BUILDWID | KILN2 | 44.67 | 49.78 | 23.66 | 28.25 | 31.98 | 32.71 |
| SO | BUILDWID | KILN2 | 33.49 | 33.25 | 32.00 | 33.25 | 33.49 | 32.71 |
| SO | BUILDWID | KILN2 | 30.94 | 28.23 | 23.66 | 0.00 | 0.00 | 0.00 |
| SO | BUILDWID | KILN2 | 44.67 | 49.78 | 23.66 | 28.25 | 31.98 | 32.71 |
| SO | BUILDWID | KILN2 | 33.49 | 33.25 | 32.00 | 33.25 | 33.49 | 32.71 |
| SO | BUILDWID | KILN2 | 30.94 | 28.23 | 23.66 | 22.04 | 0.00 | 0.00 |
| SO | BUILDLEN | KILN2 | 66.11 | 68.46 | 34.73 | 31.98 | 28.25 | 24.66 |
| SO | BUILDLEN | KILN2 | 20.34 | 15.40 | 10.00 | 15.40 | 20.34 | 24.66 |
| SO | BUILDLEN | KILN2 | 28.23 | 30.94 | 34.73 | 0.00 | 0.00 | 0.00 |
| SO | BUILDLEN | KILN2 | 66.11 | 68.46 | 34.73 | 31.98 | 28.25 | 24.66 |
| SO | BUILDLEN | KILN2 | 20.34 | 15.40 | 10.00 | 15.40 | 20.34 | 24.66 |
| SO | BUILDLEN | KILN2 | 28.23 | 30.94 | 34.73 | 29.75 | 0.00 | 0.00 |
| SO | XBADJ | KILN2 | -52.24 | -58.89 | -37.33 | -37.19 | -35.92 | 14.70 |
| SO | XBADJ | KILN2 | 21.07 | 26.79 | 31.70 | 30.09 | 27.57 | 24.20 |
| SO | XBADJ | KILN2 | 20.11 | 15.40 | -15.08 | 0.00 | 0.00 | 0.00 |
| SO | XBADJ | KILN2 | -13.87 | -9.57 | 2.60 | 5.22 | 7.67 | -39.36 |
| SO | XBADJ | KILN2 | -41.41 | -42.20 | -41.70 | -45.49 | -47.91 | -48.86 |
| SO | XBADJ | KILN2 | -48.34 | -46.34 | -19.66 | -110.97 | 0.00 | 0.00 |
| SO | YBADJ | KILN2 | 31.27 | 29.39 | 8.88 | 5.28 | 1.52 | -26.58 |
| SO | YBADJ | KILN2 | -21.48 | -15.73 | -9.50 | -2.98 | 3.63 | 10.12 |
| SO | YBADJ | KILN2 | 16.31 | 22.01 | -21.73 | 0.00 | 0.00 | 0.00 |

HorseheadCorp.SUM

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SO | YBADJ | KILN2 | -31.27 | -29.39 | -8.88 | -5.28 | -1.52 | 26.58 |
| SO | YBADJ | KILN2 | 21.48 | 15.73 | 9.50 | 2.98 | -3.63 | -10.12 |
| SO | YBADJ | KILN2 | -16.31 | -22.01 | 21.73 | -14.54 | 0.00 | 0.00 |
| SO | BUILDHGT | KILN1 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 |
| SO | BUILDHGT | KILN1 | 20.27 | 20.27 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | KILN1 | 21.34 | 21.34 | 21.34 | 0.00 | 0.00 | 0.00 |
| SO | BUILDHGT | KILN1 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 |
| SO | BUILDHGT | KILN1 | 20.27 | 20.27 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | KILN1 | 21.34 | 21.34 | 21.34 | 19.81 | 0.00 | 0.00 |
| SO | BUILDWID | KILN1 | 41.44 | 49.78 | 23.66 | 28.25 | 31.98 | 34.73 |
| SO | BUILDWID | KILN1 | 36.44 | 37.03 | 32.00 | 33.25 | 33.49 | 32.71 |
| SO | BUILDWID | KILN1 | 30.94 | 28.23 | 24.66 | 0.00 | 0.00 | 0.00 |
| SO | BUILDWID | KILN1 | 41.44 | 49.78 | 23.66 | 28.25 | 31.98 | 34.73 |
| SO | BUILDWID | KILN1 | 36.44 | 37.03 | 32.00 | 33.25 | 33.49 | 32.71 |
| SO | BUILDWID | KILN1 | 30.94 | 28.23 | 24.66 | 22.04 | 0.00 | 0.00 |
| SO | BUILDLEN | KILN1 | 66.11 | 68.46 | 34.73 | 31.98 | 28.25 | 23.66 |
| SO | BUILDLEN | KILN1 | 18.36 | 12.49 | 10.00 | 15.40 | 20.34 | 24.66 |
| SO | BUILDLEN | KILN1 | 28.23 | 30.94 | 32.71 | 0.00 | 0.00 | 0.00 |
| SO | BUILDLEN | KILN1 | 66.11 | 68.46 | 34.73 | 31.98 | 28.25 | 23.66 |
| SO | BUILDLEN | KILN1 | 18.36 | 12.49 | 10.00 | 15.40 | 20.34 | 24.66 |
| SO | BUILDLEN | KILN1 | 28.23 | 30.94 | 32.71 | 29.75 | 0.00 | 0.00 |
| SO | XBADJ | KILN1 | -66.59 | -72.65 | -50.09 | -48.56 | -45.55 | -41.16 |
| SO | XBADJ | KILN1 | -35.52 | -28.80 | 31.30 | 32.21 | 32.15 | 31.11 |
| SO | XBADJ | KILN1 | 29.12 | 26.25 | 22.58 | 0.00 | 0.00 | 0.00 |
| SO | XBADJ | KILN1 | 0.48 | 4.20 | 15.36 | 16.58 | 17.30 | 17.50 |
| SO | XBADJ | KILN1 | 17.16 | 16.30 | -41.30 | -47.62 | -52.49 | -55.77 |
| SO | XBADJ | KILN1 | -57.35 | -57.19 | -55.29 | -124.46 | 0.00 | 0.00 |
| SO | YBADJ | KILN1 | 30.76 | 24.80 | 1.98 | -3.73 | -9.33 | -14.65 |
| SO | YBADJ | KILN1 | -19.52 | -23.80 | -24.00 | -17.33 | -10.14 | -2.63 |
| SO | YBADJ | KILN1 | 4.95 | 12.38 | 19.44 | 0.00 | 0.00 | 0.00 |
| SO | YBADJ | KILN1 | -30.76 | -24.80 | -1.98 | 3.73 | 9.33 | 14.65 |
| SO | YBADJ | KILN1 | 19.52 | 23.80 | 24.00 | 17.33 | 10.14 | 2.63 |
| SO | YBADJ | KILN1 | -4.95 | -12.38 | -19.44 | -9.21 | 0.00 | 0.00 |
| SO | BUILDHGT | BIN | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 21.34 |
| SO | BUILDHGT | BIN | 21.34 | 21.34 | 20.27 | 21.34 | 21.34 | 20.27 |
| SO | BUILDHGT | BIN | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 |
| SO | BUILDHGT | BIN | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 21.34 |
| SO | BUILDHGT | BIN | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 20.27 |
| SO | BUILDHGT | BIN | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 | 20.27 |
| SO | BUILDWID | BIN | 40.76 | 49.78 | 23.66 | 28.25 | 31.98 | 32.71 |
| SO | BUILDWID | BIN | 33.49 | 33.25 | 36.50 | 33.25 | 33.49 | 34.73 |
| SO | BUILDWID | BIN | 31.98 | 28.25 | 23.66 | 49.78 | 40.76 | 30.50 |
| SO | BUILDWID | BIN | 40.76 | 49.78 | 23.66 | 28.25 | 31.98 | 32.71 |
| SO | BUILDWID | BIN | 33.49 | 33.25 | 32.00 | 33.25 | 33.49 | 34.73 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SO | BUILDWID | BIN | 31.98 | 28.25 | 23.66 | 49.78 | 40.76 | 30.50 |
| SO | BUILDLEN | BIN | 66.11 | 68.46 | 34.73 | 31.98 | 28.25 | 24.66 |
| SO | BUILDLEN | BIN | 20.34 | 15.40 | 6.25 | 15.40 | 20.34 | 23.66 |
| SO | BUILDLEN | BIN | 28.25 | 31.98 | 34.73 | 68.46 | 66.11 | 61.75 |
| SO | BUILDLEN | BIN | 66.11 | 68.46 | 34.73 | 31.98 | 28.25 | 24.66 |
| SO | BUILDLEN | BIN | 20.34 | 15.40 | 10.00 | 15.40 | 20.34 | 23.66 |
| SO | BUILDLEN | BIN | 28.25 | 31.98 | 34.73 | 68.46 | 66.11 | 61.75 |
| SO | XBADJ | BIN | -37.22 | -42.30 | -19.66 | -18.98 | -17.73 | 32.33 |
| SO | XBADJ | BIN | 37.59 | 41.71 | -7.94 | 40.50 | 35.21 | -16.07 |
| SO | XBADJ | BIN | -17.90 | -19.18 | -19.89 | -42.02 | -36.94 | -30.73 |
| SO | XBADJ | BIN | -28.88 | -26.16 | -15.07 | -12.99 | -10.52 | -56.99 |
| SO | XBADJ | BIN | -57.93 | -57.11 | -54.56 | -55.91 | -55.55 | -7.60 |
| SO | XBADJ | BIN | -10.35 | -12.79 | -14.85 | -26.43 | -29.17 | -31.02 |
| SO | YBADJ | BIN | 22.81 | 21.74 | 4.23 | 3.77 | 3.19 | -21.77 |
| SO | YBADJ | BIN | -13.68 | -5.18 | 0.13 | 12.03 | 20.22 | -2.29 |
| SO | YBADJ | BIN | -3.00 | -3.60 | -4.10 | -21.84 | -22.86 | -23.19 |
| SO | YBADJ | BIN | -22.81 | -21.74 | -4.23 | -3.77 | -3.19 | 21.77 |
| SO | YBADJ | BIN | 13.68 | 5.18 | -3.48 | -12.03 | -20.22 | 2.29 |
| SO | YBADJ | BIN | 3.00 | 3.60 | 4.10 | 21.84 | 22.86 | 23.19 |
| | | | | | | | | |
| SO | BUILDHGT | FEED | 19.81 | 19.81 | 19.81 | 19.81 | 19.81 | 19.81 |
| SO | BUILDHGT | FEED | 0.00 | 0.00 | 20.27 | 20.27 | 21.34 | 21.34 |
| SO | BUILDHGT | FEED | 21.34 | 21.34 | 21.34 | 21.34 | 0.00 | 19.81 |
| SO | BUILDHGT | FEED | 19.81 | 19.81 | 19.81 | 35.05 | 35.05 | 35.05 |
| SO | BUILDHGT | FEED | 35.05 | 0.00 | 0.00 | 0.00 | 21.34 | 21.34 |
| SO | BUILDHGT | FEED | 21.34 | 21.34 | 21.34 | 21.34 | 0.00 | 19.81 |
| SO | BUILDWID | FEED | 31.21 | 32.47 | 32.74 | 32.02 | 30.32 | 27.71 |
| SO | BUILDWID | FEED | 0.00 | 0.00 | 61.75 | 37.03 | 33.49 | 32.71 |
| SO | BUILDWID | FEED | 30.94 | 28.23 | 24.66 | 20.34 | 0.00 | 29.00 |
| SO | BUILDWID | FEED | 31.21 | 32.47 | 32.74 | 65.64 | 76.37 | 84.77 |
| SO | BUILDWID | FEED | 90.60 | 0.00 | 0.00 | 0.00 | 33.49 | 32.71 |
| SO | BUILDWID | FEED | 30.94 | 28.23 | 24.66 | 20.34 | 0.00 | 29.00 |
| SO | BUILDLEN | FEED | 32.77 | 31.80 | 29.86 | 27.02 | 23.35 | 18.97 |
| SO | BUILDLEN | FEED | 0.00 | 0.00 | 30.50 | 12.49 | 20.34 | 24.66 |
| SO | BUILDLEN | FEED | 28.23 | 30.94 | 32.71 | 33.49 | 0.00 | 32.75 |
| SO | BUILDLEN | FEED | 32.77 | 31.80 | 29.86 | 76.37 | 65.64 | 52.93 |
| SO | BUILDLEN | FEED | 38.60 | 0.00 | 0.00 | 0.00 | 20.34 | 24.66 |
| SO | BUILDLEN | FEED | 28.23 | 30.94 | 32.71 | 33.49 | 0.00 | 32.75 |
| SO | XBADJ | FEED | -58.63 | -60.00 | -59.55 | -57.30 | -53.30 | -47.68 |
| SO | XBADJ | FEED | 0.00 | 0.00 | -119.36 | -96.48 | -52.20 | -57.85 |
| SO | XBADJ | FEED | -61.75 | -63.77 | -63.85 | -61.99 | 0.00 | 22.72 |
| SO | XBADJ | FEED | 25.85 | 28.20 | 29.69 | -193.20 | -193.20 | -187.33 |
| SO | XBADJ | FEED | -175.77 | 0.00 | 0.00 | 0.00 | 31.86 | 33.19 |
| SO | XBADJ | FEED | 33.52 | 32.82 | 31.13 | 28.50 | 0.00 | -55.47 |
| SO | YBADJ | FEED | 14.41 | 6.86 | -0.90 | -8.64 | -16.11 | -23.09 |
| SO | YBADJ | FEED | 0.00 | 0.00 | 33.10 | 17.99 | 23.79 | 16.13 |
| SO | YBADJ | FEED | 7.98 | -0.41 | -8.79 | -16.91 | 0.00 | -21.53 |

HorseheadCorp.SUM

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SO | YBADJ | FEED | -14.41 | -6.86 | 0.90 | 44.45 | 16.85 | -11.25 |
| SO | YBADJ | FEED | -39.02 | 0.00 | 0.00 | 0.00 | -23.79 | -16.13 |
| SO | YBADJ | FEED | -7.98 | 0.41 | 8.79 | 16.91 | 0.00 | 21.53 |

HorseheadCorp.TAB
N:\BOA\aqp\CARI\Lead Projects\Horsehead Corp\rectangular buildings\HorseheadCo

BPIP (Dated: 04274)
DATE :  1/ 9/2020
TIME : 13:22:26
N:\BOA\aqp\CARI\Lead Projects\Horsehead Corp\rectangular buildings\HorseheadCo

==========
BPIP PROCESSING INFORMATION:
==========

The P  flag has been set for preparing downwash related data
for a model run utilizing the PRIME algorithm.

Inputs entered in METERS will be converted to meters using
a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in
UTM coordinates. BPIP will move the UTM origin to the first pair of
UTM coordinates read. The UTM coordinates of the new origin will
be subtracted from all the other UTM coordinates entered to form
this new local coordinate system.

The new local coordinates will be displayed in parentheses just below
the UTM coordinates they represent.

Plant north is set to 0.00 degrees with respect to True North.

==========
INPUT SUMMARY:
==========

Number of buildings to be processed: 6

4 has 1 tier(s) with a base elevation of 178.29 METERS

| BUILDING NAME | TIER NUMBER | BLDG-TIER NUMBER | TIER HEIGHT | NO. OF CORNERS | CORNER COORDINATES X | Y |
|---|---|---|---|---|---|---|
| 4 | 1 | 1 | 20.27 | 4 | | |
| | | | | | 453749.00 | 4615241.25 meters |
| | | | | | ( 0.00 | 0.00) meters |
| | | | | | 453718.50 | 4615241.25 meters |
| | | | | | ( -30.50 | 0.00) meters |

HorseheadCorp.TAB

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 453718.50 | 4615179.50 meters |
| | | | | | ( -30.50 | -61.75) meters |
| | | | | | 453749.00 | 4615179.50 meters |
| | | | | | ( 0.00 | -61.75) meters |

11 has 2 tier(s) with a base elevation of 178.29 METERS

| BUILDING NAME | TIER NUMBER | BLDG-TIER NUMBER | TIER HEIGHT | NO. OF CORNERS | CORNER | COORDINATES |
|---|---|---|---|---|---|---|
| | | | | | X | Y |
| 11 | 1 | 5 | 15.24 | 4 | | |
| | | | | | 453800.25 | 4615198.00 meters |
| | | | | | ( 51.25 | -43.25) meters |
| | | | | | 453800.25 | 4615230.00 meters |
| | | | | | ( 51.25 | -11.25) meters |
| | | | | | 453812.50 | 4615230.00 meters |
| | | | | | ( 63.50 | -11.25) meters |
| | | | | | 453812.50 | 4615198.00 meters |
| | | | | | ( 63.50 | -43.25) meters |
| 11 | 2 | 6 | 21.34 | 4 | | |
| | | | | | 453801.50 | 4615198.00 meters |
| | | | | | ( 52.50 | -43.25) meters |
| | | | | | 453801.50 | 4615230.00 meters |
| | | | | | ( 52.50 | -11.25) meters |
| | | | | | 453811.50 | 4615230.00 meters |
| | | | | | ( 62.50 | -11.25) meters |
| | | | | | 453811.50 | 4615198.00 meters |
| | | | | | ( 62.50 | -43.25) meters |

13 has 1 tier(s) with a base elevation of 178.29 METERS

| BUILDING NAME | TIER NUMBER | BLDG-TIER NUMBER | TIER HEIGHT | NO. OF CORNERS | CORNER | COORDINATES |
|---|---|---|---|---|---|---|
| | | | | | X | Y |
| 13 | 1 | 9 | 19.81 | 4 | | |
| | | | | | 453801.83 | 4615145.80 meters |
| | | | | | ( 52.83 | -95.45) meters |
| | | | | | 453817.83 | 4615154.55 meters |
| | | | | | ( 68.83 | -86.70) meters |
| | | | | | 453830.83 | 4615130.55 meters |
| | | | | | ( 81.83 | -110.70) meters |
| | | | | | 453814.83 | 4615121.80 meters |
| | | | | | ( 65.83 | -119.45) meters |

37 has 2 tier(s) with a base elevation of 178.29 METERS

| BUILDING NAME | TIER NUMBER | BLDG-TIER NUMBER | TIER HEIGHT | NO. OF CORNERS | CORNER | COORDINATES |
|---|---|---|---|---|---|---|
| | | | | | X | Y |

HorseheadCorp.TAB

| | | | | | | |
|---|---|---|---|---|---|---|
| 37 | 1 | 13 | 30.48 | 4 | | |
| | | | | | 453962.25 | 4615314.40 meters |
| | | | | ( | 213.25 | 73.15) meters |
| | | | | | 453981.90 | 4615314.40 meters |
| | | | | ( | 232.90 | 73.15) meters |
| | | | | | 453981.90 | 4615220.50 meters |
| | | | | ( | 232.90 | -20.75) meters |
| | | | | | 453962.25 | 4615220.50 meters |
| | | | | ( | 213.25 | -20.75) meters |
| 37 | 2 | 14 | 35.05 | 4 | | |
| | | | | | 453968.10 | 4615314.40 meters |
| | | | | ( | 219.10 | 73.15) meters |
| | | | | | 453975.00 | 4615314.40 meters |
| | | | | ( | 226.00 | 73.15) meters |
| | | | | | 453975.00 | 4615220.50 meters |
| | | | | ( | 226.00 | -20.75) meters |
| | | | | | 453968.10 | 4615220.50 meters |
| | | | | ( | 219.10 | -20.75) meters |

22 has 3 tier(s) with a base elevation of 178.29 METERS

| BUILDING NAME | TIER NUMBER | BLDG-TIER NUMBER | TIER HEIGHT | NO. OF CORNERS | CORNER X | COORDINATES Y |
|---|---|---|---|---|---|---|
| 22 | 1 | 17 | 16.76 | 4 | | |
| | | | | | 453814.50 | 4615280.75 meters |
| | | | | ( | 65.50 | 39.50) meters |
| | | | | | 453831.00 | 4615280.75 meters |
| | | | | ( | 82.00 | 39.50) meters |
| | | | | | 453831.00 | 4615265.00 meters |
| | | | | ( | 82.00 | 23.75) meters |
| | | | | | 453814.50 | 4615265.00 meters |
| | | | | ( | 65.50 | 23.75) meters |
| 22 | 2 | 18 | 21.34 | 4 | | |
| | | | | | 453820.30 | 4615278.60 meters |
| | | | | ( | 71.30 | 37.35) meters |
| | | | | | 453825.20 | 4615278.60 meters |
| | | | | ( | 76.20 | 37.35) meters |
| | | | | | 453825.20 | 4615266.60 meters |
| | | | | ( | 76.20 | 25.35) meters |
| | | | | | 453820.30 | 4615266.60 meters |
| | | | | ( | 71.30 | 25.35) meters |
| 22 | 3 | 19 | 16.76 | 4 | | |
| | | | | | 453828.30 | 4615276.60 meters |
| | | | | ( | 79.30 | 35.35) meters |
| | | | | | 453833.30 | 4615276.60 meters |
| | | | | ( | 84.30 | 35.35) meters |

HorseheadCorp.TAB

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 453833.30 | 4615268.60 meters |
| | | | | ( | 84.30 | 27.35) meters |
| | | | | | 453828.30 | 4615268.60 meters |
| | | | | ( | 79.30 | 27.35) meters |

4b has 4 tier(s) with a base elevation of 178.29 METERS

| BUILDING NAME | TIER NUMBER | BLDG-TIER NUMBER | TIER HEIGHT | NO. OF CORNERS | CORNER | COORDINATES X | Y |
|---|---|---|---|---|---|---|---|
| 4b | 1 | 21 | 16.15 | 4 | | | |
| | | | | | | 453749.00 | 4615186.10 meters |
| | | | | | ( | 0.00 | -55.15) meters |
| | | | | | | 453755.25 | 4615186.10 meters |
| | | | | | ( | 6.25 | -55.15) meters |
| | | | | | | 453755.25 | 4615192.40 meters |
| | | | | | ( | 6.25 | -48.85) meters |
| | | | | | | 453749.00 | 4615192.40 meters |
| | | | | | ( | 0.00 | -48.85) meters |
| 4b | 2 | 22 | 20.27 | 4 | | | |
| | | | | | | 453755.25 | 4615192.40 meters |
| | | | | | ( | 6.25 | -48.85) meters |
| | | | | | | 453755.25 | 4615228.90 meters |
| | | | | | ( | 6.25 | -12.35) meters |
| | | | | | | 453749.00 | 4615228.90 meters |
| | | | | | ( | 0.00 | -12.35) meters |
| | | | | | | 453749.00 | 4615192.40 meters |
| | | | | | ( | 0.00 | -48.85) meters |
| 4b | 3 | 23 | 22.86 | 4 | | | |
| | | | | | | 453755.25 | 4615200.50 meters |
| | | | | | ( | 6.25 | -40.75) meters |
| | | | | | | 453755.25 | 4615209.50 meters |
| | | | | | ( | 6.25 | -31.75) meters |
| | | | | | | 453749.00 | 4615209.50 meters |
| | | | | | ( | 0.00 | -31.75) meters |
| | | | | | | 453749.00 | 4615200.50 meters |
| | | | | | ( | 0.00 | -40.75) meters |
| 4b | 4 | 24 | 22.86 | 4 | | | |
| | | | | | | 453755.25 | 4615211.00 meters |
| | | | | | ( | 6.25 | -30.25) meters |
| | | | | | | 453755.25 | 4615220.00 meters |
| | | | | | ( | 6.25 | -21.25) meters |
| | | | | | | 453749.00 | 4615220.00 meters |
| | | | | | ( | 0.00 | -21.25) meters |
| | | | | | | 453749.00 | 4615211.00 meters |
| | | | | | ( | 0.00 | -30.25) meters |

Number of stacks to be processed : 4

HorseheadCorp.TAB

| STACK NAME | STACK BASE | STACK HEIGHT | | STACK COORDINATES X | Y |
|---|---|---|---|---|---|
| KILN2 | 178.29 | 31.09 | METERS | | |
| | | | | 453769.80 | 4615223.50 meters |
| | | | ( | 20.80 | -17.75) meters |
| KILN1 | 178.29 | 31.09 | METERS | | |
| | | | | 453770.20 | 4615238.00 meters |
| | | | ( | 21.20 | -3.25) meters |
| BIN | 178.29 | 29.87 | METERS | | |
| | | | | 453756.94 | 4615210.52 meters |
| | | | ( | 7.94 | -30.73) meters |
| FEED | 178.29 | 22.86 | METERS | | |
| | | | | 453837.86 | 4615177.27 meters |
| | | | ( | 88.86 | -63.98) meters |

No stacks have been detected as being atop any structures.

Overall GEP Summary Table
(Units: meters)

StkNo: 1 Stk Name:KILN2 Stk Ht: 31.09 Prelim. GEP Stk.Ht: 65.00
GEP: BH: 21.34 PBW: 31.22 *Eqn1 Ht: 53.34
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 308.75
Bldg-Tier nos. contributing to GEP: 6

StkNo: 2 Stk Name:KILN1 Stk Ht: 31.09 Prelim. GEP Stk.Ht: 65.00
GEP: BH: 21.34 PBW: 27.66 *Eqn1 Ht: 53.34
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 321.75
Bldg-Tier nos. contributing to GEP: 6

StkNo: 3 Stk Name:BIN Stk Ht: 29.87 Prelim. GEP Stk.Ht: 65.00
GEP: BH: 21.34 PBW: 33.51 *Eqn1 Ht: 53.34
*adjusted for a Stack-Building elevation difference of 0.00
No. of Tiers affecting Stk: 1 Direction occurred: 285.50
Bldg-Tier nos. contributing to GEP: 6

StkNo: 4 Stk Name:FEED Stk Ht: 22.86 Prelim. GEP Stk.Ht: 87.63
GEP: BH: 35.05 PBW: 74.40 *Eqn1 Ht: 87.63
*adjusted for a Stack-Building elevation difference of 0.00

HorseheadCorp.TAB
No. of Tiers affecting Stk: 1 Direction occurred: 228.00
Bldg-Tier nos. contributing to GEP: 14

Summary By Direction Table
(Units: meters)

Dominant stand alone tiers:

Direction: 10.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 40.76 PBL: 66.11 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -37.22 YADJ: 22.81

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 1 Bld Name:4 TierNo: 1
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 19.81 PBW: 31.21 PBL: 32.77 *Wake Effect Ht: 49.53
Relative Coordinates of Projected Width Mid-point: XADJ: -58.63 YADJ: 14.41

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 3 Bld Name:13 TierNo: 1

Direction: 20.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 49.78 PBL: 68.46 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -58.89 YADJ: 29.39

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 1 Bld Name:4 TierNo: 1
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09

HorseheadCorp.TAB

GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 49.78 PBL: 68.46 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -72.65 YADJ: 24.80

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 1 Bld Name:4 TierNo: 1
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 49.78 PBL: 68.46 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -42.30 YADJ: 21.74

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 1 Bld Name:4 TierNo: 1
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 19.81 PBW: 32.47 PBL: 31.80 *Wake Effect Ht: 49.53
Relative Coordinates of Projected Width Mid-point: XADJ: -60.00 YADJ: 6.86

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 3 Bld Name:13 TierNo: 1

Direction: 30.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 23.66 PBL: 34.73 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -37.33 YADJ: 8.88

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 23.66 PBL: 34.73 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -50.09 YADJ: 1.98

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 23.66 PBL: 34.73 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -19.66 YADJ: 4.23

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*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 19.81 PBW: 32.74 PBL: 29.86 *Wake Effect Ht: 49.53
Relative Coordinates of Projected Width Mid-point: XADJ: -59.55 YADJ: -0.90

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 3 Bld Name:13 TierNo: 1

Direction: 40.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 28.25 PBL: 31.98 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -37.19 YADJ: 5.28

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 28.25 PBL: 31.98 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -48.56 YADJ: -3.73

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 28.25 PBL: 31.98 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -18.98 YADJ: 3.77

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 19.81 PBW: 32.02 PBL: 27.02 *Wake Effect Ht: 49.53
Relative Coordinates of Projected Width Mid-point: XADJ: -57.30 YADJ: -8.64

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 3 Bld Name:13 TierNo: 1

Direction: 50.00

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```
 StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  31.98  PBL:  28.25  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -35.92  YADJ:    1.52

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  31.98  PBL:  28.25  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -45.55  YADJ:   -9.33

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  31.98  PBL:  28.25  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -17.73  YADJ:    3.19

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  19.81  PBW:  30.32  PBL:  23.35  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ:  -53.30  YADJ:  -16.11

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    3  Bld Name:13        TierNo:  1

 Direction:  60.00

 StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  32.71  PBL:  24.66  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   14.70  YADJ:  -26.58

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  34.73  PBL:  23.66  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -41.16  YADJ:  -14.65
```

```
          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    3  Stk Name: BIN                            Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  32.71  PBL:  24.66  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   32.33  YADJ:  -21.77

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                           Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  19.81  PBW:  27.71  PBL:  18.97  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ:  -47.68  YADJ:  -23.09

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    3  Bld Name:13        TierNo:  1

 Direction:  70.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   21.07  YADJ:  -21.48

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                          Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  36.44  PBL:  18.36  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -35.52  YADJ:  -19.52

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    3  Stk Name: BIN                            Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   37.59  YADJ:  -13.68

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                           Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
```

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No single tier affects this stack for this direction.

Direction: 80.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 33.25 PBL: 15.40 *Wake Effect Ht: 53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 26.79 YADJ: -15.73

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 37.03 PBL: 12.49 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -28.80 YADJ: -23.80

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2

StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 33.25 PBL: 15.40 *Wake Effect Ht: 53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 41.71 YADJ: -5.18

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
No single tier affects this stack for this direction.

Direction: 90.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 32.00 PBL: 10.00 *Wake Effect Ht: 53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 31.70 YADJ: -9.50

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 32.00 PBL: 10.00 *Wake Effect Ht: 53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 31.30 YADJ: -24.00

```
          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  36.50  PBL:   6.25  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:   -7.94  YADJ:    0.13

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  20.27  PBW:  61.75  PBL:  30.50  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ: -119.36  YADJ:   33.10

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    1  Bld Name:4         TierNo:  1

 Direction: 100.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.25  PBL:  15.40  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   30.09  YADJ:   -2.98

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.25  PBL:  15.40  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   32.21  YADJ:  -17.33

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.25  PBL:  15.40  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   40.50  YADJ:   12.03

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  20.27  PBW:  37.03  PBL:  12.49  *Wake Effect Ht:
```

50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -96.48 YADJ: 17.99

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2

Direction: 110.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 33.49 PBL: 20.34 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 27.57 YADJ: 3.63

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 33.49 PBL: 20.34 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 32.15 YADJ: -10.14

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 33.49 PBL: 20.34 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 35.21 YADJ: 20.22

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 21.34 PBW: 33.49 PBL: 20.34 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -52.20 YADJ: 23.79

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

Direction: 120.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 32.71 PBL: 24.66 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 24.20 YADJ: 10.12

```
          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  32.71  PBL:  24.66  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   31.11  YADJ:   -2.63

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  34.73  PBL:  23.66  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -16.07  YADJ:   -2.29

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  32.71  PBL:  24.66  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -57.85  YADJ:   16.13

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2

 Direction: 130.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  30.94  PBL:  28.23  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   20.11  YADJ:   16.31

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  30.94  PBL:  28.23  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   29.12  YADJ:    4.95

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
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     Single tier MAX:  BH:  20.27  PBW:  31.98  PBL:  28.25  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -17.90  YADJ:   -3.00

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                           Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  30.94  PBL:  28.23  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -61.75  YADJ:    7.98

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2

 Direction: 140.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  28.23  PBL:  30.94  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   15.40  YADJ:   22.01

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                          Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  28.23  PBL:  30.94  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   26.25  YADJ:   12.38

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                            Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  28.25  PBL:  31.98  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -19.18  YADJ:   -3.60

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                           Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  28.23  PBL:  30.94  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -63.77  YADJ:   -0.41

          *adjusted for a Stack-Building elevation difference of    0.00
```

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BldNo: 2 Bld Name:11 TierNo: 2

Direction: 150.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 23.66 PBL: 34.73 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -15.08 YADJ: -21.73

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2

StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 24.66 PBL: 32.71 *Wake Effect Ht: 53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 22.58 YADJ: 19.44

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 23.66 PBL: 34.73 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -19.89 YADJ: -4.10

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2

StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 21.34 PBW: 24.66 PBL: 32.71 *Wake Effect Ht: 53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -63.85 YADJ: -8.79

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

Direction: 160.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.

StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.

StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 49.78 PBL: 68.46 *Wake Effect Ht:

50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -42.02 YADJ: -21.84

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 1 Bld Name:4 TierNo: 1
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 21.34 PBW: 20.34 PBL: 33.49 *Wake Effect Ht:
51.85
Relative Coordinates of Projected Width Mid-point: XADJ: -61.99 YADJ: -16.91

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

Direction: 170.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 40.76 PBL: 66.11 *Wake Effect Ht:
50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -36.94 YADJ: -22.86

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 1 Bld Name:4 TierNo: 1
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
No single tier affects this stack for this direction.

Direction: 180.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
No single tier affects this stack for this direction.
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 30.50 PBL: 61.75 *Wake Effect Ht:
50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -30.73 YADJ: -23.19

```
          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  19.81  PBW:  29.00  PBL:  32.75  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ:   22.72  YADJ:  -21.53

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    3  Bld Name:13        TierNo:  1

 Direction: 190.00

 StkNo:    1  Stk Name: KILN2                               Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No single tier affects this stack for this direction.
 StkNo:    2  Stk Name: KILN1                               Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No single tier affects this stack for this direction.
 StkNo:    3  Stk Name: BIN                                 Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  40.76  PBL:  66.11  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -28.88  YADJ:  -22.81

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  19.81  PBW:  31.21  PBL:  32.77  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ:   25.85  YADJ:  -14.41

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    3  Bld Name:13        TierNo:  1

 Direction: 200.00

 StkNo:    1  Stk Name: KILN2                               Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:   -9.57  YADJ:  -29.39

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    2  Stk Name: KILN1                               Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
```

```
     Single tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:    4.20  YADJ:  -24.80

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -26.16  YADJ:  -21.74

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  19.81  PBW:  32.47  PBL:  31.80  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ:   28.20  YADJ:   -6.86

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    3  Bld Name:13        TierNo:  1

 Direction: 210.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  23.66  PBL:  34.73  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:    2.60  YADJ:   -8.88

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  23.66  PBL:  34.73  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:   15.36  YADJ:   -1.98

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  23.66  PBL:  34.73  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -15.07  YADJ:   -4.23

          *adjusted for a Stack-Building elevation difference of    0.00
```

```
               BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                           Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  19.81  PBW:  32.74  PBL:  29.86  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ:   29.69  YADJ:    0.90

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    3  Bld Name:13        TierNo:  1

 Direction: 220.00

 StkNo:    1  Stk Name: KILN2                          Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  28.25  PBL:  31.98  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:    5.22  YADJ:   -5.28

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    2  Stk Name: KILN1                          Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  28.25  PBL:  31.98  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:   16.58  YADJ:    3.73

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    3  Stk Name: BIN                            Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  28.25  PBL:  31.98  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -12.99  YADJ:   -3.77

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                           Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  35.05  PBW:  65.64  PBL:  76.37  *Wake Effect Ht:
87.63
     Relative Coordinates of Projected Width Mid-point: XADJ: -193.20  YADJ:   44.45

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    4  Bld Name:37        TierNo:  2

 Direction: 230.00

 StkNo:    1  Stk Name: KILN2                          Stack Ht:   31.09
```

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GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 31.98 PBL: 28.25 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: 7.67 YADJ: -1.52

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 31.98 PBL: 28.25 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: 17.30 YADJ: 9.33

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 31.98 PBL: 28.25 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -10.52 YADJ: -3.19

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 35.05 PBW: 76.37 PBL: 65.64 *Wake Effect Ht: 87.63
Relative Coordinates of Projected Width Mid-point: XADJ: -193.20 YADJ: 16.85

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 4 Bld Name:37 TierNo: 2

Direction: 240.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 32.71 PBL: 24.66 *Wake Effect Ht: 53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -39.36 YADJ: 26.58

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 34.73 PBL: 23.66 *Wake Effect Ht: 50.67
Relative Coordinates of Projected Width Mid-point: XADJ: 17.50 YADJ: 14.65

```
          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  32.71  PBL:  24.66  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -56.99  YADJ:   21.77

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  35.05  PBW:  84.77  PBL:  52.93  *Wake Effect Ht:
87.63
     Relative Coordinates of Projected Width Mid-point: XADJ: -187.33  YADJ:  -11.25

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    4  Bld Name:37        TierNo:  2

 Direction: 250.00

 StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -41.41  YADJ:   21.48

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  36.44  PBL:  18.36  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:   17.16  YADJ:   19.52

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -57.93  YADJ:   13.68

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  35.05  PBW:  90.60  PBL:  38.60  *Wake Effect Ht:
```

87.63
Relative Coordinates of Projected Width Mid-point: XADJ: -175.77 YADJ: -39.02

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 4 Bld Name:37 TierNo: 2

Direction: 260.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 33.25 PBL: 15.40 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -42.20 YADJ: 15.73

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 37.03 PBL: 12.49 *Wake Effect Ht:
50.67
Relative Coordinates of Projected Width Mid-point: XADJ: 16.30 YADJ: 23.80

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 33.25 PBL: 15.40 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -57.11 YADJ: 5.18

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
No single tier affects this stack for this direction.

Direction: 270.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 32.00 PBL: 10.00 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -41.70 YADJ: 9.50

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34

```
     Single tier MAX:  BH:  21.34  PBW:  32.00  PBL:  10.00  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -41.30  YADJ:   24.00

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  32.00  PBL:  10.00  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -54.56  YADJ:   -3.48

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No single tier affects this stack for this direction.

 Direction: 280.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.25  PBL:  15.40  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -45.49  YADJ:    2.98

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.25  PBL:  15.40  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -47.62  YADJ:   17.33

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.25  PBL:  15.40  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -55.91  YADJ:  -12.03

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No single tier affects this stack for this direction.
```

```
 Direction: 290.00

 StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -47.91  YADJ:   -3.63

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -52.49  YADJ:   10.14

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -55.55  YADJ:  -20.22

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  33.49  PBL:  20.34  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   31.86  YADJ:  -23.79

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2

 Direction: 300.00

 StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  32.71  PBL:  24.66  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -48.86  YADJ:  -10.12

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  32.71  PBL:  24.66  *Wake Effect Ht:
```

53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -55.77 YADJ: 2.63

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 34.73 PBL: 23.66 *Wake Effect Ht:
50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -7.60 YADJ: 2.29

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2
StkNo: 4 Stk Name: FEED Stack Ht: 22.86
GEP: BH: 35.05 PBW: 74.40 *Equation 1 Ht: 87.63
Single tier MAX: BH: 21.34 PBW: 32.71 PBL: 24.66 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: 33.19 YADJ: -16.13

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2

Direction: 310.00

StkNo: 1 Stk Name: KILN2 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 31.22 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 30.94 PBL: 28.23 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -48.34 YADJ: -16.31

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 2 Stk Name: KILN1 Stack Ht: 31.09
GEP: BH: 21.34 PBW: 27.66 *Equation 1 Ht: 53.34
Single tier MAX: BH: 21.34 PBW: 30.94 PBL: 28.23 *Wake Effect Ht:
53.34
Relative Coordinates of Projected Width Mid-point: XADJ: -57.35 YADJ: -4.95

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 2 Bld Name:11 TierNo: 2
StkNo: 3 Stk Name: BIN Stack Ht: 29.87
GEP: BH: 21.34 PBW: 33.51 *Equation 1 Ht: 53.34
Single tier MAX: BH: 20.27 PBW: 31.98 PBL: 28.25 *Wake Effect Ht:
50.67
Relative Coordinates of Projected Width Mid-point: XADJ: -10.35 YADJ: 3.00

*adjusted for a Stack-Building elevation difference of 0.00
BldNo: 6 Bld Name:4b TierNo: 2

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```
 StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  30.94  PBL:  28.23  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   33.52  YADJ:   -7.98

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2

 Direction: 320.00

 StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  28.23  PBL:  30.94  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -46.34  YADJ:  -22.01

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  28.23  PBL:  30.94  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -57.19  YADJ:  -12.38

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  28.25  PBL:  31.98  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -12.79  YADJ:    3.60

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  28.23  PBL:  30.94  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   32.82  YADJ:    0.41

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2

 Direction: 330.00

 StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
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     Single tier MAX:  BH:  20.27  PBW:  23.66  PBL:  34.73  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -19.66  YADJ:   21.73

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  21.34  PBW:  24.66  PBL:  32.71  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:  -55.29  YADJ:  -19.44

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  23.66  PBL:  34.73  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -14.85  YADJ:    4.10

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    6  Bld Name:4b        TierNo:  2
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  24.66  PBL:  32.71  *Wake Effect Ht:
53.34
     Relative Coordinates of Projected Width Mid-point: XADJ:   31.13  YADJ:    8.79

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    2  Bld Name:11        TierNo:  2

 Direction: 340.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  19.81  PBW:  22.04  PBL:  29.75  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ: -110.97  YADJ:  -14.54

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    3  Bld Name:13        TierNo:  1
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  19.81  PBW:  22.04  PBL:  29.75  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ: -124.46  YADJ:   -9.21

          *adjusted for a Stack-Building elevation difference of    0.00
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               BldNo:    3  Bld Name:13        TierNo:  1
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -26.43  YADJ:   21.84

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  21.34  PBW:  20.34  PBL:  33.49  *Wake Effect Ht:
51.85
     Relative Coordinates of Projected Width Mid-point: XADJ:   28.50  YADJ:   16.91

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    2  Bld Name:11        TierNo:  2

 Direction: 350.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No single tier affects this stack for this direction.
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No single tier affects this stack for this direction.
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
     Single tier MAX:  BH:  20.27  PBW:  40.76  PBL:  66.11  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -29.17  YADJ:   22.86

          *adjusted for a Stack-Building elevation difference of    0.00
               BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No single tier affects this stack for this direction.

 Direction: 360.00

 StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No single tier affects this stack for this direction.
 StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No single tier affects this stack for this direction.
 StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
```

```
     Single tier MAX:  BH:  20.27  PBW:  30.50  PBL:  61.75  *Wake Effect Ht:
50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -31.02  YADJ:   23.19

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    1  Bld Name:4         TierNo:  1
 StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     Single tier MAX:  BH:  19.81  PBW:  29.00  PBL:  32.75  *Wake Effect Ht:
49.53
     Relative Coordinates of Projected Width Mid-point: XADJ:  -55.47  YADJ:   21.53

          *adjusted for a Stack-Building elevation difference of    0.00
                BldNo:    3  Bld Name:13        TierNo:  1


 Dominant combined buildings:

 Direction:  10.00

 StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
   Combined tier MAX:  BH:  20.27  PBW:  44.67  PBL:  66.11  *WE Ht:   50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -52.24  YADJ:   31.27

          *adjusted for a Stack-Building elevation difference of    0.00
  No. of Tiers affecting Stk:  2
   Bldg-Tier nos. contributing to MAX:  22   1
 StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                 GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
   Combined tier MAX:  BH:  20.27  PBW:  41.44  PBL:  66.11  *WE Ht:   50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -66.59  YADJ:   30.76

          *adjusted for a Stack-Building elevation difference of    0.00
  No. of Tiers affecting Stk:  2
   Bldg-Tier nos. contributing to MAX:  24   1
 StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
                 GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
   Combined tier MAX:  BH:  20.27  PBW:  41.44  PBL:  66.11  *WE Ht:   50.67
     Relative Coordinates of Projected Width Mid-point: XADJ:  -37.22  YADJ:   22.47

          *adjusted for a Stack-Building elevation difference of    0.00
  No. of Tiers affecting Stk:  2
   Bldg-Tier nos. contributing to MAX:  24   1
 StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                 GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
      No combined tiers affect this stack for this direction.
```

```
Direction:  20.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -58.89  YADJ:   29.39

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -72.65  YADJ:   24.80

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -42.30  YADJ:   21.74

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction:  30.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -63.76  YADJ:   24.66

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -76.51  YADJ:   17.75

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
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StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -46.08  YADJ:   20.01

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction:  40.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -66.68  YADJ:   19.18

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -78.05  YADJ:   10.17

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -48.47  YADJ:   17.67

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction:  50.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -67.58  YADJ:   13.12
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```
         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -77.21  YADJ:    2.27

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -49.39  YADJ:   14.80

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction:  60.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -66.43  YADJ:    6.66

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -74.02  YADJ:   -5.70

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -48.80  YADJ:   11.47

         *adjusted for a Stack-Building elevation difference of    0.00
```

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```
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction:  70.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -63.26  YADJ:   -0.00

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -68.59  YADJ:  -13.49

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -46.73  YADJ:    7.80

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction:  80.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  43.22  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -58.16  YADJ:   -6.67

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
```

```
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  43.22  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -61.07  YADJ:  -20.88

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  43.22  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -43.24  YADJ:    3.88

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction:  90.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  61.75  PBL:  36.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -51.30  YADJ:  -13.13

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  61.75  PBL:  36.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -51.70  YADJ:  -27.63

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  61.75  PBL:  36.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -38.44  YADJ:   -0.15

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
  Combined tier MAX:  BH:  20.27  PBW:  61.75  PBL:  36.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ: -119.36  YADJ:   33.10
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```
         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1

Direction: 100.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  41.44  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -53.60  YADJ:  -19.19

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  41.44  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -51.48  YADJ:  -33.53

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  41.44  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -43.19  YADJ:   -4.17

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  41.44  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ: -128.66  YADJ:   14.52

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1

Direction: 110.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -54.28  YADJ:  -24.66

         *adjusted for a Stack-Building elevation difference of    0.00
```

```
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -49.69  YADJ:  -38.43

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -46.63  YADJ:   -8.07

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ: -134.04  YADJ:   -4.50

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1

Direction: 120.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -53.30  YADJ:  -29.39

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -46.40  YADJ:  -42.15

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
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```
    Relative Coordinates of Projected Width Mid-point: XADJ:  -48.66  YADJ:  -11.72

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ: -135.36  YADJ:  -23.39

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1

Direction: 130.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -50.71  YADJ:  -33.23

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -49.20  YADJ:  -15.02

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ: -132.56  YADJ:  -41.56

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1

Direction: 140.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
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  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -46.57  YADJ:  -36.05

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -48.25  YADJ:  -17.86

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 150.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -41.02  YADJ:  -37.78

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -45.83  YADJ:  -20.16

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 160.00
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StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -42.02  YADJ:  -21.84

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 170.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  43.22  PBL:  66.11  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -36.94  YADJ:  -21.63

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 180.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
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  Combined tier MAX:  BH:  20.27  PBW:  36.75  PBL:  61.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -30.73  YADJ:  -20.07

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 190.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  44.67  PBL:  66.11  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -13.87  YADJ:  -31.27

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  22   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  41.44  PBL:  66.11  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    0.48  YADJ:  -30.76

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  41.44  PBL:  66.11  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -28.88  YADJ:  -22.47

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 200.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -9.57  YADJ:  -29.39

         *adjusted for a Stack-Building elevation difference of    0.00
```

```
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    4.20  YADJ:  -24.80

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -26.16  YADJ:  -21.74

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 210.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -4.97  YADJ:  -24.66

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    7.79  YADJ:  -17.75

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -22.64  YADJ:  -20.01

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
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StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 220.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -0.23  YADJ:  -19.18

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   11.14  YADJ:  -10.17

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -18.44  YADJ:  -17.67

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 230.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    4.52  YADJ:  -13.12

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   14.15  YADJ:   -2.27
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         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -13.67  YADJ:  -14.80

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 240.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    9.14  YADJ:   -6.66

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   16.73  YADJ:    5.70

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -8.49  YADJ:  -11.47

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 250.00
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StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   13.47  YADJ:    0.00

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   18.81  YADJ:   13.49

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -3.05  YADJ:   -7.80

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 260.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  43.22  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   14.94  YADJ:    6.67

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  43.22  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   17.85  YADJ:   20.88

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
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  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  43.22  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    0.02  YADJ:   -3.88

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 270.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  61.75  PBL:  36.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   14.55  YADJ:   13.13

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  61.75  PBL:  36.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   14.95  YADJ:   27.63

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  61.75  PBL:  36.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    1.69  YADJ:    0.15

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 280.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  41.44  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   12.16  YADJ:   19.19

         *adjusted for a Stack-Building elevation difference of    0.00
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 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  41.44  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   10.03  YADJ:   33.53

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.11  PBL:  41.44  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    1.75  YADJ:    4.17

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                               Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 290.00

StkNo:    1  Stk Name: KILN2                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:    4.50  YADJ:   24.66

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                              Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -0.09  YADJ:   38.43

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                                Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.46  PBL:  49.78  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -3.15  YADJ:    8.07

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
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StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 300.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -3.99  YADJ:   29.39

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -10.89  YADJ:   42.15

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
               GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  68.73  PBL:  57.29  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:   -8.63  YADJ:   11.72

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
               GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 310.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -12.35  YADJ:   33.23

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
               GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
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```
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  66.91  PBL:  63.06  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -13.86  YADJ:   15.02

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 320.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -20.34  YADJ:   36.05

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  63.06  PBL:  66.91  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -18.66  YADJ:   17.86

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 330.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -27.71  YADJ:   37.78

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
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     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  57.29  PBL:  68.73  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -22.89  YADJ:   20.16

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 340.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  49.78  PBL:  68.46  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -26.43  YADJ:   21.84

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                             Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 350.00

StkNo:    1  Stk Name: KILN2                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    2  Stk Name: KILN1                            Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                              Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  43.22  PBL:  66.11  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -29.17  YADJ:   21.63

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
```

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```
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.

Direction: 360.00

StkNo:    1  Stk Name: KILN2                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  31.22   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    2  Stk Name: KILN1                             Stack Ht:   31.09
                GEP:  BH:  21.34  PBW:  27.66   *Equation 1 Ht:   53.34
     No combined tiers affect this stack for this direction.
StkNo:    3  Stk Name: BIN                               Stack Ht:   29.87
                GEP:  BH:  21.34  PBW:  33.51   *Equation 1 Ht:   53.34
  Combined tier MAX:  BH:  20.27  PBW:  36.75  PBL:  61.75  *WE Ht:   50.67
    Relative Coordinates of Projected Width Mid-point: XADJ:  -31.02  YADJ:   20.07

         *adjusted for a Stack-Building elevation difference of    0.00
 No. of Tiers affecting Stk:  2
  Bldg-Tier nos. contributing to MAX:  24   1
StkNo:    4  Stk Name: FEED                              Stack Ht:   22.86
                GEP:  BH:  35.05  PBW:  74.40   *Equation 1 Ht:   87.63
     No combined tiers affect this stack for this direction.
```

## Layman, Robb

**From:** Bernoteit, Bob
**Sent:** Friday, January 10, 2020 3:02 PM
**To:** Sprague, Jeff
**Subject:** Holcim FDP
**Attachments:** 031600FHQ.pdf

Your message is ready to be sent with the following file or link attachments:

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