



EXHIBIT 6

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September 24, 2019

R17421-7

Mr. Ray Pilapil
Illinois Environmental Protection Agency - Bureau of Air
1021 North Grand Avenue East
Springfield, IL 62702

**Construction Permit Application for
Scrap Metal Recycling Facility
General III, LLC – 11600 South Burley - Chicago, Illinois**

RECEIVED
STATE OF ILLINOIS
SEP 25 2019
Environmental Protection Agency
BUREAU OF AIR

Dear Mr. Pilapil:

Please find attached three copies of a construction permit application for General III, LLC (GIII) for the construction of a Scrap Metal Recycling Facility (Facility) located in Cook County at 11600 South Burley in Chicago, Illinois.

A check for the applicable permitting fee, in the amount of \$15,000, is attached to this application.

If you have any questions or need any additional information, please don't hesitate to contact us at 630-393-9000.

Yours very truly,
RK & Associates

cc: Mr. Jim Kallas – General III, LLC – Chicago, Illinois (via e-mail)

IEPA - DIVISION OF RECORDS MANAGEMENT
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OCT 02 2019

REVIEWER: MED

**Construction Permit Application for a
Scrap Metal Recycling Facility
General III, LLC - Chicago, Illinois**

ORIGINAL

September 24, 2019

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STATE OF ILLINOIS

SEP 25 2019

Environmental Protection Agency
BUREAU OF AIR

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

Prepared by:
John G. Pinion
Principal Engineer
RK & Associates, Inc.

IEPA - DIVISION OF RECORDS MANAGEMENT
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OCT 02 2019

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REVIEWER: MED



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1.0 INTRODUCTION

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

The Facility described in this application will replace an existing facility currently owned and operated by General Iron Industries, Inc. (General Iron), located at 1909 North Clifton Avenue in Chicago, Illinois, which is scheduled to close by the end of 2020. This existing facility has been in operation at that location for over 60 years. Another RMG affiliate, GII, LLC (GII), is purchasing certain assets used in connection with the operation of General Iron's scrap metal business and intends to operate the business for a period of time at the existing facility and then transition the scrap metal operations from the Clifton Avenue location to its property at South Burley Avenue. Currently, the existing facility is processing approximately 750,000 ton per year of shreddable recyclables but is configured to process 1,000,000 tons per year. For purposes of this application, the existing facility is known as the "GII facility."

The proposed GIII facility on South Burley Avenue will also be configured to process 1,000,000 tons per year of shreddable recyclables and will effectively replace the existing GII facility. Currently, there is no other business in the Chicago area that has the capacity to handle this quantity of shreddable recyclables. If the GIII facility is not ready to accept and process material by the time the GII facility closes, there will be significant economic and environmental consequences to the City of Chicago and surrounding area.

Recycling offers the obvious benefit of keeping discarded metals out of landfills, but also provides other important and valuable benefits as well. There is a long nurtured a recyclable metal supply chain that includes thousands of individual peddlers at the GII facility. If these peddlers are unable to sell the discarded metal they collect for a fair price at an easily accessible location, there will be less incentive to search for and collect these materials. The burden for collection of discarded metals, such as used appliances and other bulk metal items, would then be shifted to local governments, which would significantly increase waste collection costs.

Peddlers often collect incidental items such as pressurized containers, used televisions, and batteries which are not safe or appropriate for city sanitation workers to manage. The GII facility provides a valuable community service by accepting these materials and properly disposing of them.

Disrupting the existing capacity for processing shreddable recyclables will also increase the cost of demolition required for redevelopment by increasing the transportation costs for shipment of shreddable material to other facilities located outside of the City of Chicago metropolitan area. The lack of adequate capacity to process this material would likely encourage illegal dumping or disposal of this material.

GIII's proposed facility will be a state-of-the-art recycling facility located in the heart of an industrial district well buffered from residential properties. The proposed new shredder and processing operations

will utilize the latest technology to create a clean, efficient, and environmentally sensitive plant that will preserve metal markets in Chicago, keep metal out of city alleys and landfills, maintain city garbage collection costs, support families that rely on the metal industry, and ensure that metals are reprocessed and reused instead of being abandoned or sent to landfills.

GIII will receive and shred mixed recyclable metal 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.

GIII's proposed facility will be located in Cook County, which had been part a moderate ozone nonattainment area that was downgraded to a serious ozone nonattainment area effective September 23, 2019. GIII's proposed location is in an area that is 'in attainment' for all other National Ambient Air Quality Standards (NAAQS).

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).

GIII will apply for and obtain a federally enforceable state operating permit (FESOP) for continued operation beyond the coverage of the construction permit requested by this application.

This permit application includes the following information:

- Scrap Metal Recycling Facility Process Descriptions (Section 2.0);
- Facility Emissions Estimates (Section 3.0);
- Regulatory Applicability (Section 4.0);
- Figures;
- Emission Tables;
- IEPA Construction Permit Application Forms (Appendix A);
- Shredder/Roll-Media Filter Stack Test Report (Appendix B); and
- ISRI Title V Workbook Emission Factor Tables (Appendix C)

Any questions regarding this application may be directed to Mr. Jim Kallas, Environmental Manager of GIII, at 847-508-9170 or to Mr. John Pinion, Principal Engineer at RKA at 630-393-9000 x 208.

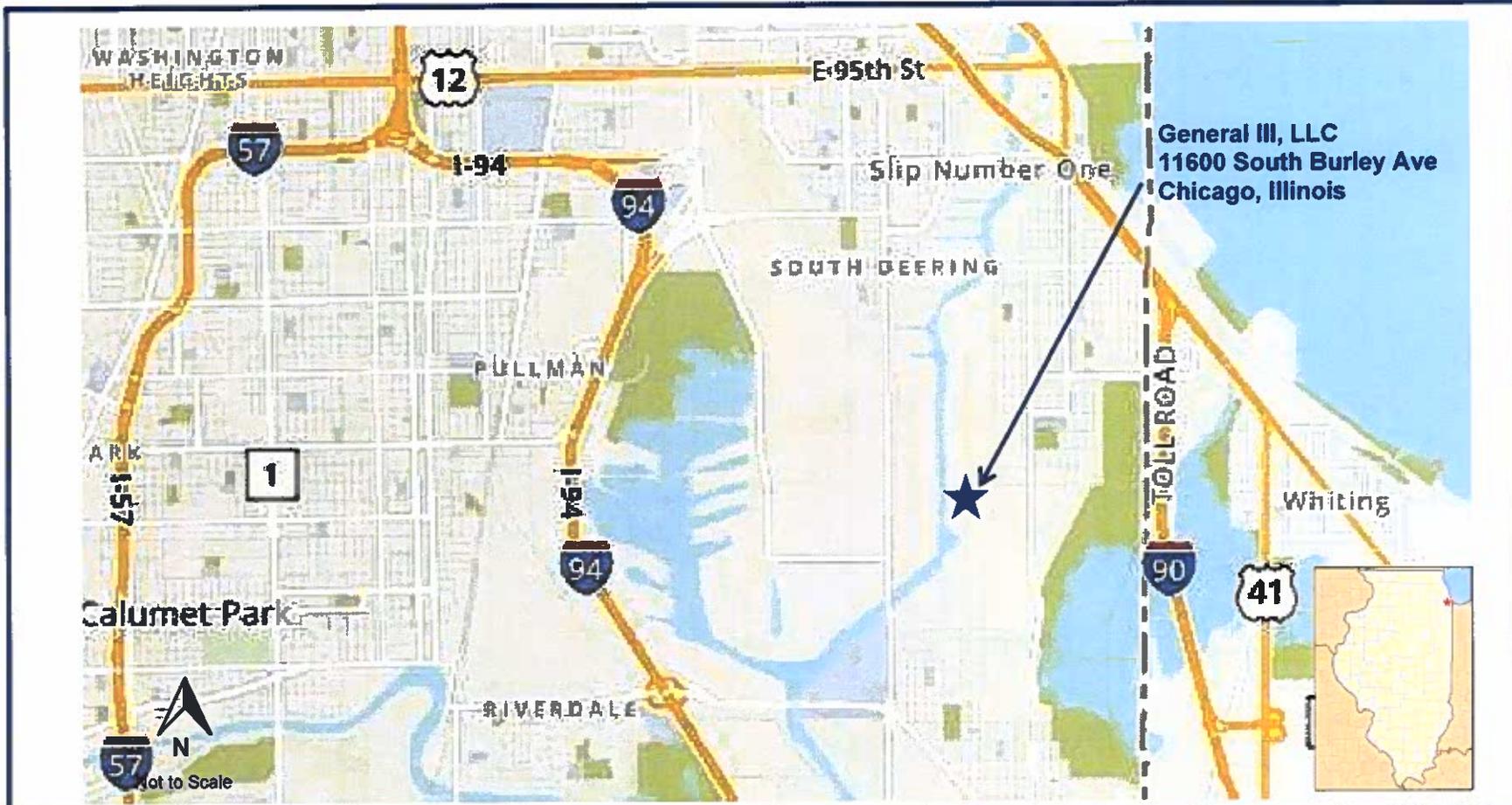


& ASSOCIATES, INC.

Introduction

1.1 Facility Location and Contact Information

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



RK
 25631 ROUTE 59, SUITE B
 WARRENVILLE, IL 60555
 630-393-9000/630-393-9111
 & ASSOCIATES, INC.

COMMENTS: Construction Permit Application for a New Scrap Metal Recycling Facility	
DRAWN BY:	APPROVED BY: JGP

Site Location Map		
General III, LLC 11600 South Burley, Chicago, Illinois		
PROJECT NUMBER R19439-2	DATE DRAWN: 09-04-2019	REVIEW DATE

FIGURE
1-1



RK
& ASSOCIATES, INC.

25631 ROUTE 69, SUITE B
WARRENVILLE, IL 60555
630-393-9000/630-393-9111

COMMENTS:

Construction Permit
Application for New
Scrap Metal Recycling
Facility

Facility Map
General III, LLC
11600 South Burley, Chicago, IL

FIGURE

1-2

DRAWN BY:

APPROVED BY:

PROJECT NUMBER:

DATE DRAWN:

REVISED DATE:

JGP

R19439-2

09-04-2019

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2.0 SCRAP METAL RECYCLING PROCESS DESCRIPTIONS

The Facility described in this application is a state-of-the-art scrap metal recycling facility designed to maximize recovery of reusable material from the raw feed stream received. The 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.

A general facility layout diagram is presented in Figure 2-2. The Facility is designed and configured to process 1,000,000 tons per year of shreddable recyclables. GIII will be also one of the first scrap metal recycling facilities in the Midwest to install an emission capture and control system on the hammermill shredder to control particulate matter (PM), including metals and metal HAPs, and volatile organic material (VOM) and associated organic HAPs. This system will utilize a high capacity fan (approximately 60,000 cfm) and emission capture hood suspended over the top of the shredder to draw ambient air from around the outside of the shredder into the hood, capturing exhaust gases from the shredder and routing them to the control system.

The shredder emission control system will include:

- a cyclone for removal of large diameter material from the shredder exhaust before reaching the control system;
- a roll-media filter to remove PM (including associated metals and metal HAPs);
- a regenerative thermal oxidizer (RTO) for destruction VOM and organic HAPs; and,
- a packed tower scrubber to neutralize any acid gases formed in the RTO.

Additional features of this Facility that will minimize emissions include covers on selected conveyors and conveyor transfer points, processing of fines inside of a building equipped with four dust collectors to collect and capture fugitive particulate from inside the building before returning treated air back into the building, use of water atomizers to wet fugitive particulate matter in the outdoor ambient air and increase on site settling of suspended particulate, sweeping and watering of paved roadways, and watering or chemical treatment of unpaved roads.

The following sections describe the proposed operations and associated control equipment.



Scrap Metal Recycling Facility Process Descriptions

2.1 Metal Shredder Controlled by Cyclone, Roll-Media Filter, RTO, and Scrubber

GIII will install a new hammermill shredder capable of shredding up to 100,000 tons per month of mixed recyclable metal in various forms to produce uniform grades of ferrous and non-ferrous metal. The shredder will be located inside of a partial enclosure with walls and a vented metal roof to help contain debris and particulate matter (PM) generated during the shredding process. The shredder will be equipped with an integral water injection system to minimize the potential for fires and deflagrations inside the shredder.

The shredder will also be equipped with an emissions control system consisting of a capture hood, cyclone, roll-media filter, RTO and wet scrubber for control of PM, metals, metal HAPs, volatile organic material (VOM) and organic HAPs. The proposed control system has been installed and is currently being operated to control shredder emissions at the GII facility and will be relocated to the GIII facility in 2020.

The actual shredder feed rate will be dependent on the type and consistency of the feed material and the ability to consistently feed the mixed recyclable metal to the shredder. A belt scale, downstream of the shredder, measures the net mass of shredded ferrous metal produced in tons per hour. A site-specific ratio of total material received to the mass of ferrous metal produced is used to convert the measured rate of ferrous materials produced to the gross shredder feed rate. The existing facility's material ratio will be used until data from GIII's facility is available to update this ratio.

Shredded material, consisting primarily of ferrous material, non-ferrous metal, and non-metallic material is discharged at the bottom of the shredder by a vibratory conveyor and is routed by a series of belt conveyors to downstream processing equipment described in Section 2.3 below.

An emissions capture hood will be suspended above the top of the shredder by an overhead crane. The hood will be equipped with rubber curtains extending downward to the top of the shredder to enhance emissions capture efficiency. An induced draft fan draws shredder exhaust into the emission capture hood and through a cyclone and roll-media filter, for control of particulate matter, metals and metal HAPs before being routed to an RTO for control of volatile organic material (VOM) and organic HAPs and then through a packed tower scrubber for the control of acid gases and inorganic HAPs.

Treated exhaust gases will be discharged to the atmosphere through a stack mounted on the top of the packed tower scrubber.

Each component of the shredder control system is described in the following sections.

2.1.1 Cyclone / Roll-Media Filter

A standard cyclone is located between the shredder capture hood and the roll-media filter to remove any large material prior to entering the roll-media filter. Material collected in the cyclone is discharged through a rotary discharge valve and is added to the shredder residue (ASR) from the ferrous plant for further processing. This cyclone is integral to the process because it separates larger material from the conveying air stream to prevent it from plugging the downstream roll-media filter.

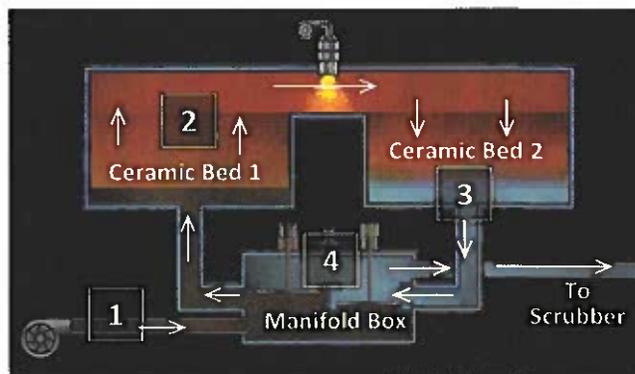
The roll-media filter includes a large rectangular section of duct measuring approximately 18 ft by 6 ft. A roll of unused filter material is placed on the supply side of the filter and fed through the rectangular section of duct to a take-up roll. The unit is designed so that the air flow passes downward through the filter to capture particulate matter. The filter material is automatically periodically advanced to remove spent filter material from the air stream and introduce clean filter material into the air stream. Spent filter material is collected on a take-up roll.

2.1.2 Regenerative Thermal Oxidizer (RTO)

RTOs achieve a very high thermal efficiency (95% or greater) and need only small amounts of supplemental fuel to maintain the desired operating temperature, even with low VOC concentrations in the process exhaust gas.

The RTO that will be installed at the Facility was designed and manufactured by Catalytic Products International of Lake Zurich, Illinois.

As illustrated on the right, the RTO is equipped with two beds of high-heat capacity ceramic media to store the heat released by the combustion of VOM and auxiliary fuel. At the beginning of an oxidization cycle, cool process exhaust gas [1] enter the RTO and are preheated as they pass through a hot ceramic bed [2] (heated by the combustion chamber exhaust gases from the previous cycle). The preheated inlet gas then enters the combustion chamber, between the two beds, where a natural gas fired burner adds additional heat required to maintain the desired temperature for destruction of the VOM. The hot gas exiting the combustion chamber is directed downward through the second bed of ceramic media [3], preheating the ceramic media for the next cycle. This heat is recovered when two valves in the manifold box [4] change position reversing the flow of gas through the RTO.





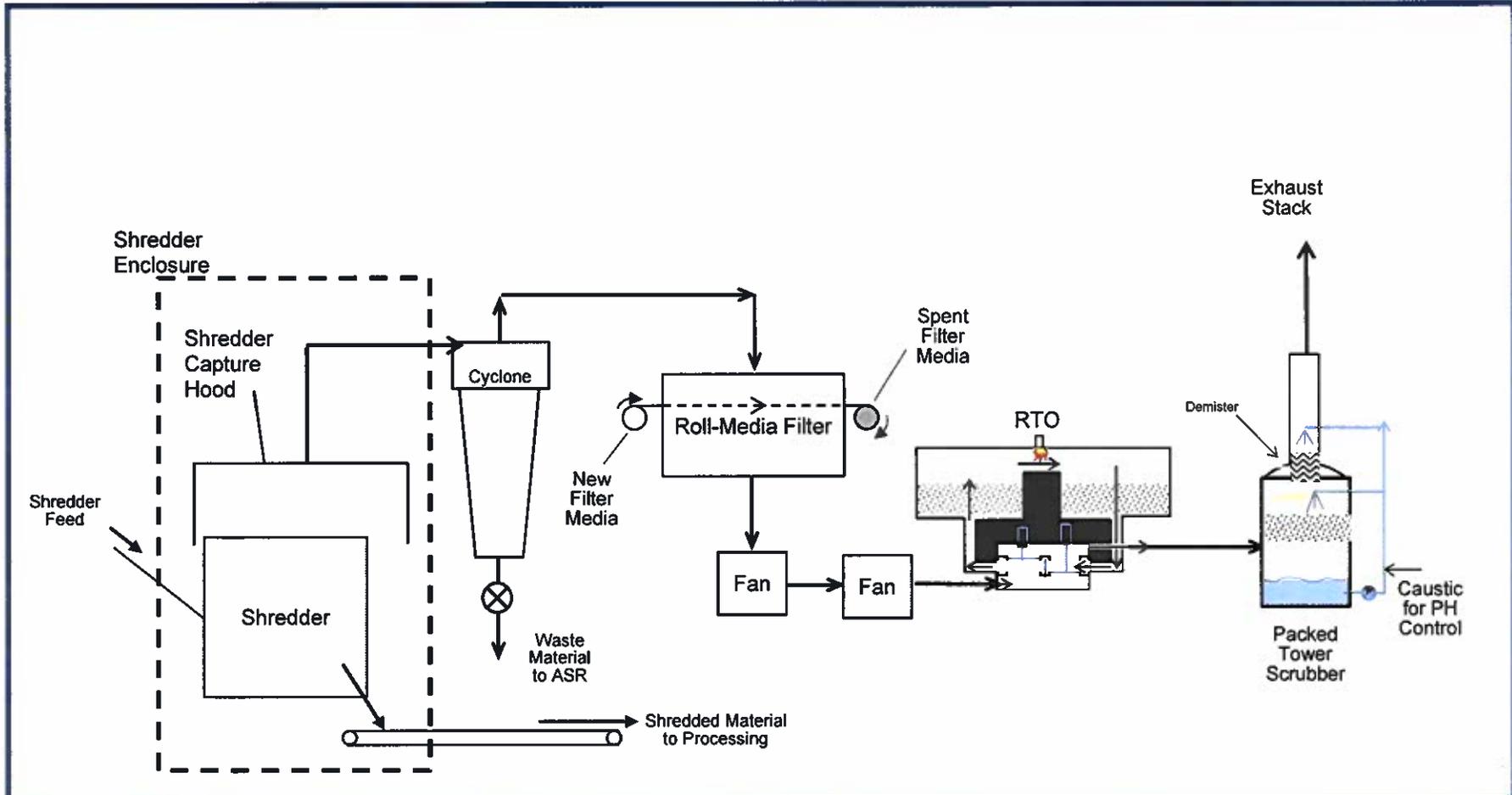
Scrap Metal Recycling Facility Process Descriptions

As shown in the shredder control system process flow diagram presented in Figure 2-1, an induced draft fan upstream of the RTO forces shredder exhaust gases through the RTO and packed bed scrubber and discharges the treated gases to the atmosphere.

A summary of the RTO design characteristics is presented in Table 2-1 below.

Table 2-1 – RTO Design Parameters

RTO Design Parameter	Value
Maximum Air Flow (scfm)	80,000
VOM Destruction Efficiency	98% or greater
Combustion Chamber Operating Temperature	Approx. 1,500 °F
Heat Exchange Media	Ceramic
Natural Gas Firing Rate	Approximately 10 to 18 MMBtu
Induced Draft Fan	Approximately 300 to 400 HP
Combustion Air Blower	Approximately 10 HP
Valve Type	Poppet



	2S631 ROUTE 59, SUITE B WARRENVILLE, IL 60555 630-393-9000/630-393-9111	COMMENTS: Construction Permit Application for New Scrap Metal Recycling Facility	Shredder Emission Control System Flow Diagram General III, LLC - Chicago, Illinois		FIGURE 2-1
		DRAWN BY:	APPROVED BY: JGP	PROJECT NUMBER R19439-2	DATE DRAWN: 09-09-2019



2.1.3 Packed Tower Scrubber

Combustion of potential chlorinated and fluorinated compounds in the shredder exhaust may generate hydrogen chloride (HCl) and hydrogen fluoride (HF). These acid gases will be neutralized in a quench/packed bed scrubber by contacting the acid gases with a solution of water and caustic.

The packed tower scrubber is a standard counter current design with gases entering the bottom of the scrubber and flowing upward through the packing. Water from the sump, located in the bottom portion of the scrubber vessel, is recirculated through one or more spray nozzles located at the top of the packing, to evenly distribute the scrubbing solution over the packing. Water will flow downward over the surfaces of the packing material. The packing material is designed to increase surface area to allow the reaction between the acid gases and scrubbing solution. In the packing, the acid gases react with the caustic in the scrubbing solution to convert the acids to salts that are disposed of with the spent scrubber water. As the treated gases exit the top of the packing, they will pass through a high efficiency mist eliminator to remove aerosols from the exhaust gases. The mist eliminator will be equipped with water sprays for periodic cleaning.

The scrubber will be equipped with a quench section located immediately upstream of the packed bed section. The quench will be equipped with water spray nozzles to ensure the process gas stream discharged from the RTO is controlled to the desired temperature, upon entering the packed tower section.

The scrubber will be equipped with a chemical metering pump suitable to handle the required caustic feed rate. The sump will be equipped with a level sensor to monitor the water level. The level transmitter will control the water makeup valve to ensure that the required volume of water is maintained. The pressure drop across the packing and demister pad will be monitored by a differential pressure gauge. In addition, a pH probe and analyzer, with control loop to the chemical metering pump, will maintain the target pH of the scrubbing solution.

The scrubber system will be designed to treat the maximum gas volume discharged by the RTO and to remove 99% of the acid gases.

2.1.4 Exhaust Stack

Treated gases are discharged to the atmosphere through a stack located on top of the packed tower scrubber.

2.2 Ferrous Material Processing System

The Ferrous Metal Processing System, including metal separation, cleaning system and equipment, that will be utilized by GIII will be designed by the Wendt Corporation of Buffalo, New York. Wendt is a



Scrap Metal Recycling Facility Process Descriptions

leader in the metal recycling industry and has over 35 years of experience designing and implementing comprehensive metal recycling systems. Emissions from the Ferrous Material Processing System are discussed in Section 3.

Shredded material is discharged from the bottom of the shredder onto a vibratory feeder located within the shredder enclosure. The shredded material has been sprayed with water from the shredder water injection system, which minimizes emissions from conveyors and downstream processing equipment. The vibratory feeder discharges shredded material to a series of belt conveyor that transport the material to downstream processing equipment. The vast majority of conveyors are either skirted or troughing conveyors designed to minimize material spilling or leaking from the conveyor on to the ground.

The following describes the major features of the Ferrous Material Processing System.

Poker Picker

The shredded material is conveyed from the shredder to a Poker Picker that automatically removes longer pieces of metal that may disrupt or damage downstream conveyor belts and equipment. The material removed slides down a gravity chute to one of two poker collection piles located in three sided partial enclosures. The majority of the materials removed by the Poker Picker will be reprocessed.

Magnetic Separation

The shredded material then passes over magnetic separators that pick up some of the ferrous metal and discharge it to a gravity chute that splits the ferrous metal into two identical streams. Non-metallic material consists primarily of ASR and a limited amount of ferrous metal. This material drops onto a takeaway conveyor.

The takeaway conveyor transports the ASR to a secondary magnetic separation system to remove any residual ferrous metal. Magnetic metal removed is conveyed back to the ferrous metal stream.

ASR Stockpile

ASR that is not removed by magnetic separation (described above) drops to a conveyor that transports the material to the ASR stockpile. A stacking conveyor is used to distribute ASR within the stockpile area. ASR is the feed stream for the Non-Ferrous Material Processing System described in Section 2.4.

Secondary Magnetic Separation

Material that passes beyond the ASR removal section is conveyed to magnetic separation process that picks up ferrous metal and discharges it to downstream conveyors. ASR that is not removed by these magnets falls onto a conveyor that transports the material back to the ASR takeaway conveyor.



Scrap Metal Recycling Facility Process Descriptions

Z-Box Separators

Ferrous metal is then conveyed to one of two Z-Box Separators. Each separator is a lined abrasion-resistant box, or chute, configured similarly to the letter "Z", which causes the material entering the top of the separator to change directions several times as it falls via gravity through the separator. An air recirculation loop, equipped with a fan, forces a stream of air into the bottom of the separator. The air flows upward through the separator, counter current to the direction of the falling ferrous metal. Light material and fines are entrained in the upward flowing air and ducted out of the top of the separator and into a cyclone. The cyclone disengages the light material and fines from the air stream. The clean air stream exiting the cyclone is ducted back to the inlet of the fan, which recirculates the clean air by ducting it back to the bottom of the separator. The separator is equipped with integral conveyor seals and air knives at the material inlet and outlet. The high velocity air curtain created by the air knives prevents particulate escape from the system without relying on pressure differential at the inlet and outlet of the separator.

Clean metal discharged from the separators is conveyed to another magnetic separation system to separate ferrous from non-ferrous metals in the final recycled metal stream. Clean metals discharged from the drum magnets are conveyed to a Picking Platform where select materials are manually separated. Ferrous metal passing through the Picking Platform is conveyed to a ferrous metal stockpile or to barge loadout.

Light Material from Z-Box Separator Cyclones

Light material removed in the cyclones is discharged through a rotary air lock to a conveyor that transports the material to another magnetic separation to remove any small pieces of ferrous metal that may become mixed with the light material. Ferrous metal is conveyed to the ferrous stream.

Non-magnetic material is conveyed to a final separation process designed to separate higher density materials from the light material, or fluff. Higher density materials are separated and drop into a container for further processing. Light material is conveyed to the fluff stockpile, located in a three-sided partial enclosure. Fluff is a waste stream that is disposed of at a properly licensed waste disposal facility.

Ferrous Stockpiles and Barge Loading

Recovered ferrous metal is either conveyed to one of two stacking conveyors for controlled distribution of materials onto ferrous stockpiles or is conveyed to barge loadout where ferrous metal drops into a barge for off-site shipment to customers. Material from the ferrous stockpiles are loaded into barges, rail cars or trucks for off-site shipment to customers.



Scrap Metal Recycling Facility Process Descriptions

2.3 Non-Ferrous Material Processing System

The Non-Ferrous Material Processing System, including metal separation, cleaning system and equipment, that will be utilized by GIII will be designed by Wendt Corporation of Buffalo, New York. Wendt is a leader in the metal recycling industry and has over 35 years of experience designing and implementing comprehensive metal recycling systems.

The Non-Ferrous Material Processing System includes a Fines Processing System to recycle smaller pieces of recyclable metal. The majority of the non-ferrous processing equipment is located outdoors and the majority of outside conveyors are equipped with covers. A portion of the Non-Ferrous Material Processing System, consisting of the induction sorters and a polisher are located inside of the Fines Building and are controlled by Dust Collector DC-01, which exhausts to the outside atmosphere.

Emissions from the Non-Ferrous Material Processing System are discussed in Section 3.

The following describes the major features of the Non-Ferrous Material Processing System.

ASR Batch Feeder

A rubber-tired end loader will be used to move material from the ASR stockpile to a vibratory batch feeder that provides a uniform feed rate to the downstream processing equipment. The vibratory batch feeder discharges to a covered conveyor. The batch feeder is located outdoors.

Magnetic Separation

ASR will pass through a magnetic separator to remove residual ferrous metal. The magnetic separation process is located outdoors. Ferrous metal is discharged to a small storage pile equipped with a partial enclosure consisting of three side walls. Material from this stockpile is recycled back to the shredder infeed. Non-magnetic material passing the drum magnet is discharged to a covered conveyor that feeds into a two-step screening process.

Screening Process

A two-step screening process is used to separate the ASR into specific material sizes. Screening equipment and connecting conveyors are located outdoors. The first screen separates material into three sizes; material > 4.5 inches in diameter; material that is 2.5 to 4.5 inches in diameter; and, material that is 1.5 to 2.5 inches in diameter. Material less than 1.5 inches in diameter is conveyed to the second screening step.

In the second screening step, two vibratory screens separate material into three sizes: material 1.5 to 2.5 inches in diameter; material that is 5/8 to 1.5 inches in diameter; and, material that is less than 5/8" inches in diameter.



Scrap Metal Recycling Facility Process Descriptions

Material discharged from the screening process is conveyed to various downstream separation equipment, as described below.

Other Equipment

The following is a brief description of other types of processing equipment in the Non-Ferrous Material Processing System.

Eddy Current Separators (ECS)

Upon exiting the screeners, the material streams pass through one of seven Eddy Current Separators . Each ECS is enclosed in a building to protect equipment from the weather. No credit for emissions control is attributed to the ECS building. Each ECS processes material in a specific size range. Each ECS is preceded by a magnetic separator to separate magnetic and weakly magnetic materials that represent impurities that can negatively affect the value of recovered non-ferrous products.

An ECS has a conveyor belt system with a high-speed magnetic rotor at the drive end. The rotational speed of the magnet generates an induction field, creating a rapidly changing magnetic field that temporarily magnetizes non-ferrous metals.

Non-ferrous metal removed by each ECS is conveyed to a polisher for further separation by particle density before being conveyed to a product storage pile as a finished product.

Material that cannot be magnetized is conveyed for further processing in Wind Sifters and Induction Sorters as described below.

Wind Sifters

There are four Wind Sifters included in the Non-Ferrous Material Processing System. All Wind Sifters and connecting conveyors are located outdoors. A Wind Sifter is an air classifier, in which a conveyor belt discharges material into an upward flowing air stream that removes light material. The residue laden air stream is ducted to a cyclone to remove the light material. Clean air from the cyclone is then ducted to a fan and is recycled back to the Wind Sifter. The Wind Sifter is an air classifier that functions similarly to the Z-Box separators described above. The residue removed in the cyclone is discharged through a rotary valve to conveyors that transport the material to the waste storage pile for subsequent off-site disposal. This device is treated as a screen with for purposes of estimating emissions.

Heavier metallic material falls downward through the air stream to a takeaway conveyor that transports the material to an Induction Sorter.



Scrap Metal Recycling Facility Process Descriptions

Induction Sorters

There are eight Induction Sorters. An Induction Sorter consists of a conveyor belt that carries material over an inductive metal sensor that produces an electromagnetic field. Any conductive object passing through the sensor area is detected and classified. As the material falls off the end of the conveyor, a targeted blast of compressed air ejects the metal containing material onto separate takeaway conveyor. Nonmetallic material falls off the end of the conveyor onto another takeaway conveyor.

The eight induction sorters and connecting conveyors are located inside of the Fines Processing Building. A network of ductwork connect the induction sorter enclosures to Dust Collector DC-01, which exhausts to the outside atmosphere.

Polishers

There are five polishers. Polishers function as an air classifier. As material travels over a perforated conveyor, a gentle stream of air flows upward through the conveyor to lift light (low density) material, such as paper and plastic, directing it to a separate takeaway conveyor. This material is relatively clean by the time it enters the polishers and results in only minimal emissions; however, for the purposes of this application, emissions are calculated using screening emission factors.

Air Vibe

There is one Air Vibe. The Air Vibe and connecting conveyors are located outdoors. An Air Vibe is a vibratory air separator that uses a combination of vibratory screens and air to separate dry materials by different density, shape and surface characteristics. The air flow through the separator is a closed loop system with no discharge point. A fan forces air through the separator. Dirty air exiting the device is ducted to a cyclone to remove suspended particulate matter. Clean air is ducted back to the inlet of the fan.

Low-Speed Shredder

There is one small low-speed shredder located outdoors. The Low-Speed Shredder is a small, low speed, high torque, quad shaft shredder used for size reduction of clean metal on an as-needed basis.

Fines Processing System

The Fines Processing System is a separate system of conveyors and processing equipment located in the Fines Processing Building. A system of exhaust ducts connects the fines processing equipment to three identical dust collectors that exhaust treated air back into the building. A fourth identical dust collector controls non-ferrous equipment located in the Fines Processing Building and discharges to the outside atmosphere.



Scrap Metal Recycling Facility Process Descriptions

All four dust collectors are located outside of the east wall of the Fines Processing Building and are identical in design and function. Each dust collector has a design air flow rate of 12,000 cfm. Combined, the four dust collectors withdraw 48,000 cfm from the building, return 36,000 cfm to the building, and exhaust 12,000 cfm of treated air to the outside atmosphere. The difference between the building withdrawal and return rates must be satisfied with outside makeup air entering the building through conveyor wall penetrations and air makeup louvers. This configuration will minimize potential emission of fugitive particulate from the building by maintaining a low particulate concentration in the inside air and by maintaining an inward flow through building openings.

Based on the configuration described above, there three dust collectors that discharge to the interior of the Fines Processing Building are not control devices for purposes of permitting. Only the dust collector that exhausts to the outside atmosphere is a permitted control device.

There are no other control devices associated with the Non-Ferrous Material Processing System.

2.4 Stockpile Operations

Stockpile Operations includes three large stockpiles fed by stacking conveyors and multiple small stockpiles fed by a standard conveyor. Small stockpiles are located within partial enclosures consisting of three walls to minimize fugitive emissions and provide secure containment for the material. All stockpiled material is moved by rubber-tired end loaders or material handlers equipped with electromagnets or grapples. Individual stockpiles are identified on Table 3-4.

2.5 Vehicular Traffic

The vast majority of material received at the proposed facility will be delivered by dump and gondola 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.

Dump trailers will dump material near one of two raw material storage piles located adjacent to the shredder infeed conveyor. Cranes equipped with electromagnets and grapples will move material from the unloading areas to the storage piles and from the storage piles to the shredder infeed conveyor.

Pickup trucks will be directed to a dedicated peddler unloading area where scrap metal will be manually unloaded or by an electromagnet and sorted. Sorted material will be transported by rubber-tired loader, material handlers with grapples, or dump trailers to the raw material storage piles.

After unloading, all vehicles will travel over a scale before exiting the facility.



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Scrap Metal Recycling Facility Process Descriptions

Emissions from unloading scrap from dump trailers are identified in Section 3.3 and emissions associated with vehicular traffic are identified in Section 3.5.

Approximately 95% of the interior plant roadways are paved roads consisting of concrete or asphalt. Only 5% of interior plant roadways are unpaved roads consisting of compacted slag or other similar materials.

2.6 Natural Gas Combustion

Natural gas will be combusted by the shredder RTO and by miscellaneous environmental heaters located throughout the proposed facility. The miscellaneous environmental heaters are exempt from the requirement to obtain a state construction or operating permit pursuant to 35 IAC 201.146(d).

2.7 Excluded Activities

The following activities, potentially associated with the operation of metal recycling facilities, are not included in this permit application:

- Torch Cutting;
- Fuel Storage Tanks; and
- Emergency Generators.



Scrap Metal Recycling Facility Process Descriptions

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3.0 FACILITY EMISSIONS ESTIMATES

As described in this application, GIII will install a state-of-the-art emissions control system on the hammermill shredder. The shredder will be located inside of a partial enclosure with walls and a vented metal roof to help contain debris and particulate matter (PM) generated during the shredding process. The shredder will be equipped with an integral water injection system to minimize the potential for fires and deflagrations inside the shredder. As established in previous permits, the water injection system is integral to the process and is not a pollution control device for the purposes of this permit application.

GIII has taken other significant measures to limit emissions, and potential impacts, from this facility, including:

- GIII's proposed facility will be a state-of-the-art recycling facility located in the heart of an industrial district well buffered from residential properties with at least 1,500 feet between the facility property line and the nearest residential area.
- Approximately 95% of interior plant roadways are paved with concrete or asphalt. The remaining approximately 5% of interior plant roadways consist of crushed slag or similar materials and are only lightly traveled.
- The shredder will one of the first shredders in the nation to install a comprehensive emissions capture and control system to control VOM, PM, and HAPs.
- Many of the conveyors in the Non-Ferrous Material Processing System will be equipped with covers to prevent windblown emissions.
- The majority of the fines processing equipment is located within a building and controlled with dust collectors.
- GIII will implement a fugitive operating program that will require periodic watering and sweeping of traffic areas to minimize fugitive particulate emissions.
- GIII will use a network of dust boss water atomizing cannons to apply water into the ambient air to wet suspended particulate to increase settling.
- The facility has received all necessary zoning approvals from the City of Chicago.

Emission units identified in the application include:

- Shredder controlled by cyclone, roll-media filter, RTO, and packed tower scrubber;
- Ferrous Material Processing System;
- Non-Ferrous Material Processing System;

- Dust Collector for control of select exhaust streams from the fines handling building;
- Stockpiles (fugitive emissions);
- Paved and Unpaved Roads (fugitive emissions); and
- Miscellaneous Natural Gas Fired Environmental Heaters (exempt from permitting).

Each of the above emission units are discussed in the sections below and emissions for each are summarized in Tables 3-1A through 3-1E and Tables 3-2 through 3-6. Facility-wide criteria and HAP pollutant emissions are summarized in Tables 3-7 and 3-8. The emissions estimates presented in this application demonstrate that the proposed Facility is a minor source with respect to new source review, and Title V permitting requirements and is also a minor source of HAP emissions.

3.1 Shredder Emissions Controlled by Cyclone, Roll-Media Filter, Regenerative Thermal Oxidizer, and Packed Tower Scrubber

This section provides shredder emissions estimates for captured/controlled emissions routed through the proposed emission control system consisting of a cyclone, roll-media filter, RTO, and packed tower scrubber.

GIII will install a new shredder at the proposed facility and will relocate the existing cyclone, roll-media filter, RTO and packed tower scrubber from the existing GII facility to the proposed facility. The raw scrap feed stream received at the existing GII facility is essentially the same feed stream that will be received at GIII's proposed facility. For these reasons, for the purposes of this application, the emission data from the existing shredder and emission control system at the GII facility is assumed to reasonably represent the anticipated emissions from GIII's new shredder at the proposed facility.

The shredder will be located inside of a partial enclosure with walls and a vented metal roof to help contain debris and particulate matter (PM) generated during the shredding process. The shredder will be equipped with an integral water injection system to minimize the potential for fires and deflagrations inside the shredder.

VOM emission estimates presented herein assume an RTO control efficiency of 98% based on the design of the RTO. As of the date of this permit application, the existing GII shredder emissions, controlled by the RTO and packed tower scrubber, have not yet been measured. Emission testing of the RTO and packed tower scrubber are scheduled to be completed in early November 2019. This proposed testing will provide updated controlled shredder emission factors for PM/PM10, NO_x, CO, SO₂, VOM, metals, metal HAPs, hydrochloric acid, and hydrofluoric acid. Currently, the proposed testing of the existing shredder will not include organic HAPs. Once the emission data from the November 2019 testing have been finalized, the emission estimates in this application will be updated to incorporate the new November 2019 test results..



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Facility Emissions Estimate

The captured shredder emissions identified in this application are based on demonstrated emission factors in units of pounds-of-emissions per ton of gross feed to the shredder derived from THC emissions testing performed on May 25, 2018, and PM and metals emissions testing performed on June 13 and 14, 2018. A copy of the test report from each of these testing events is presented in Appendix B of this application.

The emissions estimates presented in this section are calculated using demonstrated emission factors and proposed material throughput rates. This construction permit application does not rely on operating hours to estimate monthly or annual emissions; therefore, no operating hour limits are requested.

The new shredder for this facility will have a rated capacity of 100,000 tons/month. This construction permit application requests an annual shredder throughput limit of 1,000,000 tons/year and a monthly throughput limit of 10% of the annual, or 100,000 tons/month. These values are based on recent operating data and have also been used to estimate the proposed monthly and annual emissions limits requested in this construction permit application (see Table 3-1E).

Visual observations of the shredder capture hood by Agency observers during May 2018 emission testing showed that the capture hood is very effective and provides a high capture efficiency. The nature of the shredding operation and related safety concerns prevents a direct measurement of emissions capture efficiency using a permanent or temporary total enclosure. GIII anticipates that the new shredder emissions capture hood will perform similarly to the observed operation during the May/June 2018 testing of the existing shredder at the GII facility.

3.1.1 Shredder VOM and CO Emissions

For the purposes of these emission calculations, it is assumed that THC, as referenced in May 2018 GII shredder emission test report (presented in Appendix B) is equivalent to VOM.

The estimated controlled VOM and CO emissions from the proposed shredder, controlled by a cyclone, roll-media filter, RTO and packed tower scrubber, are presented in Table 3-1A. An uncontrolled VOM emission factor, adjusted to subtract methane, ethane, and other compounds exempt from the federal definition of volatile organic compound, was developed from THC emissions testing conducted on May 25, 2018, at the existing shredder at the GII facility. The THC test report is presented in Appendix B of this application.

The adjusted VOM emission factor is 0.2430 pounds of VOM (as propane) per ton of gross feed to the shredder. This VOM emission factor identifies captured/uncontrolled VOM, which is assumed to represent 95% or more of total VOM emissions.



Facility Emissions Estimate

The hourly shredder VOM emission rate is calculated using the following equation:

$$100,000 \frac{\text{ton}}{\text{month}} \times 0.2430 \frac{\text{lb VOM}}{\text{ton shredder feed}} \times (1 - 0.98) = 0.24 \frac{\text{tons}}{\text{month}}$$

maximum monthly shredder throughput	adjusted VOM emission factor (captured emissions)	RTO VOM removal efficiency	monthly VOM emissions
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The annual shredder RTO VOM emission rate is calculated using the following equation:

$$1,000,000 \frac{\text{ton}}{\text{year}} \times 0.2430 \frac{\text{lb VOM}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2,000 \text{ lbs}} \times (1 - 0.98) = 2.43 \frac{\text{tons}}{\text{year}}$$

maximum annual shredder throughput	adjusted VOM emission factor (captured emissions)	convert lbs to tons	RTO VOM removal efficiency	annual VOM emissions
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The monthly shredder RTO VOM emissions rate is based on 10% of the annual emission rate.

For the purposes of this application, shredder CO emissions are assumed to be 1% by weight of the uncontrolled VOM at the entrance of the RTO (See Table 3-1A).

3.1.2 Shredder Particulate Emissions

The estimated shredder PM/PM₁₀ emissions are presented in Table 3-1B. A PM/PM₁₀ emission factor was developed from filterable PM/Metals emission testing conducted on June 13 and 14, 2018, at a location downstream of the existing roll-media filter at the existing GII facility. The emissions test report for this testing event is presented in Appendix B of this application.

The measured controlled PM emission factor was 0.0047 lb-PM/ton of gross feed to the shredder. For the purposes of this permit application, the measured filterable PM is conservatively assumed to be PM₁₀ at the location where PM emission sampling was performed (downstream of the existing roll-media filter). For the purpose of this application, it has been assumed that the RTO and packed tower scrubber will not reduce the measured PM/PM₁₀ emission rate at the outlet of the roll-media filter.

The PM/PM₁₀ emissions factor identifies captured filterable PM/PM₁₀, which is assumed to be 95% of total shredder emissions.



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Facility Emissions Estimate

The hourly shredder PM/PM₁₀ emissions at the scrubber stack are calculated using the following equation:

$$100,000 \frac{\text{ton}}{\text{month}} \times 0.0047 \frac{\text{lb filterable PM/PM}_{10}}{\text{ton shredder feed}} = 0.24 \frac{\text{ton}}{\text{month}}$$

maximum monthly shredder throughput	measured filterable PM/PM ₁₀ emission factor (captured emissions)		monthly filterable PM/PM ₁₀ emissions
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The annual shredder PM/PM₁₀ emissions at the scrubber stack are calculated using the following equation:

$$1,000,000 \frac{\text{ton}}{\text{year}} \times 0.0047 \frac{\text{lb filterable PM/PM}_{10}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = 2.36 \frac{\text{tons}}{\text{year}}$$

maximum annual shredder throughput	measured filterable PM/PM ₁₀ emission factor (captured emissions)	convert lbs to tons	annual filterable PM/PM ₁₀ emissions
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The monthly shredder PM/PM₁₀ emission rate is based on 10% of the annual emission rate.

3.1.3 Shredder Hazardous Air Pollutant Emissions

Shredder metal and organic HAP emissions are summarized in Table 3-1C.

The metal HAP emission factors identified in Table 3-1C are the measured controlled emission factors from the June 2018 metals emissions testing at the discharge of the roll-media filter at the existing GII facility.

Organic HAPs were not measured during the existing GII shredder emissions compliance test. Therefore, in order to estimate organic HAP emissions from the GII shredder, uncontrolled organic HAP emission factors were obtained from the *Institute of Scrap Recycling Industries (ISRI) Title V Applicability Workbook (1996), Table D-11F*. A copy of this table is presented in Appendix C.

For the purposes of this construction permit application, it has been conservatively assumed that the RTO and packed tower scrubber will not provide any additional metal HAP removal and that the RTO will control 98% of the organic HAPs.

Metal and organic HAP emissions from combustion of natural gas in the shredder RTO are identified on Table 3-1D.

3.1.4 Shredder RTO Natural Gas Combustion Emissions

The estimated shredder RTO natural gas combustion emissions are presented in Table 3-1D. Emissions are calculated using a maximum natural gas firing rate of 15 MMBtu/hr, a natural gas higher heating value (HHV) of 1,020 Btu/scf, and standard USEPA natural gas emission factors from AP-42; Chapter 1.4; Tables 1.4-1 and 1.4-2.

Emission estimates are presented for criteria pollutants, greenhouse gas (GHG), and metal and organic HAPs.

3.1.5 Shredder Emissions Summary

Table 3-1E presents a summary of total estimated shredder emissions controlled by the cyclone, roll-media filter, RTO and packed tower scrubber. The values identified in Table 3-1E identify the emission limits and shredder throughput limits requested in this permit application. Proposed emission units are in units of tons/month and tons/year and correspond to shredder gross feed rate of 100,000 tons/month and 1,000,000 tons/year.

3.2 Ferrous Material Processing System Emissions

Emissions from the Ferrous Material Processing System include PM, PM₁₀, PM_{2.5} and metal HAPs. There is no combustion or high temperature processing performed, so emissions of VOM and other products of combustion are not anticipated.

Particulate Emissions

A review of AP-42 emission factors did not identify any published emission factors for processing shredded scrap metal or ASR using feed hoppers, conveyors, magnetic separators, screens, vibratory feed tables, eddy current separators, wind sifters, induction sorters, polishers, Air Vibe separators, or material transfer to stockpiles or storage containers. RKA is also not aware of any other source of published emission factors for this equipment processing shredded scrap metal or ASR.

In the *Institute of Scrap Recycling Industries (ISRI) Title V Applicability Workbook (1996)*, Footnote 1 on Table D-9, states that;

“Emission factors applicable to conveyor transfer points for scrap in feed material or products are not available. A conservative estimate of PM₁₀ emission scan be made using emission factors derived from the handling of crushed stone products. The factors in this table were adapted from AP-42, Crushed Stone Processing, Section 11.19.2, Table 11.19.2-2 for uncontrolled and controlled transfer points.”



Facility Emissions Estimate

The AP-42 emission factors for crushed stone (Section 11.19.2; Table 11.19.2.2) have been uniformly adopted by the metal recycling industry as evidenced by their use in numerous permit applications for metal recycling facilities and have been accepted by IEPA and other state regulatory agencies throughout the United States.

ASR separation processes include only one small low speed high torque shredder used for size reduction of clean metal. All other ASR equipment is designed for material separation. This fact limits the potential generation of total suspended particulate matter (TSP) to only the fines present in the ASR being processed. Based on the above, the application of AP-42 particulate matter emission factors for crushed stone processing to ASR processing is likely to result in estimated emissions that are greater than actual emissions from ASR separation processes.

The following table identifies emission factors from AP-42, Table 11.19.2-2 that are typically used in metal recycling emission calculations. The identifiers in the first column of the table are used in Tables 3-2 and 3-3 to document the specific emission factors used to estimate emissions for each piece of equipment or operation.

Particulate Emission Factors from AP 42; Table 11.19.2-2 Crushed Stone Processing (8/2004) Used in Estimating PM Emissions in Scrap Metal Material Handling and ASR Separation Operations.

Identifier Used in Tables 2 & 3	Equipment	Material	Uncontrolled			Controlled ¹		
			PM lb/ton	PM10 lb/ton	PM2.5 lb/ton	PM lb/ton	PM10 lb/ton	PM2.5 lb/ton
A	Conveyor Transfer Point	Crushed Stone	0.0030	0.0011	0.000167 ²	0.00014	0.000046	0.000013
B	Screening	Crushed Stone	0.0250	0.0087	0.001317 ²	0.00220	0.000740	0.000050
C	Truck loading	Fragmented Stone	0.000033 ³	0.000016	0.000002 ²			
D	Truck Loading	Crushed Stone	0.000204 ³	0.00010	0.000015 ²			

1. Use controlled emission factors when the moisture content of the materials being processed are greater than 1.5% by weight.
2. Where PM2.5 emission factors are not provided in AP-42, 11-19.2-2, a ratio of aerodynamic particle size multipliers from AP-42, 13.2.4 are used to estimate PM2.5 emission factors. $PM2.5\ EF = (PM10\ EF / .035) \times .0053$.

Aerodynamic Particle sizes from AP-42, 13.2.4				
<30 um	<15 um	<10 um	<5 um	<2.5 um
0.74	0.48	0.35	0.2	0.053

3. PM emissions estimated as % of PM10 pursuant to Appendix A of SCAQMD Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, October 2006.

Particulate emissions from the Ferrous Material Processing System are generated from material transfer points and material drops (dropping materials onto stockpiles).

Material transfer emissions are calculated by applying selected PM, PM₁₀ and PM_{2.5} emission factors, in units of pounds of particulate matter per ton of material processed, to the projected material throughput rates (tons per hour and tons per year) at each material transfer point. Material transfer points include the

points at which material is transferred from one device to another, such as conveyor to conveyor transfers, conveyor to equipment transfers, and equipment to conveyor transfers. Material throughput rates at each transfer point have been estimated by the equipment supplier.

Material drop emissions are calculated using the material drop equation from AP-42 Section 13.2.4.3 for all locations where material is dropped from a conveyor onto a stockpile or into a container.

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

E = emission factor (lb/ton of material dropped)
 k = particle size multiplier (dimensionless)
 U = mean wind speed
<https://www.timeanddate.com/weather/usa/chicago/climate>
 M = material moisture content (%)

U = 9.0 mph - annual average wind speed for Chicago (Midway Airport)
 K = 0.74 PM - AP-42, Section 13.2.4, for particle size < 30 um
 0.35 PM - AP-42, Section 13.2.4, for particle size < 10 um
 0.053 PM - AP-42, Section 13.2.4, for particle size < 2.5 um
 M = 1.5 % for light materials - AP-42, Table 13.2.4-1 for crushed limestone - (conservative)

The mean wind speed is annual average wind speed recorded at Midway Airport in Chicago, Illinois. Material discharged from the shredder is sprayed by water due the water injection system. The moisture content of material is conservatively assumed to be 1.5% for most applications (unless otherwise specified in table footnotes) because this is the moisture content that triggers the use of controlled emission factors for material transfer points in AP-42, Section 11.19.2 (Crushed Stone Processing).

Table 3-2 presents a summary of estimated PM/PM₁₀/PM_{2.5} from the Ferrous Material Processing System with the exception of shredder emissions discussed in Section 3.1 above.

Metal HAP Emissions

There is no data available on HAP content of particulate emissions from the Ferrous Material Processing System.

For the purposes of this application, it has been assumed (as a worst case) that the particulate from the Ferrous Material Processing System will contain the same percentage of metal HAPs as the particulate emissions from the existing roll-media filter at the existing GII facility. Emission testing for metals using USEPA Method 29 was performed at the outlet of the existing roll-media filter (controlling shredder emissions) in June of 2018. The list of analytes specified in Method 29 includes 12 HAP metals.

Emissions of these metal HAPs are calculated by multiplying the estimated PM emissions from Ferrous Material Processing System by the weight % of each HAP (lb HAP/lb of PM) measured in the roll-media



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Facility Emissions Estimate

filter emissions. The following table identifies the metal HAP data from the roll-media filter used to estimate HAP emissions from Ferrous Material Processing.

Metal HAPs	% of Metal HAP in Roll-Media PM Emissions	Metal HAPs	% of Metal HAP in Roll-Media PM Emissions
Lead	0.0665%	Beryllium	0.0003%
Manganese	0.0535%	Cadmium	0.0147%
Mercury	1.2866%	Chromium	0.0163%
Nickel	0.0207%	Cobalt	0.0014%
Antimony	0.0040%	Phosphorus	0.2000%
Arsenic	0.0015%	Selenium	0.0074%

Metal HAP emissions in the Ferrous Material Processing System are summarized on Table 3-8 (Summary of Facility-Wide HAP Emissions).

3.3 Non-Ferrous Material Processing System Emissions

Emissions from the Non-Ferrous Material Processing System include PM, PM₁₀, PM_{2.5} and metal HAPs. There is no combustion or high temperature processing performed, so emissions of VOM and other products of combustion are not anticipated.

Particulate Emissions

Particulate emissions from the Non-Ferrous Material Processing System are generated from material transfer points screening, truck loading, and material drops.

Material transfer emissions are calculated by applying selected PM, PM₁₀ and PM_{2.5} emission factors in units of pounds of particulate matter per ton of material processed, to the projected material throughput rates (tons per hour and tons per year) at each material transfer point. Material transfer points include the points at which material is transferred from one device to another, such as conveyor to conveyor transfers, conveyor to equipment transfers and equipment to conveyor transfers. Material throughput rates at each transfer point have been estimated by the applicant and the supplier.

Truck loading emissions are calculated by applying selected PM, PM₁₀ and PM_{2.5} emission factors in units of pounds of particulate matter per ton of material loaded, to the projected truck loading rates (tons per hour and tons per year).

Material drop emissions are calculated using the material drop equation from AP-42 Section 13.2.4.3 (see Section 3.2 above) for all locations where material is dropped from a conveyor onto a stockpile or into a container.

Equipment located in the Fines Building are controlled by one of four identical dust collectors. Each dust collector has a design flow rate of 12,000 cfm. Three of the dust collectors (DC-02, DC-03 and DC-04) will discharge treated air back into the building and therefore, have no emissions and are not emission units with respect to permitting requirements.

One of the dust collectors (DC-01) does vent to the outside atmosphere and its emissions represent emissions from all of the equipment located inside of the fines processing building. Particulate emissions from the dust collector are calculated by multiplying the design air flow rate by a clean side particulate concentration of 0.005 gr/dscf. The result of this calculation is shown on Table 3-3.

Table 3-3 presents a summary of estimated PM/PM₁₀/PM_{2.5} from the Non-Ferrous Material Processing System

Metal HAP Emissions

There is no data available on metal HAP content of particulate emissions from the Non-Ferrous Material Processing System.

For the purposes of this application, it has been assumed (as a worst case) that the particulate emissions from the Non-Ferrous Material Processing System will contain the same percentage of metal HAPs as the particulate emissions from the existing roll-media filter at the existing GII facility. Emission testing for metals using USEPA Method 29 was performed at the outlet of the existing roll-media filter (controlling shredder emissions) in June of 2018. The list of analytes specified in Method 29 includes 12 HAP metals.

Emissions of these metal HAPs are calculated by multiplying the estimated PM emissions from the Non-Ferrous Material Processing System by the weight % of each HAP (lb HAP/lb of PM) measured in the roll-media filter emissions. The metal HAP data from the roll-media filter used to estimate HAP emissions from the Non-Ferrous Material Processing System are identified in Section 3.2 above.

Metal HAP emissions from the Non-Ferrous Material Processing System are summarized on Table 3-8 (Summary of Facility-Wide HAP Emissions).

3.4 Stockpile Fugitive Emissions

Fugitive emissions from stockpiles include particulate matter and assumed metal HAPs.



Facility Emissions Estimate

Particulate Emissions

Fugitive particulate emissions from stockpiles are estimated in accordance with procedures recommended by the Texas Commission on Environmental Quality (TCEQ) for calculation of emissions from crushed stone processing. Fugitive emissions from stockpiles are calculated using the following equation:

$$\text{PM Emission Rate (tpy)} = \frac{[(\text{inactive day PM EF} \times \text{No. of inactive days}) \times (\text{stockpile area}/2000) \times \text{control factor}] + [(\text{active day PM EF} \times \text{No. of active days}) \times (\text{stockpile area}/2000) \times \text{control factor}]}$$

Stockpile control factors are identified as follows:

Stockpile 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

A summary of stockpile fugitive particulate emissions is presented in Table 3-4.

Metal HAP Emissions

There is no data available on the metal HAP content of particulate emissions from stockpiles.

For the purposes of this application, it has been assumed (as a worst case) that the fugitive particulate from stockpiles will contain the same percentage of metal HAPs as the particulate emissions from the existing roll-media filter at the existing GII facility. Emission testing for metals using USEPA Method 29 was performed at the outlet of the existing roll-media filter (controlling shredder emissions) in June of 2018. The list of analytes specified in Method 29 includes 12 HAP metals.

Emissions of these metal HAPs are calculated by multiplying the estimated PM emissions from the Non-Ferrous Material Processing System by the weight % of each HAP (lb HAP/lb of PM) measured in the roll-media filter emissions. The metal HAP data from the roll-media filter used to estimate HAP emissions from the Non-Ferrous Material Processing System are identified in Section 3.2 above.

Estimated metal HAP emissions from stockpiles are summarized on Table 3-8 (Summary of Facility Wide HAP Emissions).

3.5 Fugitive Emissions from Paved and Unpaved Roads

Fugitive emissions from paved and unpaved roads include fugitive particulate and assumed metal HAPs.

Particulate Emissions

Approximately 95% of interior plant roadways are paved with concrete or asphalt. The remaining approximately 5% of interior plant roadways will be lightly traveled and consist of crushed slag or similar materials. The facility will employ a program of sweeping and watering and posted speed limits of 10 mph to minimize generation of fugitive emissions.

Fugitive particulate emissions from vehicular traffic on paved roadways are calculated pursuant to AP-42, Section 13.2.1 Paved Roads, using the following equation:

$$E_{\text{ext}} = (k * (sL)^{0.91} * (W)^{1.02}) * (1 - (P/(4N)))$$

Equation 2, AP42, Section 13.2.1 Paved Roads (Jan 2011)

E_{ext}	=	0.011 PM	Size specific annual average particulate emission factor (lb/VMT)
K	=	0.0022 PM ₁₀ 0.0054 PM _{2.5}	Particle size multiplier lb/VMT (AP-42 Table 13.2.1-1)
sL	=	9.7	Mean controlled silt content, % (AP42 Table 13.2.1-3 Jan 2011 - Iron & Steel Range: 0.09 to 79; mean 9.7-g/m ²)
W	=		Mean vehicle weight, tons (use weighted average where available)
P	=	120	Number of precipitation days (>0.01 in) per year (AP42 Fig 13.2.1.2 Jan 2011 - Chicago, IL)
N	=	365	Averaging Period, annual
Control Efficiency	=	%	Estimated Control Efficiency for periodic sweeping and watering

Table 3-5A presents a summary of the estimated fugitive particulate emissions from paved roadways.



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Facility Emissions Estimate

Fugitive particulate emissions from vehicular traffic on unpaved roadways are calculated pursuant to AP-42, Section 13.2.2 Unpaved Roads, using the following equation:

$E_{ext} = (k * (s/12)^a * (W/3)^b) * ((N-P)/P)$	Equation 1a & 2, AP42, Section 13.2.2 Paved Roads (Nov 2006)
$E_{ext} =$	Size specific annual average particulate emission factor (lb/VMT)
$K =$	4.9 PM
	1.5 PM ₁₀
	0.15 PM _{2.5}
$s =$	6
	Mean controlled silt content, % (AP42 Table 13.2.2-2 Nov 2006 - Iron & Steel Production (%))
$W =$	Mean vehicle weight, tons (use weighted average where available)
$P =$	120
	Number of precipitation days (>0.01 in) per year – Chicago, IL (AP42 Fig 13.2.2-2 Nov 2006)
$N =$	365
	Averaging Period, annual
Control Efficiency =	%
	Estimated Control Efficiency for periodic watering or chemical treatment

Table 3-5B presents a summary of the estimated fugitive particulate emissions from unpaved roadways.

The estimated number and weight of vehicles required to operate the facility at its maximum throughput was calculated, and the mean vehicle weight (19.08 tons) was used in the fugitive particulate calculations for both paved and unpaved roads. The total daily vehicle miles traveled on-site for each type of vehicle was provided by facility personnel.

Metal HAP Emissions

There is no data available on the metal HAP content of particulate emissions from paved or unpaved roads.

For the purposes of this application, it has been assumed (as a worst case) that the fugitive particulate from paved and unpaved roads will contain the same percentage of metal HAPs as the particulate emissions from the existing roll-media filter at the existing GII facility. Emission testing for metals using USEPA Method 29 was performed at the outlet of the existing roll-media filter (controlling shredder emissions) in June of 2018. The list of analytes specified in Method 29 includes 12 HAP metals.

Emissions of these metal HAPs are calculated by multiplying the estimated PM emissions from the Non-Ferrous Material Processing System by the weight % of each HAP (lb HAP/lb of PM) measured in the roll-media filter emissions. The metal HAP data from the roll-media filter used to estimate HAP emissions from the Non-Ferrous Material Processing System are identified in Section 3.2 above.

Estimated metal HAP emissions from paved and unpaved roads are summarized on Table 3-8 (Summary of Facility-Wide HAP Emissions).

3.6 Miscellaneous Natural Gas Combustion

Miscellaneous natural gas combustion sources will consist of environmental heaters.

The estimated miscellaneous natural gas combustion emissions are presented in Table 3-6. Emissions are calculated using a maximum natural gas firing rate of 10 MMBtu/hr, a natural gas higher heating value (HHV) of 1,020 Btu/scf, and standard USEPA natural gas emission factors from AP-42; Chapter 1.4; Tables 1.4-1 and 1.4-2.

Emission estimates are presented for criteria pollutants, greenhouse gas (GHG), and metal and organic HAPs.

3.7 Facility-Wide Criteria Pollutant Emissions

A summary of facility-wide criteria pollutant emissions is presented in Table 3-7.

3.8 Facility-Wide HAP Emissions

A summary of facility-wide HAP emissions is presented in Table 3-8.



4.0 REGULATORY APPLICABILITY

The proposed facility is a greenfield facility and has no existing state air permits at the South Burley Avenue location.

GIII is requesting limits on its potential to emit (PTE), so the Facility will be a minor source with respect to federal and state prevention of significant deterioration (PSD) and nonattainment area new source review (NA NSR) rules and an 'area source' (i.e., minor source) with respect to HAP emissions.

4.1 Single Source

The proposed facility will be located at the site of a former steel mill that has been converted into an industrial campus which currently houses the sources identified below, all of which share common ownership and control under Reserve Management Group, (RMG), which also has corporate offices at the South Burley Avenue industrial campus.

Source Name	Source Description
Reserve Marine Terminals (RMT)	<p>RMT operates a foundry sand, slag and scrap recovery operation that includes conveyors, magnetic separation, screening, crushing, and conveying that processes approximately 60,000 tpy of material. Outdoor equipment is equipped with water misters as necessary to control particulate emissions.</p> <p>RMT generates fugitive particulate emissions from use of paved and unpaved roads, torch cutting, and operation of one 7 HP gasoline-fired generator and three diesel-fired electric generators (56 HP, 167 HP, and 241 HP) used to power process equipment. Generators operate only when processes are operating.</p> <p>RMT has no air permits and is not registered under the ROSS program.</p>
Regency Technologies (RSR)	<p>RSR is a small electronics recycling operation that operates indoors and has no process emissions.</p> <p>RSR also generates fugitive particulate emissions from use of paved roads.</p> <p>RSR has no process air emissions and therefore, is not required to obtain an air permit or register under the ROSS program.</p>

Source Name	Source Description
Napuck Salvage of Waupaca (NSW)	<p>NSW recycles approximately 262,800 tpy of aluminum (with some cast steel). Operations include crushing, screening and conveying with processing equipment located indoors.</p> <p>NSW also acquires, processes, and markets all grades of ferrous and non-ferrous scrap, specializing in engine blocks, foundry steel and aluminum. This includes processing of approximately 5,400 tpy of material by crushing, screening and other separation processes. All processing equipment is located indoors.</p> <p>NSW also generates fugitive particulate emissions from use of paved roads.</p> <p>NSW is registered under the Registration of Smaller Sources (ROSS) program (Application 12020006) – since February 6, 2012 continues to meet program eligibility requirements.</p>
South Shore Recycling (SSR)	<p>SSR purchases retail non-ferrous scrap metal and sells it to NSW or other offsite entities.</p> <p>SSR generates fugitive particulate emissions from use of unpaved roads and torch cutting (propane and plasma).</p> <p>SSR has no air emission permits and is not registered under the ROSS program.</p>

The four entities identified above share their primary SIC code, 5093 – *Scrap and Waste Materials*, with the proposed GIII facility.

4.2 Site Attainment Status

The proposed facility is located in Cook County, Illinois, as illustrated in Figure 1-1. The following identifies the attainment status for this site.

<u>Pollutant</u>	<u>Designation</u>
Sulfur Dioxide (SO ₂)	Attainment
Carbon Monoxide (CO)	Attainment
Ozone (O ₃)	Cook County had been designated as a moderate non-attainment for the 8-hour ozone standard but was downgraded to serious on September 23, 2019.
Particulate Matter	



< 2.5 Microns in Diameter (PM_{2.5}) Attainment

Particulate Matter

< 10 Microns in Diameter (PM₁₀) Attainment

Oxides of Nitrogen (NO₂) Attainment

Lead (Pb) Attainment

4.3 Fugitive Emissions

Fugitive emission sources at the proposed facility include, but are not limited to, vehicular traffic emissions, conveyor transfer points, stockpile operations, and truck and barge loading.

Since metal recycling is not one of the twenty-eight listed industrial categories under 35 IAC 203.206(d) and there is no applicable New Source Performance Standard or National Emission Standard for Hazardous Air Pollutants that was in effect on August 7, 1980, fugitive emission of criteria pollutants are not counted toward the determination of potential to emit with respect to federal and state PSD, NA NSR, or Title V permitting rules. However, for purposes of NESHAP applicability, fugitive HAP emissions are included in the facility wide potential to emit for HAPs.

The fugitive emissions of hazardous air pollutants (HAPs) are counted toward the determination of Part 70 Permit (Title V Permitting) applicability and source status under Section 112 of the Clean Air Act (CAA).

4.4 New Source Review for Ozone Nonattainment Area (NA-NSR)

The proposed facility is located in an area that is designated as serious nonattainment for ozone (VOM and NO_x). Proposed VOM and NO_x emission limits are significantly less than 25 tpy, which is below the corresponding major source threshold of 50 tpy for both VOM and NO_x.

4.5 Prevention of Significant Deterioration (PSD)

The proposed facility is located in an area that is designated in attainment or unclassifiable for criteria pollutants, other than ozone (VOM and NO_x). The requested emission limits in this application limit potential to emit for each pollutant to below major source thresholds with respect to PSD.

4.6 New Source Performance Standards (NSPS)

The proposed facility will not be subject to any New Source Performance Standards (NSPS) codified in 40 CFR 60 as described in the following sections.

4.6.1 40 CFR 60 Subpart LL Metallic Mineral Processing

The requirements of the NSPS for Metallic Mineral Processing Plants, 40 CFR 60, Subpart LL, are not applicable because the proposed facility will not meet the definition of a metallic mineral processing plant, as defined in 40 CFR 60.381. The proposed facility is a scrap metal recycling facility and will not produce metallic mineral concentrates from ore.

4.7 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

The proposed facility is not subject to any National Emission Standards for Hazardous Air Pollutants (NESHAP) codified in 40 CFR 60 as described in the following sections.

The proposed facility is also not subject to any NESHAP requirements in 40 CFR 61 or 63.

4.7.1 40 CFR 63 Subpart 6J – Industrial, Commercial, and Institutional Boilers Area Sources

The requirements of the NESHAP for Industrial, Commercial, and Institutional Boilers Area Sources, 40 CFR 63.11193, Subpart JJJJJ (6J), are not applicable because the proposed facility will not include subject boilers or process heaters and because hot water heaters are exempt under 40 CFR 63.11195(f).

4.7.2 40 CFR 63 Subpart 6G – Primary Non-Ferrous Metals Area Sources – Zinc, Cadmium and Beryllium

The requirements of the NESHAP for Primary Non-Ferrous Metals Area Sources- Zinc, Cadmium and Beryllium, 40 CFR 63, Subpart GGGGG (6G), are not applicable because the proposed facility will not be engaged in primary zinc production or primary beryllium production. The proposed facility is a scrap metal recycling facility.

4.7.3 40 CFR 63 Subpart 6T – Secondary Non-Ferrous Metals Processing Area Sources

The requirements of the NESHAP for Secondary Non-Ferrous Metals Processing Area Sources, 40 CFR 63, Subpart TTTTT (6T), are not applicable because the proposed facility will not engage in secondary Non-Ferrous Metals Processing as defined in 40 CFR 63.11472.

4.7.4 40 CFR 63 Subpart 6X – Nine Metal Fabrication and Finishing Source Categories

The requirements of the NESHAP for Nine Metal Fabrication and Finishing Source Categories, 40 CFR 63, Subpart XXXXX (6X), are not applicable because the proposed facility will not be primarily engaged in operations which are classified in one of the nine source categories listed in 40 CFR 63.11514(a)(1) through (9).

4.7.5 40 CFR 63 Subpart DD – Off-Site Waste and Recovery Operations

The requirements of the NESHAP for Off-Site Waste and Recovery Operations, 40 CFR 63, Subpart DD, are not applicable because the proposed facility is not located at, or part of, a major source of HAPs.

Emission limits requested in this permit limit HAP emission to below major source levels.

4.8 State Rules

4.8.1 35 IAC 205 – Emission Reduction Market System

The operating limits requested in this application limit the Facility's potential to emit VOM to less than 25 tpy, and is therefore, not subject to ERMS requirements.

4.8.2 35 IAC 207 – Vehicle Scrappage Activities

Part 207 identifies the procedures and performance requirements to be followed when conducting vehicle scrappage activities within the State of Illinois for the purpose of receiving Creditable Emission Reductions (CERs). Vehicle scrappage is defined in Section 207.102 as activities related to the retirement of eligible vehicles for the purpose of CERs.

Although the proposed facility will recycle End of Life Vehicles (ELVs), the proposed facility will not be performing these activities for the purposes of obtaining CERs and is, therefore, not subject to these requirements.

4.8.3 35 IAC 212 – Visible and Particulate Matter Emissions

4.8.3.1 35 IAC 212.123 – Opacity Limits

Section 212.123(a) prohibits the emission of smoke or other particulate matter from any process source to exceed 30% opacity.

4.8.3.2 35 IAC 212.301 – Process Fugitive Particulate Matter

Section 212.301 prohibits the emission of fugitive particulate matter from any process that is visible by an observer looking generally toward the zenith overhead, at a point beyond the property line of the source, unless wind speed is greater than 25 mph.

4.8.3.3 35 IAC 212.309 – Fugitive Particulate Matter Operating Program

Section 212.309 requires certain types of sources located in designated geographical areas defined in §212.302 to prepare, implement and maintain a fugitive particulate matter operating program meeting the minimum requirements identified in §212.310.

Although the proposed facility is located in Cook County, which is a geographical area defined in §212.302(a), the facility's SIC code (5093) is not included in the major SIC groups that are subject to this rule. Therefore, GIII is not subject to the requirements of §212.309.

Despite this exemption, GIII will voluntarily implement and maintain a fugitive particulate matter operating program that meets the requirements of §212.309.

4.8.3.4 35 IAC 212.321 – Process Weight Rate

Section 212.321(a) prohibits the emissions of particulate matter into the atmosphere in any one hour period from any new or modified emission unit to exceed the allowable emission rates specified in §212.321(c). The requested particulate emissions limit for emissions units identified in the application does not exceed the allowable particulate emission limit, as specified by the process weight rate equations in §212.321(c).

4.8.3.5 35 IAC 212.324 – Process Emission Units in Certain Areas

GIII's proposed facility is located in an area described by §212.324(a)(1)(B). Emissions units identified in this application will be subject to the following requirements:

§212.324(b) PM_{10} emissions from any process emissions unit shall not exceed 0.03 gr/scf during any one-hour period.

Pursuant to §212.324(d), this mass emissions limit shall not apply to emissions units with no visible emissions other than fugitive particulate matter.

§212.324(f) Requirements for maintenance and repair of air pollution control equipment.

§212.324(g) Recordkeeping of maintenance and repair of air pollution control equipment.

4.8.3.6 35 IAC 212 Subpart U – Additional Control Measures

The requirements of §212 Subpart U apply to facilities located within an area defined in §212.324(a)(1) and that have actual annual source-wide PM_{10} emissions of at least 15 tpy. Actual annual source-wide emissions is defined as the total of fugitive emissions and stack emissions from process emission units and fuel combustion units, as reported on a facility's annual emission report. For a newly constructed



& ASSOCIATES, INC.

Regulatory Applicability

source, the estimated emissions included in this permit application are compared to the applicability threshold.

GIII's proposed facility is located in the area described by §212.324(a)(1)(B) and this permit application identifies estimated annual source wide PM₁₀ emissions from fugitives and process emission units exceeding 15-tpy. Therefore, the requirements of §212 Subpart U are applicable to the proposed facility.

4.8.4 35 IAC 214 – Sulfur Limitations

4.8.4.1 35 IAC 214.301 General Limitations for Process Emission Sources

Section 214.301 prohibits the emission of sulfur dioxide from any process emissions source from exceeding 2,000 ppm.

Combustion emissions sources at the proposed facility are limited to small natural gas-fired environmental heaters with negligible emission of SO₂ due to negligible amounts of sulfur present in the fuel (pipeline quality natural gas). No solid or liquid fuel will be combusted in these units.

The materials that will be processed at this facility contain negligible amounts of sulfur and process operating conditions will not result in oxidization of sulfur to SO₂.

Based on the above, SO₂ emissions will be negligible.

4.8.5 35 IAC 216 - Carbon Monoxide Emissions

Part 216 regulates carbon dioxide (CO) emissions from various types of sources. Potentially regulated emission sources at the proposed facility are limited to natural gas-fired unit heaters under §216.121.

Section 216.121 prohibits emission of carbon monoxide into the atmosphere from any fuel combustion source with actual heat input greater than 10 MMBtu/hr to exceed 200 ppm, corrected to 50% excess air. None of the fuel combustion units at the proposed facility will have a design firing rate exceeding 10 MMBtu/hr and therefore, this facility is exempt from this limitation.

4.8.6 35 IAC 217 – Nitrogen Oxide Emissions

Part 217 regulates emission of oxides of nitrogen (NO_x) from various types of sources. Pursuant to §217.150, the provisions of Subparts E, F, G H, I and M of this rule apply only to units that emit or have the potential to emit NO_x in an amount equal to or greater than 100 tpy. As presented in Section 3 of this application, the proposed facility's potential to emit for NO_x is less than 100 tpy, and the proposed facility does not include any other regulated NO_x emission sources.

Based on the above, the proposed facility is not subject to any requirements in 35 IAC 217.

4.8.7 35 IAC 218 - Organic Material Emissions Standards and Limitations for the Chicago Area

4.8.7.1 Section 218.105 Test Methods and Procedures

Section 218.105 includes testing, monitoring, and recordkeeping requirements applicable to the proposed shredder emission control system (cyclone, roll-media filter, RTO and scrubber).

Section 218.105(c)(2) requires capture efficiency of an emission unit to be measured using one of the specified test protocols, unless the specified techniques are not suitable to a particular process, then an alternative capture efficiency protocol may be used pursuant to §218.108(b). Due to safety concerns, none of the specified methods for capture efficiency testing can be used at the shredder exhaust hood.

Section 218.105(d)(1) addresses demonstration of control device efficiency. Control device efficiency must be determined by simultaneously measuring the inlet and outlet gas phase VOM concentration and gas volumetric flow rates, in accordance with the gas phase test methods specified in §218.105(f).

Section 218.105(d)(2)(A) addresses control device monitoring requirements. When an afterburner (without a catalyst bed) is used, temperature of the combustion chamber must be continuously monitored with a monitoring device that is installed, calibrated, maintained, and operated according to vendor specifications at all times that the control device is in use.

Section 218.105(d)(2)(B) requires that a continuous temperature recorder must installed, calibrated, operated and maintained in accordance with the manufacturer's specifications.

4.8.7.2 Section 218.301 – Use of Organic Material

Section 218.301 limits the discharge of organic material from any emission source to less than 8 lb/hr, except as provided in Sections 218.302, 218.303, 218.304, and if no odor nuisance exists, the limitation of this Subpart shall apply only to photochemically reactive material.

Section 218.302(a) allows emissions of organic material in excess of that permitted by §218.301, if such emissions are controlled by a thermal incinerator so as either to reduce such emissions to 10 ppm equivalent methane or less, or to convert 85% of the hydrocarbons to carbon dioxide and water.

The only process unit with a potentially significant amount of organic material emissions is the hammermill shredder. The shredder will be equipped with a regenerative thermal oxidizer (RTO) that will have a destruction efficiency of at least 98%. The use of an RTO will ensure that the proposed shredder does not exceed the requirements of §218.301.



The ASR processed in the non-ferrous plant, contains negligible amounts of organic material, and operating conditions do not promote the generation of volatile organic material from the materials being processed. Based on the applicant's significant experience operating ferrous and non-ferrous separation processes, plant operations are not anticipated to result in an odor nuisance.

Based on the above, emissions of organic material will not exceed the allowable limit in this rule.

4.8.7.3 35 IAC 218 Subpart TT – Other Emission Units

35 IAC 218 Subpart TT identifies VOM control requirements for sources that have a potential to emit of 25 tpy or more of VOM. The application of an RTO to control VOM emissions from the hammermill shredder, limits the source-wide VOM potential to emit to less than 25 tpy, as evidenced by the VOM emission limits requested in this application.

Based on the above, the requirements of §218 Subpart TT are not applicable to the proposed facility.

4.8.8 35 IAC 244 – Episodes

Section 244.142 identifies the facilities for which Episode Action Plans are required. The proposed facility does not meet any of the applicability criteria identified in this section; therefore, 35 IAC 244 is not applicable to the proposed facility.

4.8.9 35 IAC 254 – Annual Emissions Report

Part 254 establishes uniform procedures for the reporting of air pollution emissions data from sources of regulated air pollutants. The proposed facility will be required to submit annual emissions reports to the IEPA and maintain associated facility records pursuant to this rule.

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**Construction Permit Application for New
Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

September 20, 2019

TABLES

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Table 3-1A Summary of Controlled Shredder VOM and CO Emissions
General III, LLC - Chicago, Illinois

Parameter	Units	Values	Comment
Captured VOC Emissions Controlled by RTO and Emitted Through the RTO/Scrubber Stack			
Demonstrated Captured Shredder VOM Emission Factor ^a	$\frac{\text{lbs of VOM}}{\text{ton of gross shredder feed}}$	0.2430	Measured value from May 25, 2018 testing by Method 25A (as propane). (Assume VOM = THC)
Maximum Gross Shredder Feed Rate	tons/month	100,000	Permitted maximum shredder feed rates requested in shredder RTO construction permit.
Maximum Annual Shredder Throughput ^b	tons/year	1,000,000	
RTO VOM Control Eff.	%	98.0%	RTO manufacturer's guarantee.
VOM emission safety factor		1.00	Safety factor used to establish permitted shredder VOM emission limits.
Shredder VOM Emissions ^a	tons/month	0.24	Maximum VOM emission rates requested in construction permit application.
	tons/year	2.43	

Parameter	Units	Units	Comment
CO Emissions (from combustion of VOM)			
CO emissions as percent of VOM at RTO Inlet	%	1.0%	Assumed value identified by IEPA
Total Shredder CO Emissions	tons/month	0.12	Maximum CO emission rates requested in construction permit application.
	tons/year	1.22	

a. VOM emissions measured by USEPA Method 25A minus methane, ethane, and compounds exempt from the federal definition of VOC and reported as propane.

b. Maximum annual shredder throughput requested in shredder RTO construction permit application based on recent operating data.

c. Minimum 81% VOM overall capture and control efficiency is required by 35 IAC 218 Subpart TT.

Table 3-1B Summary of Controlled Shredder Filterable Particulate Emissions
General III, LLC - Chicago, Illinois

Parameter	Units	Values	Comment
Captured PM/PM₁₀ Emissions Controlled by Cyclone and Roll Media Filter and Emitted Through the RTO/Scrubber Stack			
Demonstrated Filterable PM Emission Factor ^a	$\frac{\text{lbs of filterable PM}}{\text{ton of gross shredder feed}}$	0.0047	Measured values from shredder filterable PM emission testing performed June 13 & 14, 2018, downstream from roll media filter (represents inlet to RTO).
Maximum Annual Shredder Throughput ^b	tons/month	100,000	Permitted maximum shredder feed rates requested in shredder RTO construction permit.
	tons/year	1,000,000	
Assumed Shredder Emissions Capture Eff.	%	95.0%	Assumed value based on visible observations at shredder emissions capture hood.
Filterable PM Emissions Safety Factor		1.00	Safety factor used to establish permitted shredder PM emission rates.
Controlled Shredder Filterable PM Emission Rates	tons/month	0.24	Permitted filterable PM/PM ₁₀ emission rates requested in shredder RTO/Scrubber construction permit.
	tons/year	2.36	
Controlled Shredder Filterable PM ₁₀ Emission Rates	tons/month	0.24	Assumes that all PM is PM ₁₀ . Estimates assume no PM/PM ₁₀ emission reductions in RTO/Scrubber.
	tons/year	2.36	

a. Filterable PM emission rate measured by USEPA Methods 1 through 4 and Method 29.

b. Maximum annual shredder throughput requested in shredder RTO construction permit application based on recent operating data.

c. Maximum allowable PM emission rate defined by the Process Weight Rate (35 IAC 212 321) is 67-lb/hr.

**Table 3-1C Summary of Controlled Shredder HAP Emissions
General III, LLC - Chicago, Illinois**

	Emission Factor From June 2018 Emission Testing lb/ton	Permitted Shredder Thruput Rates	
		100,000 ton/mo Maximum Hourly Emissions ton/month	1,000,000 tpy Maximum Annual Emissions tpy
Metal HAPs¹			
Lead ⁽²⁾	3.1377E-06 ¹	0.0002	0.0016
Manganese	2.5261E-06 ¹	0.0001	0.0013
Mercury	6.0694E-05 ¹	0.0030	0.0303
Nickel	9.7720E-07 ¹	0.0000	0.0005
Antimony	1.8777E-07 ¹	0.0000	0.0001
Arsenic	7.2614E-08 ¹	0.0000	0.0000
Beryllium	1.4583E-08 ¹	0.0000	7.29E-06
Cadmium	6.9228E-07 ¹	0.0000	0.0003
Chromium ⁽³⁾	7.6720E-07 ¹	0.0000	0.0004
Cobalt	6.4876E-08 ¹	0.0000	0.0000
Phosphorus	9.4334E-06 ¹	0.0005	0.0047
Selenium	3.4861E-07 ¹	0.0000	0.0002
Volatile HAPs²			
Ethylbenzene	6.6700E-05 ²	0.0001	0.0007
Styrene	1.3300E-05 ²	0.0000	0.0001
Toluene	3.3300E-04 ²	0.0003	0.0033
Tetrachloroethane (PCE)	2.6700E-06 ²	0.0000	0.0000
m,p-Xylene	1.3300E-05 ²	0.0000	0.0001
Benzene	4.0000E-04 ²	0.0004	0.0040
1,1,1-Trichloroethane	2.0000E-04 ²	0.0002	0.0020
Methylene Chloride	6.0000E-05 ²	0.0001	0.0006
Trichloroethene (TCE)	6.6700E-05 ²	0.0001	0.0007
o-Xylene	6.6700E-05 ²	0.0001	0.0007
Total Metal HAPs		0.0039	0.0395
Total Organic HAPs		0.0012	0.0122
Total HAPs		0.0052	0.0517
Maximum Individual HAP		Mercury	0.0303

1. Measured metal emission rates from hammermill shredder controlled by cyclone and a roll media filter from June 2018.
2. Uncontrolled organic compound emission rates, as presented in ISRI Title V Applicability Workbook, Table D-11F, adjusted for RTO with 98% destruction efficiency.
3. Chromium (metal) and compounds other than Chromium VI

**Table 3-1D Shredder RTO Natural Gas Combustion Emissions
General III, LLC - Chicago, Illinois**

Pollutant	Pollutant Emission Factor ^a lb/MMscf	RTO Max Firing Rate 15.0 MMBtu/hr NG HHV = 1,020-Btu/scf Annual Gas Consumption 52,500 MMBtu/yr	
		ton/month ^b	tpy
Nitrogen Oxide (NOx)	100	0.26	2.57
Carbon Monoxide (CO)	84	0.22	2.16
Total Filterable PM	1.9	0.00	0.05
Total Condensable PM	5.7	0.01	0.15
Total Particulate Matter	7.6	0.02	0.20
Sulfur Dioxide (SO ₂)	0.6	0.00	0.02
Volatile Organic Compounds (VOC)	5.5	0.01	0.14
Greenhouse Gas Emissions			
Carbon Dioxide (CO ₂)	120,174	309.27	3,092.72
Methane (CH ₄)	2.2649	0.0058	0.06
Nitrous Oxide (N ₂ O)	0.2265	0.0006	0.01
Carbon Dioxide Equivalents (CO₂e) ^c		309.59	3,095.91

a. AP-42 Emission factors from Tables 1.4-1 and 1.4-2.

b. Monthly emissions are assumed to be 10% of annual emissions.

c. Global Warming Potentials (GWPs) for CO₂, CH₄ and N₂O are 1, 25, and 298 respectively (40 CFR 98 Subpart A).

**Table 3-1D Shredder RTO Natural Gas Combustion Emissions
General III, LLC - Chicago, Illinois**

Summary of HAP Emissions from Natural Gas Combustion

HAP ^b Y/N	Pollutant	Emission Factor ^a (lb/10 ³ scf)	Emissions	
			ton/month ^e	tpy
Metal HAPs^c				
Y	Lead	0.0005	1.29E-06	1.29E-05
Y	Manganese	3.80E-04	9.78E-07	9.78E-06
Y	Mercury	2.60E-04	6.69E-07	6.69E-06
Y	Nickel	2.10E-03	5.40E-06	5.40E-05
Y	Arsenic	2.00E-04	5.15E-07	5.15E-06
Y	Beryllium	< 1.20E-05	3.09E-08	3.09E-07
Y	Cadmium	1.10E-03	2.83E-06	2.83E-05
Y	Chromium	1.40E-03	3.60E-06	3.60E-05
Y	Cobalt	8.40E-05	2.16E-07	2.16E-06
Y	Selenium	< 2.40E-05	6.18E-08	6.18E-07
Volatile HAPs^d				
Y	Toluene	3.40E-03	8.75E-06	8.75E-05
Y	Hexane	< 1.80E+00	< 4.63E-03	< 4.63E-02
Y	Anthracene	< 2.40E-06	< 6.18E-09	< 6.18E-08
Y	Pyrene	5.00E-06	1.29E-08	1.29E-07
Y	Benzo(g,h,i)perylene	< 1.20E-06	< 3.09E-09	< 3.09E-08
Y	Indeno(1,2,3-cd)pyrene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Acenaphthylene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Benzo(b)fluoranthene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Fluoranthene	3.00E-06	7.72E-09	7.72E-08
Y	Benzo(k)fluoranthene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Chrysene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Dichlorobenzene	1.20E-03	3.09E-06	3.09E-05
Y	Formaldehyde	7.50E-02	1.93E-04	1.93E-03
Y	Benzo(a)pyrene	< 1.20E-06	< 3.09E-09	< 3.09E-08
Y	Dibenzo(a,h)anthracene	< 1.20E-06	< 3.09E-09	< 3.09E-08
Y	3-Methylcholanthrene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Benz(a)anthracene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	7,12-Dimethylbenz(a)anthracene	< 1.60E-05	< 4.12E-08	< 4.12E-07
Y	Benzene	< 2.10E-03	< 5.40E-06	< 5.40E-05
Y	Acenaphthene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Phenanthrene	1.70E-05	4.38E-08	4.38E-07
Y	Fluorene	2.80E-06	7.21E-09	7.21E-08
Y	Naphthalene	6.10E-04	1.57E-06	1.57E-05
Y	2-Methylnaphthalene	2.40E-05	6.18E-08	6.18E-07
Total HAPs			4.86E-03	4.86E-02
Maximum Individual HAP			Hexane	4.63E-02

- a. Criteria pollutant emission factors for natural gas combustion - AP-42 Tables 1.4-1 and 1.4-2.
b. Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.
c. Metal HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-4.
d. Organic HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-3.
e. Monthly emissions are assumed to be 10% of annual emissions.

**Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Equipment Generating Emissions	No of Points	Moisture > 1.5% Y / N	Transfer Point Location	Emission Factor Source ^d	Estimated Material Throughput		PM Emissions			PM ₁₀ Emissions			PM _{2.5} Emissions				
					ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy		
Conveyor Transfer Points - Controlled Emission Factors ^a	52	Y ^a	Outside	A	1,245,450	12,454,500	0.00014 ^a	0.0874	0.8205	0.000046 ^a	0.0290	0.2692	0.000013 ^a	0.0085	0.0764		
Truck Loading Crushed Stone - Uncontrolled Emission Factors ^b	3	NA ^b	Outside	D	174,000	1,740,000	0.00020 ^b	0.0177	0.1778	0.000100 ^b	0.0087	0.0870	0.000015 ^b	0.0014	0.0132		
Stockpile Loading - material drop emissions ^c	7	NA ^c	Outside	Drop	300,000	3,000,000	^c	0.1831	1.8294	^c	0.0866	0.8653	^c	0.0130	0.1309		
Totals Ferrous Plant Material Handling PM Emissions											0.2882	2.8277		0.1243	1.2215	0.0229	0.2205
Totals Ferrous Plant Material Handling HAP Metal Emissions										1.33% ^e	0.0038	0.0375	Ratio of HAP metal to total PM from June 2018 emission test of existing roll media filter at General II, LLC.				

- a. Controlled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying used based on conservative assumption that moisture content is greater than 1.5% due to water added in the shredder.
- b. Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for truck loading of crushed stone - conservative. Use uncontrolled emission factor because controlled emissions factors are not identified.

c. Material Drop PM Emission Equation from AP-42, Section 13.2.4.3.

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

E = emission factor (lb/ton of material dropped)
k = particle size multiplier (dimensionless)
U = mean wind speed
<https://www.timeanddate.com/weather/usa/chicago/climate>
M = material moisture content (%)

- U = 9.0 mph - annual average wind speed for Chicago (Midway Airport)
- k = 0.74 PM - AP-42, Section 13.2.4, for particle size < 30 um
- 0.35 PM - AP-42, Section 13.2.4, for particle size < 10 um
- 0.053 PM - AP-42, Section 13.2.4, for particle size < 2.5 um
- M = 1.5 Applied to light material stockpile loading. Moisture content for use of controlled emission factors for crushed stone processing - Conveyor Transfer Points - AP-42, Table 11.19.2-2. Considered to be conservative due to moisture added to material in shredder.
- 5.4 Applied to raw scrap metal handling. Material moisture was assumed to be the mean of material moisture contents for Iron and Steel Production identified in AP42, Table 13.2.4-1.
- 10.0 Applied to ASR stockpile loading. 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.

- d. See emission factors identified in Section 3.2 of permit application.
- e. Metal HAPs as percent of total PM measured at the discharge of the existing roll media filter during June 2018 metal emissions testing at General II, LLC.

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Equipment Generating Emissions	No of Points	Moisture > 1.5% Y / N	Transfer Point Location	Transfer Point Controlled	Emission Factor Source ^d	Estimated Material Throughput		PM Emissions			PM ₁₀ Emissions			PM _{2.5} Emissions				
						ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy		
Conveyor Transfer Points - Uncontrolled Emission Factors	74	N ^{a1}	Inside Bldg	Y	A	110,624	1,106,236	0.00300	Note f	Note f	0.001100	Note f	Note f	0.000167	Note f	Note f		
Conveyor Transfer Points - Controlled Emission Factors ^{a2}	30	Y ^{a2}	Inside Bldg	Y	A	13,436	134,361	0.00014 ^{a2}	Note f	Note f	0.000046 ^{a2}	Note f	Note f	0.000013 ^{a2}	Note f	Note f		
Screening - Uncontrolled Emission Factors	8	N ^{a3}	Inside Bldg	Y	B	2,820	28,196	0.02500	Note f	Note f	0.008700	Note f	Note f	0.001317	Note f	Note f		
Screening - Controlled Emission Factors	8	Y ^{a4}	Inside Bldg	Y	B	1,541	15,406	0.00220	Note f	Note f	0.000740	Note f	Note f	0.000050	Note f	Note f		
Stockpile Loading - Material Drop Emissions ^c	17	NA ^c	Inside Bldg	Y	Drop	838	8,381	^c	Note f	Note f	^c	Note f	Note f	^c	Note f	Note f		
Total Emissions for Sources Inside Building											0.14	1.36		0.14	1.36		0.14	1.36
Conveyor Transfer Points - Uncontrolled Emission Factors	59	N ^{a1}	outside	N	A	215,368	2,153,675	0.00300 ^{a1}	0.3228	3.2259	0.00110 ^{a1}	0.1188	1.1824	0.000167 ^{a1}	0.0178	0.1791		
Conveyor Transfer Points - Controlled Emission Factors ^{a2}	11	Y ^{a2}	outside	Y	A	57,210	572,103	0.00014 ^{a2}	0.0040	0.0363	0.00005 ^{a2}	0.0014	0.0118	0.000013 ^{a2}	0.0004	0.0034		
Screening - Uncontrolled Emission Factors	13	N ^{a3}	outside	N	B	13,670	136,702	0.02500 ^{a3}	0.1710	1.7088	0.00870 ^{a3}	0.0595	0.5944	0.001317 ^{a3}	0.0090	0.0900		
Screening - Controlled Emission Factors	12	Y ^{a4}	outside	Y	B	42,209	422,085	0.00220 ^{a4}	0.0464	0.4140	0.00074 ^{a4}	0.0153	0.1394	0.000050 ^{a4}	0.0011	0.0093		
Truck Loading Crushed Stone - Uncontrolled Emission Factors ^b	2	NA ^b	outside	NA	D	26,003	260,027	0.00020 ^b	0.0026	0.0266	0.00010 ^b	0.0013	0.0130	0.000015 ^b	0.0002	0.0020		
Stockpile Loading - Material Drop Emissions ^c	10	NA ^c	outside	NA	Drop	23,073	230,725	^c	0.0877	0.8480	^c	0.0416	0.4010	^c	0.0065	0.0609		
Totals Ferrous Plant Material Handling PM Emissions									0.77	7.62		0.37	3.71		0.17	1.71		
Totals Ferrous Plant Material Handling HAP Metal Emissions								1.33%	^a	0.0102	0.1012	Ratio of HAP metal to total PM from June 2018 emission test of existing roll media filter at General II, LLC.						

- a1. Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying.
- a2. Controlled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying used based on conservative assumption that moisture content is greater than 1.5% due to water added in the shredder.
- a3. Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for screening.
- a4. Controlled particulate matter emission factors from AP-42, Table 11.19.2-2 for screening used based on conservative assumption that moisture content is greater than 1.5% due to water added in the shredder.
- b. Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for truck loading of crushed stone - conservative. Use uncontrolled emission factor because controlled emissions factors are not identified.
- c. **Material Drop PM Emission Equation from AP-42, Section 13.2.4.3.**

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

E = emission factor (lb/ton of material dropped)
k = particle size multiplier (dimensionless)
U = mean wind speed
<https://www.timeanddate.com/weather/usa/chicago/climate>
M = material moisture content (%)

- U = 9.0 mph - annual average wind speed for Chicago (Midway Airport)
- k = 0.74 PM - AP-42, Section 13.2.4, for particle size < 30 um
- 0.35 PM - AP-42, Section 13.2.4, for particle size < 10 um
- 0.053 PM - AP-42, Section 13.2.4, for particle size < 2.5 um

M = 1.5 Applied to light material stockpile loading. Moisture content for use of controlled emission factors for crushed stone processing - Conveyor Transfer Points - AP-42, Table 11.19.2-2. Considered to be conservative due to moisture added to material in shredder.

- d. See emission factors identified in Section 3.2 of permit application.
- e. Metal HAPs as percent of total PM measured at the discharge of the existing roll media filter during June 2018 metal emissions testing at General II, LLC.
- f. Sources located inside the Fines Building emit to the atmosphere through Dust Collection DC-01. Emissions are estimated by multiplying the DC air flow rate of 12,000 cfm by a grain loading of 0.005 gr/dscf. All PM emissions are assumed to be PM_{2.5}.

Table 3-4 - Summary of Estimated Fugitive Particulate Emissions from Stockpile Operations^a
General III, LLC - Chicago, Illinois

Plant	Stock Pile	Stock Pile Area Acres	Control Factor ^b	No of Active Days day/yr ^c	Inactive Emissions			Active Emissions			Total PM Emissions		
					PM tpy ^{d,h}	PM10 tpy ^{d,h}	PM2.5 tpy ^{d,h}	PM tpy ^{d,h}	PM10 tpy ^{d,h}	PM2.5 tpy ^{d,h}	PM tpy ^{d,h}	PM10 tpy ^{d,h}	PM2.5 tpy ^{d,h}
Ferrous Plant	Poker North	0.0115	0.1	312	0.0001	0.0001	0.0000	0.0024	0.0012	0.0002	0.0025	0.0013	0.0002
	Poker South	0.0115	0.1	312	0.0001	0.0001	0.0000	0.0024	0.0012	0.0002	0.0025	0.0013	0.0002
	ASR	0.2541	1	312	0.0236	0.0118	0.0018	0.5232	0.2616	0.0396	0.5468	0.2734	0.0414
	Ferrous North	0.3630	1	312	0.0337	0.0169	0.0026	0.7475	0.3738	0.0566	0.7812	0.3907	0.0592
	Ferrous South	0.3630	1	312	0.0337	0.0169	0.0026	0.7475	0.3738	0.0566	0.7812	0.3907	0.0592
	Fluff (Bin)	0.0161	0.1	312	0.0001	0.0001	0.0000	0.0033	0.0017	0.0003	0.0034	0.0018	0.0003
	Raw Material Truck Dumping (Drop 1)	0.3630	1	312	0.0337	0.0169	0.0026	0.7475	0.3738	0.0566	0.7812	0.3907	0.0592
	Raw Material Movement from Truck Dumping Area to Stockpile (Drop 2)	0.1815	1	312	0.0168	0.0084	0.0013	0.3737	0.1869	0.0283	0.3905	0.1953	0.0296
Nonferrous Plant	FE from E-02	0.0047	0.1	312	0.0000	0.0000	0.0000	0.0010	0.0005	0.0001	0.0010	0.0005	0.0001
	5" + Zorba	0.0189	0.1	312	0.0002	0.0001	0.0000	0.0039	0.0020	0.0003	0.0041	0.0021	0.0003
	2-1/2" - 5" Zorba	0.0189	0.1	312	0.0002	0.0001	0.0000	0.0039	0.0020	0.0003	0.0041	0.0021	0.0003
	5/8" - 2-1/2" Zorba	0.0189	0.1	312	0.0002	0.0001	0.0000	0.0039	0.0020	0.0003	0.0041	0.0021	0.0003
	Tailings	0.0195	0.1	312	0.0002	0.0001	0.0000	0.0040	0.0020	0.0003	0.0042	0.0021	0.0003
	Open	0.0195	0.1	312	0.0002	0.0001	0.0000	0.0040	0.0020	0.0003	0.0042	0.0021	0.0003
	Wire	0.0195	0.1	312	0.0002	0.0001	0.0000	0.0040	0.0020	0.0003	0.0042	0.0021	0.0003
	Wire Rich Solids	0.0195	0.1	312	0.0002	0.0001	0.0000	0.0040	0.0020	0.0003	0.0042	0.0021	0.0003
	Zurick	0.0195	0.1	312	0.0002	0.0001	0.0000	0.0040	0.0020	0.0003	0.0042	0.0021	0.0003
	Waste	0.0868	0.1	312	0.0008	0.0004	0.0001	0.0179	0.0090	0.0014	0.0187	0.0094	0.0015
	Totals											3.2893	1.6452

- 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:

$$\text{PM Emission Rate (tpy)} = \{[(\text{inactive day PM EF} \times \text{No. of inactive days}) \times \text{stockpile area}/2000 \times \text{control factor}] + [(\text{active day PM EF} \times \text{No. of active days}) \times (\text{stockpile area}/2000) \times \text{control factor}]\}$$

$$\text{Inactive Day PM Emission Factor} = 3.50 \text{ lb-PM/acre-day from TCEQ rock crushing emission calculation spreadsheet.}$$

$$\text{Active Day PM Emission Factor} = 13.20 \text{ lb-PM/acre-day from TCEQ rock crushing emission calculation spreadsheet.}$$
- e. PM10 emissions are half of PM emission per TCEQ Air Permits Division, Rock Crushing Emission Calculation spreadsheet.
- f. Where PM2.5 emission factors are not provided in AP-42, 11-19.2-2, a ratio of aerodynamic particle size multipliers from AP-42, 13.2.45 is used to estimate PM2.5 emission factors. $\text{PM2.5 EF} = (\text{PM10 EF}/0.35) \times 0.053$.
- g. Total particulate emissions is the sum of inactive day emissions plus active day emissions.
- h. Hourly emissions, if required, would be based on 8,760 hr/yr.

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

Walls on three sides.
 Use 0.10 as average control factor.

**Table 3-5A - Fugitive PM Emissions - Paved Roads
General III, LLC - Chicago, Illinois**

Paved Road Fugitive Emission Calculation Procedure

$$E_{ext} = (k * (sL)^{0.91} * (W)^{1.02}) * (1 - (P/(4N)))$$

Equation 2, AP-42 13.2.1 Paved Roads (Jan 2011)
equation does not include brake and tire wear.

where:

E_{ext} =	Size specific annual average particulate emission factor (lb/VMT)
k =	See Below Particle size multiplier lb/VMT (AP-42 Table 13.2.1-1)
sL =	9.7 mean controlled silt content, % (AP42 Table 13.2.1-3 Jan 2011 - Iron & Steel Range: 0.09 to 79; mean 9.7-g/m2)
W =	19.08 Mean vehicle weight, tons (use weighted average where available)
P =	120 Number of precipitation days (>0.01 in) per year (AP42 Fig 13.2.1.2 Jan 2011 - Chicago, IL)
N =	365 Averaging Period, annual
Control Eff % =	75.00% Emission Control Efficiency for sweeping or watering
Daily Operating Hours	17 Hours per Year
Weekly Operating Days	6 Days /Week
Annual Operating Weeks =	52 Weeks/Yr
Annual Operating hours =	5,304 Hours per Year

Material Hauling			PM Particle size multiplier (k) =				0.011
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Annual Average Uncontrolled Emissions 1.6155-lb/VMT		Annual Average Controlled Emissions		Annual PM Emissions tpy
			(lb/day)	(ton/month)	(lb/day)	(ton/month)	
Semi (Shredded Steel)	26.75	27.17	43.893	0.685	10.973	0.171	1.71
Semi (scrap metal)	24.50	70.87	114.490	1.786	28.623	0.447	4.47
Semi (overseas container)	27.25	2.57	4.144	0.065	1.036	0.016	0.16
Semi (shredder residue (fluff))	27.75	9.69	15.654	0.244	3.914	0.061	0.61
Peddler Pickups	3.45	66.41	107.277	1.674	26.819	0.419	4.18
WA500 Loader (steel residue)	36.49	20.90	33.764	0.527	8.441	0.132	1.32
WA300 Loader (steel residue)	16.60	9.50	15.347	0.239	3.837	0.060	0.60
Weighted Average Weight:	19.08	Subtotals:	334.569	5.220	83.643	1.306	13.05

Material Hauling			PM10 Particle size multiplier (k) =				0.0022
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Annual Average Uncontrolled Emissions 0.3231-lb/VMT		Annual Average Controlled Emissions		Annual PM10 Emissions tpy
			(lb/day)	(ton/month)	(lb/day)	(ton/month)	
Semi (Shredded Steel)	26.75	27.17	8.779	0.137	2.195	0.034	0.34
Semi (scrap metal)	24.50	70.87	22.898	0.357	5.725	0.089	0.89
Semi (overseas container)	27.25	2.57	0.829	0.013	0.207	0.003	0.03
Semi (shredder residue (fluff))	27.75	9.69	3.131	0.049	0.783	0.012	0.12
Peddler Pickups	3.45	66.41	21.455	0.335	5.364	0.084	0.84
WA500 Loader (steel residue)	36.49	20.90	6.753	0.105	1.688	0.026	0.26
WA300 Loader (steel residue)	16.60	9.50	3.069	0.048	0.767	0.012	0.12
Weighted Average Weight:	19.08	Subtotals:	66.914	1.044	16.729	0.260	2.61

Material Hauling			PM2.5 Particle size multiplier (k) =				0.00054
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Annual Average Uncontrolled Emissions 0.0793-lb/VMT		Annual Average Controlled Emissions		Annual PM2.5 Emissions tpy
			(lb/day)	(ton/month)	(lb/day)	(ton/month)	
Semi (Shredded Steel)	26.75	27.17	2.155	0.034	0.539	0.009	0.08
Semi (scrap metal)	24.50	70.87	5.620	0.088	1.405	0.022	0.22
Semi (overseas container)	27.25	2.57	0.203	0.003	0.051	0.001	0.01
Semi (shredder residue (fluff))	27.75	9.69	0.768	0.012	0.192	0.003	0.03
Peddler Pickups	3.45	66.41	5.266	0.082	1.317	0.021	0.21
WA500 Loader (steel residue)	36.49	20.90	1.657	0.026	0.414	0.007	0.07
WA300 Loader (steel residue)	16.60	9.50	0.753	0.012	0.188	0.003	0.03
Weighted Average Weight:	19.08	Subtotals:	16.422	0.257	4.106	0.066	0.64

**Table 3.5B - Fugitive PM Emissions - Paved Roads
General III, LLC - Chicago, Illinois**

Unpaved Industrial Road Fugitive Emission Calculation Procedure

$$E_{ext} = [(k * (s/12)^a * (W/3)^b) * ((N-P)/N)]$$

Equation 1a & 2, AP-42 13.2.2-2 (Nov 2006)

where:

E_{ext} =	Size specific annual average particulate emission factor (lb/VMT)
k =	See Below Particle size multiplier lb/VMT (AP-42 Table 13.2.2-2)
s =	6 mean material silt content (%) (AP42 Table 13.2.2-1 Nov 2006 - Iron & Steel Production: mean = 6.0%)
W =	19.08 Mean vehicle weight, tons (use weighted average where available)
P =	120 Number of precipitation days (>0.01 in) per year (AP42 Fig 13.2.1.2 Jan 2011 - Chicago, IL)
N =	365 Averaging Period, annual
Control Eff % =	50.00% Emission Control Efficiency for watering
Daily Operating Hours =	17 Hours per Year
Weekly Operating Days =	6 Days/Week
Annual Operating Weeks =	52 Weeks/Yr
Annual Operating hours =	5,304 Hours per Year

(AP42 Table 13.2.2-2 Nov 2006 - Industrial Roads (Eq. 1a))			
EQ 1a Constants	PM	PM10	PM2.5
a =	0.7	0.9	0.9
b =	0.45	0.45	0.45

Material Hauling

Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	PM Particle size multiplier (k) = 4.9				
			Annual Average Uncontrolled Emissions 4.6548-lb/VMT		Annual Average Controlled Emissions		Annual PM Emissions tpy
			(lb/day)	(ton/month)	(lb/day)	(ton/month)	
Semi (Shredded Steel)	26.75	1.43	6.656	0.104	3.328	0.052	0.52
Semi (scrap metal)	24.50	3.73	17.362	0.271	8.681	0.136	1.35
Semi (overseas container)	27.25	0.14	0.628	0.010	0.314	0.005	0.05
Semi (shredder residue (fluff))	27.75	0.51	2.374	0.037	1.187	0.019	0.19
Peddler Pickups	3.45	3.50	16.269	0.254	8.135	0.127	1.27
WA500 Loader (steel residue)	36.49	1.10	5.120	0.080	2.560	0.040	0.40
WA300 Loader (steel residue)	16.60	0.50	2.327	0.036	1.164	0.018	0.18
Weighted Average Weight:	19.08	Subtotals:	50.736	0.792	25.369	0.397	3.96

Material Hauling

Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	PM10 Particle size multiplier (k) = 1.5				
			Annual Average Uncontrolled Emissions 1.2405-lb/VMT		Annual Average Controlled Emissions		Annual PM10 Emissions tpy
			(lb/day)	(ton/month)	(lb/day)	(ton/month)	
Semi (Shredded Steel)	26.75	1.43	1.774	0.028	0.887	0.014	0.14
Semi (scrap metal)	24.50	3.73	4.627	0.072	2.314	0.036	0.36
Semi (overseas container)	27.25	0.14	0.167	0.003	0.084	0.001	0.01
Semi (shredder residue (fluff))	27.75	0.51	0.633	0.010	0.317	0.005	0.05
Peddler Pickups	3.45	3.50	4.336	0.068	2.168	0.034	0.34
WA500 Loader (steel residue)	36.49	1.10	1.365	0.021	0.683	0.011	0.11
WA300 Loader (steel residue)	16.60	0.50	0.620	0.010	0.310	0.005	0.05
Weighted Average Weight:	19.08	Subtotals:	13.522	0.211	6.763	0.106	1.06

Material Hauling

Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	PM2.5 Particle size multiplier (k) = 0.15				
			Annual Average Uncontrolled Emissions 0.1240-lb/VMT		Annual Average Controlled Emissions		Annual PM2.5 Emissions tpy
			(lb/day)	(ton/month)	(lb/day)	(ton/month)	
Semi (Shredded Steel)	26.75	1.43	0.177	0.003	0.089	0.001	0.01
Semi (scrap metal)	24.50	3.73	0.463	0.007	0.232	0.004	0.04
Semi (overseas container)	27.25	0.14	0.017	0.000	0.009	0.000	0.00
Semi (shredder residue (fluff))	27.75	0.51	0.063	0.001	0.032	0.001	0.01
Peddler Pickups	3.45	3.50	0.433	0.007	0.217	0.003	0.03
WA500 Loader (steel residue)	36.49	1.10	0.136	0.002	0.068	0.001	0.01
WA300 Loader (steel residue)	16.60	0.50	0.062	0.001	0.031	0.001	0.00
Weighted Average Weight:	19.08	Subtotals:	1.351	0.021	0.678	0.009	0.11

Table 3-6 Miscellaneous Natural Gas Fired Environmental Heaters
General III, LLC - Chicago, Illinois

Pollutant	Pollutant Emission Factor ^a lb/MMscf	10 Total Max Firing Rate 10.0 MMBtu/hr NG HHV = 1,020-Btu/scf Annual Gas Consumption 65,700 MMBtu/yr	
		ton/mo ^b	tpy
Nitrogen Oxide (NO _x)	100	0.32	3.22
Carbon Monoxide (CO)	84	0.27	2.71
Total Filterable PM	1.9	0.01	0.06
Total Condensable PM	5.7	0.02	0.18
Total Particulate Matter	7.6	0.02	0.24
Sulfur Dioxide (SO ₂)	0.6	0.00	0.02
Volatile Organic Compounds (VOC)	5.5	0.02	0.18
Greenhouse Gas Emissions			
Carbon Dioxide (CO ₂)	120,174	387.03	3,870.31
Methane (CH ₄)	2.2649	0.0073	0.07
Nitrous Oxide (N ₂ O)	0.2265	0.0007	0.01
Carbon Dioxide Equivalents (CO₂e) ^c		387.43	3,874.31

a. AP-42 Emission factors from Tables 1.4-1 and 1.4-2.

b. Unit heaters are estimated to operate 6,570 hr/year.

c. Global Warming Potentials (GWPs) for CO₂, CH₄ and N₂O are 1, 25, and 298 respectively (40 CFR 98 Subpart A).

**Table 3-6 Miscellaneous Natural Gas Fired Environmental Heaters
General III, LLC - Chicago, Illinois**

Summary of HAP Emissions from Natural Gas Combustion

HAP ^b Y/N	Pollutant	Emission Factor ^a (lb/10 ⁶ scf)	Emissions	
			ton/mo	tpy
Metal HAPs^c				
Y	Lead	0.0005	1.61E-06	1.61E-05
Y	Manganese	3.80E-04	1.22E-06	1.22E-05
Y	Mercury	2.60E-04	8.37E-07	8.37E-06
Y	Nickel	2.10E-03	6.76E-06	6.76E-05
Y	Arsenic	2.00E-04	6.44E-07	6.44E-06
Y	Beryllium	< 1.20E-05	3.86E-08	3.86E-07
Y	Cadmium	1.10E-03	3.54E-06	3.54E-05
Y	Chromium	1.40E-03	4.51E-06	4.51E-05
Y	Cobalt	8.40E-05	2.71E-07	2.71E-06
Y	Selenium	< 2.40E-05	7.73E-08	7.73E-07
Volatile HAPs^d				
Y	Toluene	3.40E-03	1.10E-05	1.10E-04
Y	Hexane	< 1.80E+00	< 5.80E-03	< 5.80E-02
Y	Anthracene	< 2.40E-06	< 7.73E-09	< 7.73E-08
Y	Pyrene	5.00E-06	1.61E-08	1.61E-07
Y	Benzo(g,h,i)perylene	< 1.20E-06	< 3.86E-09	< 3.86E-08
Y	Indeno(1,2,3-cd)pyrene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Acenaphthylene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Benzo(b)fluoranthene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Fluoranthene	3.00E-06	9.66E-09	9.66E-08
Y	Benzo(k)fluoranthene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Chrysene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Dichlorobenzene	1.20E-03	3.86E-06	3.86E-05
Y	Formaldehyde	7.50E-02	2.42E-04	2.42E-03
Y	Benzo(a)pyrene	< 1.20E-06	< 3.86E-09	< 3.86E-08
Y	Dibenzo(a,h)anthracene	< 1.20E-06	< 3.86E-09	< 3.86E-08
Y	3-Methylcholanthrene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Benz(a)anthracene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	7,12-Dimethylbenz(a)anthracene	< 1.60E-05	< 5.15E-08	< 5.15E-07
Y	Benzene	< 2.10E-03	< 6.76E-06	< 6.76E-05
Y	Acenaphthene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Phenanathrene	1.70E-05	5.48E-08	5.48E-07
Y	Fluorene	2.80E-06	9.02E-09	9.02E-08
Y	Naphthalene	6.10E-04	1.96E-06	1.96E-05
Y	2-Methylnaphthalene	2.40E-05	7.73E-08	7.73E-07
Total HAPs			6.08E-03	6.08E-02
Maximum Individual HAP			Hexane	5.80E-02

a. AP-42 Emission factors from Tables 1.4-1 and 1.4-2.

b. Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

c. Metal HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-4.

d. Organic HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-3.

e. Monthly emissions are assumed to be 10% of annual emissions.

**Table 3-7 - Summary of Facility Wide Criteria Pollutant Emissions
General III, LLC - Chicago, Illinois**

Pollutant	RTO ^a		RTO Natural Gas ^b		Ferrous Plant ^c		Nonferrous Plant ^d		Misc Natural Gas ^e		Facility Wide Potential ^h tpy	Fugitive Emissions From Stockpile Operations ^f		Fugitive Emissions from Paved Roads ^g		Facility Wide Emissions with Fugitives tpy
	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy		ton/mo	tpy	ton/mo	tpy	
Oxides of Nitrogen - NOx				2.57						3.22	5.79					5.79
Carbon Monoxide - CO	0.12	1.22	0.22	2.16					2.71	2.71	6.08					6.08
Total Particulate Matter - PM	0.24	2.36		0.20		2.83		7.62		0.24	13.25	0.33	3.29	1.31	13.05	29.59
filterable PM less than 10 microns in diameter - PM ₁₀	0.24	2.36		0.20		1.22		3.71		0.24	7.73	0.16	1.65	0.26	2.61	11.98
Filterable PM less than 2.5 microns in diameter - PM _{2.5}				0.20		0.22		1.71		0.24	2.37	0.02	0.25	0.06	0.64	3.26
Sulfur Dioxide - SO ₂				0.02						0.02	0.03					0.03
Volatile Organic Material - VOM	0.24	2.43		0.14						0.18	2.75					2.75
Total - HAPs	0.0052	0.0517		0.0486		0.0473		0.1275		0.0608	0.3359	0.0055	0.0550	0.03	0.2845	0.6754
Max Individual HAP	Mercury	Mercury		Hexane		Mercury		Mercury		Hexane		Mercury	Mercury	Mercury	Mercury	
		0.0303				0.0364		0.0980			0.1648	0.0042	0.0423	0.02	0.2188	0.4259
	Hexane			0.0463						0.0580	0.1043					0.1043
Greenhouse Gas Emissions											0.00					0.00
Carbon Dioxide - CO ₂		3,095.91		3,092.72						3,870.31	10,058.94					10,058.94
Methane - CH ₄		0.0583		0.0583						0.0729	0.1895					0.1895
Nitrous Oxide - N ₂ O		0.0058		0.0058						0.0073	0.0190					0.0190
Carbon Dioxide Equivalents - CO ₂ e		3,099.10		3,095.91						3,874.31	10,069.33					10,069.33

a. See Tables 1A (VOM and CO), Table 1B (PM), and Table 1C (HAPs). For the purposes of this application, GHG from combustion of VOM in the RTO is assumed to be equal to GHG from maximum natural gas combustion in RTO.

b. See Table 1D.

c. See Table 2.

d. See Table 3.

e. See Table 4.

f. See Table 5.

g. See Table 6.

h. Scrap metal recycling is not one included in one of the 28 industrial quantities identified in PSD rules, there for purposes of PSD, fugitive emissions are not included in PTE.

**Table 3-8 - Summary of Facility Wide HAP Emissions
General III, LLC - Chicago, Illinois**

Hazardous Air Pollutant	RTO ^a		RTO Natural Gas ^b		Ferrous Plant ^c		Nonferrous Plant ^c		Stockpile Operations ^c		Paved + Unpaved Fugitive Road ^c		Misc Natural Gas ^b		Facility Wide Total HAP	
	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy
Volatile HAPs																
Ethylbenzene	6.67E-05	6.67E-04													6.67E-05	6.67E-04
Styrene	1.33E-05	1.33E-04													1.33E-05	1.33E-04
Toluene	3.33E-04	3.33E-03	8.75E-06	8.75E-05									1.10E-05	1.10E-04	3.53E-04	3.53E-03
Hexane			4.63E-03	4.63E-02									5.80E-03	5.80E-02	1.04E-02	1.04E-01
Anthracene			6.18E-09	6.18E-08									7.73E-09	7.73E-08	1.39E-08	1.39E-07
Tetrachloroethane (PCE)	2.67E-06	2.67E-05													2.67E-06	2.67E-05
Pyrene			1.29E-08	1.29E-07									1.61E-08	1.61E-07	2.90E-08	2.90E-07
m,p-Xylene	1.33E-05	1.33E-04													1.33E-05	1.33E-04
Benzo(g,h,i)perylene			3.09E-09	3.09E-08									3.86E-09	3.86E-08	6.95E-09	6.95E-08
Indeno(1,2,3-cd)pyrene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
Acenaphthene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
Benzo(b)fluoranthene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
Fluoranthene			7.72E-09	7.72E-08									9.66E-09	9.66E-08	1.74E-08	1.74E-07
Benzo(k)fluoranthene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
Chrysene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
Dichlorobenzene			3.09E-06	3.09E-05									3.86E-06	3.86E-05	6.95E-06	6.95E-05
Formaldehyde			1.93E-04	1.93E-03									2.42E-04	2.42E-03	4.35E-04	4.35E-03
Benzo(a)pyrene			3.09E-09	3.09E-08									3.86E-09	3.86E-08	6.95E-09	6.95E-08
Dibenzo(a,h)anthracene			3.09E-09	3.09E-08									3.86E-09	3.86E-08	6.95E-09	6.95E-08
3-Methylcholanthrene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
Benzo(a)anthracene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
7,12-Dimethylbenzene(a)anthracene			4.12E-08	4.12E-07									5.15E-08	5.15E-07	9.27E-08	9.27E-07
Benzene	4.00E-04	4.00E-03	5.40E-06	5.40E-05									6.76E-06	6.76E-05	4.12E-04	4.12E-03
1,1,1-Trichloroethane	2.00E-04	2.00E-03													2.00E-04	2.00E-03
Methylene Chloride	6.00E-05	6.00E-04													6.00E-05	6.00E-04
Trichloroethene (TCE)	6.67E-05	6.67E-04													6.67E-05	6.67E-04
Acenaphthylene			4.63E-09	4.63E-08									5.80E-09	5.80E-08	1.04E-08	1.04E-07
Phenanthrene			4.38E-08	4.38E-07									5.48E-08	5.48E-07	9.85E-08	9.85E-07
Fluorene			7.21E-09	7.21E-08									9.02E-09	9.02E-08	1.62E-08	1.62E-07
Naphthalene			1.57E-06	1.57E-05									1.96E-06	1.96E-05	3.53E-06	3.53E-05
2-Methylnaphthalene			6.18E-08	6.18E-07									7.73E-08	7.73E-07	1.39E-07	1.39E-06
o-Xylene	6.67E-05	6.67E-04													6.67E-05	6.67E-04
Metal HAPs																
Lead	1.57E-04	1.57E-03	1.29E-06	1.29E-05	1.92E-04	1.88E-03	5.12E-04	5.07E-03	2.19E-04	2.19E-03	1.13E-03	1.13E-02	1.61E-06	1.61E-05	2.21E-03	2.20E-02
Manganese	1.26E-04	1.26E-03	9.78E-07	9.78E-06	1.54E-04	1.51E-03	4.12E-04	4.08E-03	1.76E-04	1.76E-03	9.11E-04	9.11E-03	1.22E-06	1.22E-05	1.78E-03	1.77E-02
Mercury	3.03E-03	3.03E-02	6.69E-07	6.69E-06	3.71E-03	3.64E-02	9.91E-03	9.80E-02	4.23E-03	4.23E-02	2.19E-02	2.19E-01	8.37E-07	8.37E-06	4.28E-02	4.26E-01
Nickel	4.89E-05	4.89E-04	5.40E-06	5.40E-05	5.97E-05	5.86E-04	1.60E-04	1.58E-03	6.81E-05	6.81E-04	3.52E-04	3.52E-03	6.76E-06	6.76E-05	7.01E-04	6.98E-03
Antimony	9.39E-06	9.39E-05			1.15E-05	1.13E-04	3.06E-05	3.03E-04	1.31E-05	1.31E-04	6.77E-05	6.77E-04			1.32E-04	1.32E-03
Arsenic	3.63E-06	3.63E-05	5.15E-07	5.15E-06	4.44E-06	4.35E-05	1.19E-05	1.17E-04	5.06E-06	5.06E-05	2.62E-05	2.62E-04	6.44E-07	6.44E-06	5.23E-05	5.21E-04
Beryllium	7.29E-07	7.29E-06	3.09E-08	3.09E-07	8.91E-07	8.74E-06	2.38E-06	2.36E-05	1.02E-06	1.02E-05	5.26E-06	5.26E-05	3.86E-08	3.86E-07	1.03E-05	1.03E-04
Cadmium	3.46E-05	3.46E-04	2.83E-06	2.83E-05	4.23E-05	4.15E-04	1.13E-04	1.12E-03	4.83E-05	4.83E-04	2.50E-04	2.50E-03	3.54E-06	3.54E-05	4.94E-04	4.92E-03
Chromium	3.84E-05	3.84E-04	3.60E-06	3.60E-05	4.69E-05	4.60E-04	1.25E-04	1.24E-03	5.35E-05	5.35E-04	2.77E-04	2.77E-03	4.51E-06	4.51E-05	5.49E-04	5.46E-03
Cobalt	3.24E-06	3.24E-05	2.16E-07	2.16E-06	3.96E-06	3.89E-05	1.06E-05	1.05E-04	4.52E-06	4.52E-05	2.34E-05	2.34E-04	2.71E-07	2.71E-06	4.62E-05	4.60E-04
Phosphorus	4.72E-04	4.72E-03			5.76E-04	5.65E-03	1.54E-03	1.52E-02	6.58E-04	6.58E-03	3.40E-03	3.40E-02			6.65E-03	6.62E-02
Selenium	1.74E-05	1.74E-04	6.18E-08	6.18E-07	2.13E-05	2.09E-04	5.69E-05	5.63E-04	2.43E-05	2.43E-04	1.26E-04	1.26E-03	7.73E-08	7.73E-07	2.46E-04	2.45E-03
Total HAPs	5.17E-03	5.17E-02	4.86E-03	4.86E-02	4.82E-03	4.73E-02	1.29E-02	1.27E-01	5.50E-03	5.50E-02	2.85E-02	2.85E-01	6.08E-03	6.08E-02	6.78E-02	6.75E-01
											Maximum Individual HAP					
													Mercury		4.28E-02	4.26E-01

a. Uncontrolled organic compound emission factors (lb/ton), as presented in ISRI Title V Applicability Workbook, Table D-11F, were multiplied by proposed permit throughput limits, adjusted for 98% control by the RTO. Metal HAP emission factors were taken from the June 2018 emission testing of the RTO at Gil, LLC's existing Clifton Street facility in Chicago. No additional control efficiency was applied to the metal HAP emission factors for the packed tower scrubber.

b. HAP emissions from natural gas combustion as identified in AP-42, Tables 1.4-3 and 1.4-4.

c. Metal HAP emissions calculated by multiplying the weight % of metal HAP in RTO particulate emission by the total PM emissions from identified emission unit.

d. HAP emission factors from natural gas combustion from AP-42, Tables 1.4-3 and 1.4-4 adjusted to propane on the basis of 1,020 Btu/cf (see footnotes on Table 5).



**Construction Permit Application for New
Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

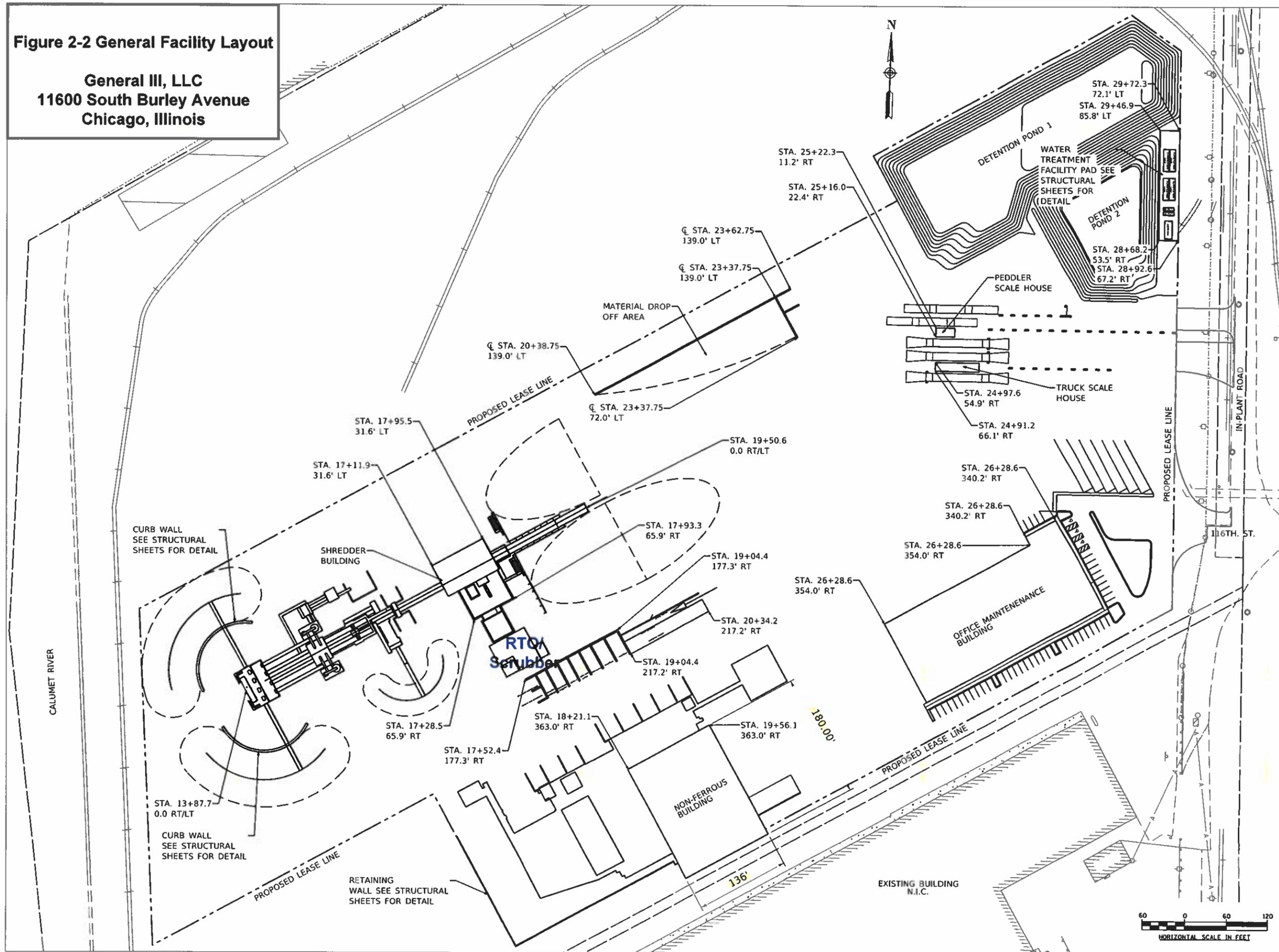
September 20, 2019

FIGURES

R-000068

Figure 2-2 General Facility Layout

General III, LLC
11600 South Burley Avenue
Chicago, Illinois



IEPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE

OCT 02 2019

REVIEWER: MED



Construction Permit Application for New Scrap Metal Recycling Facility

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

September 24, 2019

APPENDIX A - IEPA PERMIT APPLICATION FORMS

APC-628	Construction Permit Application for a FESOP Source	A-1
197-FEE	Fee Form	A-5
CAAPP-286	Single Source Determination	A-7
CAAPP-220	Process Equipment Data and Information – Metal Shredder.....	A-11
CAAPP-260	Air Pollution Control Equipment Data and Information – Metal Shredder Roll-Media Filter, RTO, and Packed Tower Scrubber	A-21
CAAPP-260C	Supplement Form Air Pollution Control Equipment	A-31
	Roll-Media Filter	
CAAPP-260B	Supplement Form Air Pollution Control Equipment	A-33
	Afterburner	
CAAPP-260G	Supplement Form Air Pollution Control Equipment	A-35
	Packed Tower Scrubber	
CAAPP-220	Process Equipment Data and Information	A-37
	Ferrous Material Processing System	
CAAPP-220	Process Equipment Data and Information	A-47
	Non-Ferrous Material Processing System	
CAAPP-260	Air Pollution Control Equipment Data and Information	A-57
	Dust Collector DC-01	
CAAPP-260C	Supplement Form Air Pollution Control Equipment	A-67
	Dust Collector DC-01	



Illinois Environmental Protection Agency
 Division Of Air Pollution Control -- Permit Section
 P.O. Box 19506
 Springfield, Illinois 62794-9506

R 000070
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 STATE OF ILLINOIS
 SEP 25 2019
 Environmental Protection Agency
 BUREAU OF AIR

Construction Permit Application for a FESOP Source (FORM APC628)	For Illinois EPA use only
	BOA ID No.: 031 600 SPK
	Application No.: 19 09 0021
Date Rec'd: 9-25-19	

This form is to be used to supply information to obtain a construction permit for a proposed project involving a Federally Enforceable State Operating Permit (FESOP) or Synthetic Minor source, including construction of a new FESOP source. Other necessary information must accompany this form as discussed in the "General Instructions For Permit Applications," Form APC-201

Proposed Project	
1. Working Name of Proposed Project:	Scrap Metal Recycling Facility
2. Is the project occurring at a source that already has a permit from the Bureau of Air (BOA)?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, provide BOA ID Number:
3. Does this application request a revision to an existing construction permit issued by the BOA?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, provide Permit Number:
4. Does this application request that the new/modified emission units be incorporated into an existing FESOP issued by the BOA? (facility will apply for a FESOP)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If Yes, provide Permit Number:

Source Information		IEPA - DIVISION OF RECORDS MANAGEMENT REC-AS FILE
5. Source name:*	General III, LLC	
6. Source street address:*	11600 South Burley Avenue	
7. City: Chicago	8. County: Cook	9. Zip code: 60617
ONLY COMPLETE THE FOLLOWING FOR A SOURCE WITHOUT AN ID NUMBER.		
10. Is the source located within city limits?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, provide Township Name:	
11. Description of source and product(s) produced: Scrap metal recycling recovering ferrous and non-ferrous metals for reuse	12. Primary Classification Code of source: SIC 5093 or NAICS 423930	
13. Latitude (DD:MM:SS.SSSS): 41° 41' 07.02" N	14. Longitude (DD:MM:SS.SSSS): 87° 32' 45.09" W	

* If this information different than previous information, then complete a new Form 200-CAAPP to change the source name in initial FESOP application for the source or Form APC-620 for Air Permit Name and/or Ownership Change if the FESOP has been previously issued.

Applicant Information	
15. Who is the applicant? <input checked="" type="checkbox"/> Owner <input checked="" type="checkbox"/> Operator	16. All correspondence to: (check one) <input type="checkbox"/> Source <input type="checkbox"/> Owner <input checked="" type="checkbox"/> Operator
17. Applicant's FEIN: 40-0011010	18. Attention name and/or title for written correspondence: Mr. Jim Kallas

This Agency is authorized to require and you must disclose this information under 415 ILCS 5/39. Failure to do so could result in the application being denied and penalties under 415 ILCS 5 et seq. It is not necessary to use this form in providing this information. This form has been approved by the forms management center.

Owner Information*		
19. Name: General III, LLC		
20. Address: 11600 South Burley Avenue		
21. City: Chicago	22. State: Illinois	23. Zip code: 60617

* If this information different than previous information, then complete Form 272-CAAPP for a Request for Ownership Change for CAAPP Permit for an initial FESOP application for the source or Form APC-620 for Air Permit Name and/or Ownership Change if the FESOP has been previously issued.

Operator Information (if different from owner)*		
24. Name: Same as above		
25. Address:		
26. City:	27. State:	28. Zip code:

* If this information different than previous information, then complete a new Form 200-CAAPP to change the source name in initial FESOP application for the source or Form APC-620 for Air Permit Name and/or Ownership Change if the FESOP has been previously Issued

Technical Contacts for Application	
29. Preferred technical contact: (check one) <input checked="" type="checkbox"/> Applicant's contact <input type="checkbox"/> Consultant	
30. Applicant's technical contact person for application: Mr. Jim Kallas	
31. Contact person's telephone number(s) 847-508-9170	32. Contact person's e-mail address: jim@general-iron.com
33. Consultant for application: RK & Associates, Inc. – Mr. John G. Pinion	
34. Applicant's consultant's telephone number: 660-393-9000 x 208	35. Consultant's e-mail address: jpinion@rka-inc.com

Review Of Contents of the Application	
36. Is the emission unit covered by this application already constructed? If "Yes", provide the date construction was completed: Note: The Illinois EPA is unable to issue a construction permit for a emission unit that has already been constructed	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
37. Does the application include a narrative description of the proposed project?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
38. Does the application contain a list or summary that clearly identifies the emission units and air pollution control equipment that are part of the project?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
39. Does the application include process flow diagram(s) for the project showing new and modified emission units and control equipment, and related existing equipment and their relationships?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
40. If the project is at a source that has not previously received a permit from the BOA, does the application include a source description, plot plan and site map?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Review Of Contents of the Application (continued)	
41. Does the application include relevant information for the proposed project as requested on Illinois, BOA application forms (or otherwise contain all relevant technical information)?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
42. Does the application identify and address all applicable or potentially applicable emission standards, including: a. State emission standards (35 IAC Chapter I, Subtitle B); b. Federal New Source Performance Standards (40 CFR Part 60); c. Federal standards for HAPs (40 CFR Parts 61 & 63)?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
43. Does the application address whether the proposed project or the source could be a major project for Prevention of Significant Deterioration, 40 CFR 52.21?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
44. Does the application address for which pollutant(s) the proposed project or source could be a major project for PSD, 40 CFR 52.21?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A
45. Does the application address whether the proposed project or the source could be a major project for "Nonattainment New Source Review," (NA NSR), 35 IAC Part 203?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
46. Does the application address for which pollutant(s) the proposed project or the source could be a major project for NA NSR, 35 IAC Part 203?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A*
47. Does the application address whether the proposed project or the source could potentially be subject to federal Maximum Achievable Control Technology (MACT) standard under 40 CFR Part 63 for Hazardous Air Pollutants (HAP) and identify the standard that could be applicable?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A* * Source not major <input checked="" type="checkbox"/> Project not major <input checked="" type="checkbox"/>
48. Does the application identify the HAP(s) from the proposed project or the source that would trigger the applicability of a MACT standard under 40 CFR Part 63?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
49. Does the application include a summary of the current and the future potential emissions of the source after the proposed project has been completed for each criteria air pollutant and/or HAP (tons/year)?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A* * Applicability of PSD, NA NSR or 40 CFR 63 not applicable to the source's emissions.
50. Does the application include a summary of the requested permitted annual emissions of the proposed project for the new and modified emission units (tons/year)?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A* * Project does not involve an increase in emission from new or modified emission units.
51. Does the application include a summary of the requested permitted production, throughput, fuel, or raw material usage limits that correspond to the annual emissions limits of the proposed project for the new and modified emission units?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A* * Project does not involve an increase in emission from new or modified emission units.
52. Does the application include sample calculations or methodology for the emission estimations and the requested emission limits?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
53. Does the application address the relationships with and implications of the proposed project for the source's FESOP?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A* * FESOP not yet issued
54. If the application contains information that is considered a TRADE SECRET, has such information been properly marked and claimed and other requirements to perfect such a claim been satisfied in accordance with 35 IAC Part 130?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A* * No information in the application is claimed to be a TRADE SECRET

Note: *Claimed information will not be legally protected from disclosure to the public if it is not properly claimed or does not qualify as trade secret information.

Review Of Contents of the Application (continued)

55. If the source is located in a county other than Cook County, are two separate copies of this application being submitted	<input type="checkbox"/> YES <input type="checkbox"/> NO NA - Source located in Cook County
56. If the source is located in Cook County, are three separate copies of this application being submitted?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
57. Does the application include a completed "FEE DETERMINATION FOR CONSTRUCTION PERMIT APPLICATION," Form 197-FEE, for the emission units and control equipment for which a permit for construction or modification is being sought?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
58. Does the application include a check in the proper amount for payment of the Construction permit fee??	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Note: Answering "No" to Items 36 through 58 may result in the application being deemed incomplete.

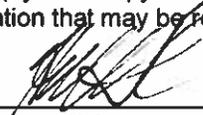
Signature Block

Pursuant to 35 IAC 201.159, all applications and supplements thereto shall be signed by the owner and operator of the source, or their authorized agent, and shall be accompanied by evidence of authority to sign the application. Applications without a signed certification will be deemed incomplete

59. Authorized Signature:

I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate and complete and that I am a responsible official for the source, as defined by Section 39.5(1) of the Environmental Protection Act. In addition, the technical contact person identified above is authorized to submit (by hard copy and/or by electronic copy) any supplemental information related to this application that may be requested by the Illinois EPA.

BY: _____



SIGNATURE

COO

TITLE OF SIGNATORY

Mr. Hal Tolin

TYPED OR PRINTED NAME OF SIGNATORY

9 / 19 / 19

DATE

Reserve FTL, LLC

11600 S. Burley Ave
Chicago, IL 60617

VOID AFTER 90 DAYS

No. 019714

DATE

08/20/19

CHECK AMOUNT

\$*****15,000.00

PAY EXACTLY ***15,000 DOLLARS AND 00 CENTS**

Wells Fargo Bank, N.A.
420 Montgomery Street
San Francisco, CA 94104

PAY TO THE
ORDER OF

ILLINOIS EPA
1021 N GRAND AVENUE EAST
PO BOX 19506
SPRINGFIELD, IL 62794-9506



AUTHORIZED SIGNATURE

SECURITY FEATURES INCLUDED. DETAILS ON BACK

⑆019714⑆ ⑆121000248⑆

031600SFX/BOOK
GENERAL ILL LLC
AIR PERMIT - CONSTRUCTION / POINT

EPA - DIVISION OF RECORDS MANAGEMENT
RELEASABLE

OCT 02 2019

REVIEWER: MED



Illinois Environmental Protection Agency

RECEIVED
STATE OF ILLINOIS
SEP 25 2019
Environmental Protection Agency
BUREAU OF AIR

Bureau of Air • 1021 North Grand Avenue East • P.O. Box 19506 • Springfield • Illinois • 62794-9506

FEE DETERMINATION FOR CONSTRUCTION PERMIT APPLICATION

FOR AGENCY USE ONLY			
ID Number: <u>031600 SFX</u>	Permit #: <u>19 09 0021</u>		\$15000
<input checked="" type="checkbox"/> Complete <input type="checkbox"/> Incomplete	Date Complete: <u>8-20-19</u>		
Check Number: <u>019714</u>	Account Name: <u>Resene FTL LLC</u>		

This form is to be used to supply fee information that must accompany all construction permit applications. This application must include payment in full to be deemed complete. Make check or money order payable to the Illinois Environmental Protection Agency, Division of Air Pollution Control - Permit Section at the above address. Do NOT send cash. Refer to instructions (197-INST) for assistance.

Source Information

- | | |
|--|---|
| 1. Source Name: <u>General III, LLC</u> | 3. Source ID #: (if applicable) _____ |
| 2. Project Name: <u>Metal Recycling Facility</u> | 5. Contact Phone #: <u>847-508-9170</u> |
| 4. Contact Name: <u>Jim Kallas</u> | |

Fee Determination

6. The boxes below are automatically calculated.

Section 1 Subtotal	\$5,000.00	+	Section 2, 3 or 4 Subtotal	\$10,000.00	=	\$15,000.00
						Grand Total

Section 1: Status of Source/Purpose of Submittal

7. Your application will fall under only one of the following five categories described below. Check the box that applies. Proceed to applicable sections. For purposes of this form:

- **Major Source** is a source that is required to obtain a CAAPP permit.
- **Synthetic Minor Source** is a source that has taken limits on potential to emit in a permit to avoid CAAPP permit requirements (e.g., FESOP).
- **Non-Major Source** is a source that is not a major or synthetic minor source.

- | | |
|---|--------------------|
| <input type="checkbox"/> Existing source without status change or with status change from synthetic minor to major source or vice versa. Proceed to Section 2. | |
| <input type="checkbox"/> Existing non-major source that will become synthetic minor to major source. Proceed to Section 4. | |
| <input checked="" type="checkbox"/> New major or synthetic minor source. Proceed to Section 4. | \$5,000.00 |
| <input type="checkbox"/> New non-major source. Proceed to Section 3. | Section 1 Subtotal |
| <input type="checkbox"/> AGENCY ERROR. If this is a timely request to correct an issued permit that involves only an agency error and if the request is received within the deadline for a permit appeal to the Pollution Control Board. Skip Sections 2, 3 and 4. Proceed directly to Section 5. | |

This agency is authorized to require and you must disclose this information under 415 ILCS 5/39. Failure to do so could result in the application being denied and penalties under 415 ILCS 5 ET SEQ. It is not necessary to use this form in providing this information. This form has been approved by the forms management center.

Section 2: Special Case Filing Fee

8. **Filing Fee.** If the application only addresses one or more of the following, check the appropriate boxes, skip Sections 3 and 4 and proceed directly to Section 5. Otherwise, proceed to Section 3 or 4 as appropriate.

- | | |
|---|--------|
| Addition or replacement of control devices on permitted units. | |
| Pilot projects/trial burns by a permitted unit | |
| Land remediation projects | \$0.00 |
| Revisions related to methodology or timing for emission testing | |
| Minor administrative-type change to a permit | |

Section 3: Fees for Current or Projected Non-Major Sources

- 9. This application consists of a single new emission unit or no more than two modified emission units. (\$500 fee) 9. _____
- 10. This application consists of more than one new emission unit or more than two modified units. (\$1,000 fee) 10. _____
- 11. This application consists of a new source or emission unit subject to Section 39.2 of the Act (i.e., Local Siting Review); a commercial incinerator or a municipal waste, hazardous waste, or waste tire incinerator; a commercial power generator; or an emission unit designated as a complex source by agency rulemaking. (\$15,000 fee) 11. _____
- 12. A public hearing is held (see instructions). (\$10,000 fee) 12. _____
- 13. Section 3 subtotal. (lines 9 through 12 - entered on page 1) 13. \$0.00

Section 4: Fees for Current or Projected Major or Synthetic Minor Sources

Application contains modified emission units only	14. For the first modified emission unit, enter \$2,000.	
	15. Number of additional modified emission units = _____ x \$1,000.	15. <u> \$0.00</u>
	16. Line 14 plus line 15, or \$5,000, whichever is less.	16. <u> \$0.00</u>
Application contains new and/or modified emission units	17. For the first new emission unit, enter \$4,000.	17. <u> \$4,000.00</u>
	18. Number of additional new and/or modified emission units = <u> > 10 </u> x \$1,000.	18. <u> \$10,000.00</u>
	19. Line 17 plus line 18, or \$10,000, whichever is less.	19. <u> \$10,000.00</u>
Application contains netting exercise	20. Number of individual pollutants that rely on a netting exercise or contemporaneous emissions decrease to avoid application of PSD or nonattainment area NSR = _____ x \$3,000.	20. <u> \$0.00</u>
Additional Supplemental Fees	21. If the new source or emission unit is subject to Section 39.2 of the Act (i.e. siting); a commercial incinerator or other municipal waste, hazardous waste, or waste tire incinerator; a commercial power generator; or one or more other emission units designated as a complex source by Agency rulemaking, enter \$25,000.	21. _____
	22. If the source is a new major source subject to PSD, enter \$12,000.	22. _____
	23. If the project is a major modification subject to PSD, enter \$6,000.	23. _____
	24. If this is a new major source subject to nonattainment area (NAA) NSR, enter \$20,000.	24. _____
	25. If this is a major modification subject to NAA NSR, enter \$12,000.	25. _____
	26. If the application involves a determination of MACT for a pollutant and the project is not subject to BACT or LAER for the related pollutant under PSD or NSR (e.g., VOM for organic HAP), enter \$5,000 per unit for which a determination is requested or otherwise required. _____ x \$5,000.	26. <u> \$0.00</u>
27. If a public hearing is held (see instructions), enter \$10,000.		27. _____
28. Section 4 subtotal (line 16 and lines 19 through 28) to be entered on page 1		28. <u> \$10,000.00</u>

Section 5: Certification

NOTE: Applications without a signed certification will be deemed incomplete.

29. I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the information contained in this fee application form is true, accurate and complete.

by: _____
 Signature
 Hal Tolin

 Typed or Printed Name of Signatory

COO

 Title of Signatory
9.19.19

 Date

SECTION FOUR

OPERATING AS A SINGLE SOURCE WITH THE FACILITY

COMPLETE THE FOLLOWING TABLE FOR ALL SOURCES WHICH ARE CONSIDERED SINGLE SOURCES WITH THIS SOURCE. FOR THE REQUESTED SINGLE SOURCE DESCRIPTION COLUMN, DESCRIBE THE FUNCTION AND PRODUCT/SERVICE PROVIDED BY THE SINGLE SOURCE. FOR THE REQUESTED SINGLE SOURCE RELATIONSHIP COLUMN, DESCRIBE THE INTERACTION(S) WITH THE SINGLE SOURCE BY CHOOSING FROM AMONG THE FOLLOWING REASONS LISTED BELOW, AND BRIEFLY EXPLAIN IF NECESSARY. USE ADDITIONAL PAGES OR ATTACHMENTS AS NECESSARY.

#	SOURCE NAME	SOURCE ID#	ADDRESS	SINGLE SOURCE DESCRIPTION	SINGLE SOURCE RELATIONSHIP
1	Reserve Marine Terminals (RMT)	None	11600 South Burley Ave Chicago, IL 60617	See Section 4.1 of Application.	<ul style="list-style-type: none"> • Located on same site as other entities identified herein⁽¹⁾. • Primary SIC Code is 5093⁽²⁾ • Common Ownership/ Control thru Reserve Management Group (RMG)
2	Regency Technologies (RSR)	None	11600 South Burley Ave Chicago, IL 60617	See Section 4.1 of Application.	<ul style="list-style-type: none"> • Located on same site as other entities identified herein⁽¹⁾. • Primary SIC Code is 5093⁽²⁾ • Common Ownership/ Control thru Reserve Management Group (RMG)
3	Napuck Salvage of Waupaca (NSW)	031600GYI	11600 South Burley Ave Chicago, IL 60617	See Section 4.1 of Application.	<ul style="list-style-type: none"> • Located on same site as other entities identified herein⁽¹⁾. • Primary SIC Code is 5093⁽²⁾ • Common Ownership/ Control thru Reserve Management Group (RMG)
4	South Shore Recycling (SSR)	None	11600 South Burley Ave Chicago, IL 60617	See Section 4.1 of Application.	<ul style="list-style-type: none"> • Located on same site as other entities identified herein⁽¹⁾. • Primary SIC Code is 5093⁽²⁾ • Common Ownership/ Control thru Reserve Management Group (RMG)
5					

(1) General Ill will be located at this site. (2) General Ill has a primary SIC code of 5093 – Scrap and Waste Materials.

A CHOOSE OF THE FOLLOWING REASONS AND BRIEFLY EXPLAIN IF NECESSARY: 1) SAME SIC CODE; 2) SHARED COMPANY STRUCTURE (E.G., SAME PARENT COMPANY, SISTER COMPANIES, ETC.); 3) CONTRACTUAL RELATIONSHIP(S); 4) PROCESS/PRODUCTION CO-DEPENDENCY; 5) CONTIGUOUS OR ADJACENT PROPERTIES; 6) INTEGRATED FACILITIES; 7) SUPPORT FACILITY RELATIONSHIP (E.G., CONVEYS, STORES, OR OTHERWISE ASSISTS IN THE PRODUCTION OF A PRINCIPAL PRODUCT AT ANOTHER SOURCE), OR 8) OTHER (EXPLAIN).

APPLICATION PAGE _____

Printed on Recycled Paper
286-CAAPP

SECTION FIVE NOT OPERATING AS A SINGLE SOURCE WITH THIS FACILITY

1) SOURCE NAME	
2) SOURCE STREET ADDRESS:	
3) CITY	
4) ZIP:	5) PRIMARY SIC NO.:
6) PRIMARY STANDARD INDUSTRIAL CLASSIFICATION (SIC) CATEGORY:	
7) LONGITUDE (DD:MM:SS):	8) LONGITUDE (DD:MM:SS):

SINGLE SOURCE FACTORS: SINGLE MAJOR INDUSTRIAL GROUPING (SIC CODE)

9) THE ABOVE MENTIONED SOURCE IS A STATIONARY SOURCE BELONGING TO A SINGLE MAJOR INDUSTRIAL GROUPING (SIC CODE) :
<input type="checkbox"/> YES <input type="checkbox"/> NO
PRIMARY SIC OF THE SINGLE SOURCE: _____

SINGLE SOURCE FACTORS: COMMON CONTROL

10) THE ABOVE MENTIONED SOURCE IS A STATIONARY SOURCE UNDER COMMON CONTROL :	
<input type="checkbox"/> YES <input type="checkbox"/> NO IF "YES" CONTINUE TO QUESTION 11 AS THE SOURCE CONFIRMS A COMMON CONTROL RELATIONSHIP	
A	<input type="checkbox"/> SAME "PARENT" COMPANY BETWEEN THE TWO (OR MORE) FACILITIES?
B	<input type="checkbox"/> CONTRACTUAL RELATIONSHIPS BETWEEN THE TWO (OR MORE) FACILITIES?
C	<input type="checkbox"/> A FINANCIAL CO-DEPENDENCY BETWEEN THE TWO (OR MORE) FACILITIES?
D	<input type="checkbox"/> JOINT OWNERSHIP BETWEEN THE TWO (OR MORE) FACILITIES?
E	<input type="checkbox"/> VOTING INTEREST BETWEEN THE TWO (OR MORE) FACILITIES?
F	<input type="checkbox"/> SHARED LIABILITY BETWEEN THE TWO (OR MORE) FACILITIES?
G	<input type="checkbox"/> SHARED MANAGERIAL HIERARCHY BETWEEN THE TWO (OR MORE) FACILITIES?
H	<input type="checkbox"/> CONTRACT-FOR-SERVICE RELATIONSHIP BETWEEN THE TWO (OR MORE) FACILITIES?
I	<input type="checkbox"/> PROCESS/PRODUCTION CO-DEPENDENCY BETWEEN THE TWO (OR MORE) FACILITIES?
J	<input type="checkbox"/> ADJACENT LOCATION BETWEEN THE TWO (OR MORE) FACILITIES?
K	<input type="checkbox"/> FINANCIAL INTEREST BETWEEN THE TWO (OR MORE) FACILITIES?
L	<input type="checkbox"/> COMMON EMPLOYEES BETWEEN THE TWO (OR MORE) FACILITIES?
M	<input type="checkbox"/> SHARED EQUIPMENT BETWEEN THE TWO (OR MORE) FACILITIES?
N	<input type="checkbox"/> LANDLORD-TENANT RELATIONSHIP BETWEEN THE TWO (OR MORE) FACILITIES?
O	<input type="checkbox"/> FUNDING RELATIONSHIP BETWEEN THE TWO (OR MORE) FACILITIES?
P	<input type="checkbox"/> SHARED PRODUCTS OR BY-PRODUCTS BETWEEN THE TWO (OR MORE) FACILITIES?
Q	<input type="checkbox"/> SHARED TRANSPORTATION/PROCESS LINE BETWEEN THE TWO (OR MORE) FACILITIES?
R	<input type="checkbox"/> SHARED PAYROLL ACTIVITY, EMPLOYEE BENEFITS, HEALTH PLANS, RETIREMENT FUNDS, INSURANCE COVERAGE, OR OTHER ADMINISTRATIVE FUNCTIONS BETWEEN THE TWO (OR MORE) FACILITIES?
S	<input type="checkbox"/> SHARED RESPONSIBILITY FOR COMPLIANCE WITH AIR QUALITY CONTROL REQUIRMENTS BETWEEN THE TWO (OR MORE) FACILITIES?
T	<input type="checkbox"/> OTHER (EXPLAIN):



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

FOR APPLICANT'S USE

Revision No.: _____
 Date: _____
 Page: _____ of _____
 Source Designation: _____

PROCESS EMISSION UNIT DATA AND INFORMATION	FOR AGENCY USE ONLY
	ID NUMBER: _____
	EMISSION POINT #: _____
	DATE: _____

SOURCE INFORMATION

1) SOURCE NAME: General III, LLC	
2) DATE FORM PREPARED September 2019	3) SOURCE ID NO. (IF KNOWN): _____

GENERAL INFORMATION

4) NAME OF EMISSION UNIT: Hammermill Shredder	
5) NAME OF PROCESS: Ferrous Material Processing System	
6) DESCRIPTION OF PROCESS: Scrap metal shredder	
7) DESCRIPTION OF ITEM OR MATERIAL PRODUCED OR ACTIVITY ACCOMPLISHED: Scrap metal is shredded to a size suitable for processing for recovery of ferrous metals	
8) FLOW DIAGRAM DESIGNATION OF EMISSION UNIT: Shredder	
9) MANUFACTURER OF EMISSION UNIT (IF KNOWN): To Be Determined (TBD)	
10) MODEL NUMBER (IF KNOWN): TBD	11) SERIAL NUMBER (IF KNOWN): TBD
12) DATES OF COMMENCING CONSTRUCTION, OPERATION AND/OR MOST RECENT MODIFICATION OF THIS EMISSION UNIT (ACTUAL OR PLANNED)	a) CONSTRUCTION (MONTH/YEAR): June 2020
	b) OPERATION (MONTH/YEAR): _____
	c) LATEST MODIFICATION (MONTH/YEAR): _____
13) DESCRIPTION OF MODIFICATION (IF APPLICABLE): _____	

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

APPLICATION PAGE _____

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220-CAAPP

FOR APPLICANT'S USE

14) DOES THE EMISSION UNIT HAVE MORE THAN ONE MODE OF OPERATION? YES NO
 IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE PROCESS EMISSION UNIT FORM 220-CAAPP MUST BE COMPLETED FOR EACH MODE):

15) PROVIDE THE NAME AND DESIGNATION OF ALL AIR POLLUTION CONTROL EQUIPMENT CONTROLLING THIS EMISSION UNIT, IF APPLICABLE (FORM 260-CAAPP AND THE APPROPRIATE 260-CAAPP ADDENDUM FORM MUST BE COMPLETED FOR EACH ITEM OF AIR POLLUTION CONTROL EQUIPMENT):
Emissions will be controlled by shredder emissions control system – See 260 CAAPP

16) WILL EMISSIONS DURING STARTUP EXCEED EITHER THE ALLOWABLE EMISSION RATE PURSUANT TO A SPECIFIC RULE, OR THE ALLOWABLE EMISSION LIMIT AS ESTABLISHED BY AN EXISTING OR PROPOSED PERMIT CONDITION? YES NO
 IF YES, COMPLETE AND ATTACH FORM 203-CAAPP, "REQUEST TO OPERATE WITH EXCESS EMISSIONS DURING STARTUP OF EQUIPMENT".

17) PROVIDE ANY LIMITATIONS ON SOURCE OPERATION AFFECTING EMISSIONS OR ANY WORK PRACTICE STANDARDS (E.G., ONLY ONE UNIT IS OPERATED AT A TIME):
Scheduled maintenance and malfunctions of any equipment in the ferrous material processing system (upstream or downstream of the shredder) potentially affects the ability to operate the shredder.

OPERATING INFORMATION				
18) ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSION RELATED, FROM WHICH THE FOLLOWING OPERATING INFORMATION, MATERIAL USAGE INFORMATION AND FUEL USAGE DATA WERE BASED AND LABEL AS EXHIBIT 220-1. REFER TO SPECIAL NOTES OF FORM 202-CAAPP.				
19a) MAXIMUM OPERATING HOURS	HOURS/DAY: 14	DAYS/WEEK: 6	WEEKS/YEAR: 52	
b) TYPICAL OPERATING HOURS	HOURS/DAY: 10	DAYS/WEEK: 6	WEEKS/YEAR: 52	
20) ANNUAL THROUGHPUT	DEC-FEB(%): 22	MAR-MAY(%): 26	JUN-AUG(%): 26	SEP-NOV(%): 26

MATERIAL USAGE INFORMATION						
21a) RAW MATERIALS	APPROX MAXIMUM RATES			APPROX TYPICAL RATES		
	LBS/HR		TONS/YEAR	LBS/HR		TONS/YEAR
Scrap Metal			1,000,000			750,000

21b) PRODUCTS	APPROX MAXIMUM RATES		APPROX TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Shredded Scrap		1,000,000		750,000

21c) BY-PRODUCT MATERIALS	MAXIMUM RATES		TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
NA				

FUEL USAGE DATA		
22a) MAXIMUM FIRING RATE (MILLION BTU/HR): None	b) TYPICAL FIRING RATE (MILLION BTU/HR):	c) DESIGN CAPACITY FIRING RATE (MILLION BTU/HR):
d) FUEL TYPE: <input type="checkbox"/> NATURAL GAS <input type="checkbox"/> FUEL OIL: GRADE NUMBER _____ <input type="checkbox"/> COAL <input type="checkbox"/> OTHER IF MORE THAN ONE FUEL IS USED, ATTACH AN EXPLANATION AND LABEL AS EXHIBIT 220-2.		
e) TYPICAL HEAT CONTENT OF FUEL (BTU/LB, BTU/GAL OR BTU/SCF):	f) TYPICAL SULFUR CONTENT (WT %, NA FOR NATURAL GAS):	
g) TYPICAL ASH CONTENT (WT %, NA FOR NATURAL GAS):	h) ANNUAL FUEL USAGE (SPECIFY UNITS, E.G., SCF/YEAR, GAL/YEAR, TON/YEAR):	
23) ARE COMBUSTION EMISSIONS DUCTED TO THE SAME STACK OR CONTROL AS PROCESS UNIT EMISSIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, IDENTIFY THE EXHAUST POINT FOR COMBUSTION EMISSIONS:		

APPLICABLE RULES

24) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.204(j)(4), 3.5 LBS/GAL):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)

25) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REQUIREMENT(S)
	<div style="border: 2px solid blue; padding: 5px; display: inline-block;"> <p>See 260 CAAPP for Shredder Emissions Control System and Section 4 of the application.</p> </div>

26) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)

27) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

28) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT :

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

29) DOES THE EMISSION UNIT QUALIFY FOR AN EXEMPTION FROM AN OTHERWISE APPLICABLE RULE? YES NO

IF YES, THEN LIST BOTH THE RULE FROM WHICH IT IS EXEMPT AND THE RULE WHICH ALLOWS THE EXEMPTION. PROVIDE A DETAILED EXPLANATION JUSTIFYING THE EXEMPTION. INCLUDE DETAILED SUPPORTING DATA AND CALCULATIONS. ATTACH AND LABEL AS EXHIBIT 220-3, OR REFER TO OTHER ATTACHMENT(S) WHICH ADDRESS AND JUSTIFY THIS EXEMPTION.

COMPLIANCE INFORMATION

30) IS THE EMISSION UNIT IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS? YES NO

IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.

31) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:

Operate shredder in accordance with manufacturer's recommendations
See CAAPP 260 for Shredder Emissions Control System

32) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:

Operating shredder emissions control system as described in 260 CAAPP

TESTING, MONITORING, RECORDKEEPING AND REPORTING

33a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):

PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
Scrap Throughput	Tons/month	Belt scale and database of purchasing, shipping and inventory	monthly

33b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
Scrap throughput	Electronic database	Environmental Manager	Environmental Manager

c) IS COMPLIANCE OF THE EMISSION UNIT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? YES NO

IF NO, EXPLAIN:

d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND SUBMITTAL TO THE AGENCY UPON REQUEST? YES NO

IF NO, EXPLAIN:

34a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE:

Recording scrap throughput

b) WHAT PARAMETER(S) IS (ARE) BEING MONITORED (E.G., VOM EMISSIONS TO ATMOSPHERE)?

Scrap throughput

c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., IN STACK MONITOR 3 FEET FROM EXIT):

Belt scale data is adjusted based on monthly records reflecting purchases, shipments, and change in inventory.

34d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE? YES NO
 IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:

e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS? YES NO
 IF NO, EXPLAIN:

f) IS EACH MONITOR OPERATED AT ALL TIMES THE ASSOCIATED EMISSION UNIT IS IN OPERATION? YES NO
 IF NO, EXPLAIN:

35) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 220-4:

TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS
NA				

36) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:

REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY
Annual Emissions	Annual Emissions Report	Annually
Emission Deviations	Emission Deviation Report	Within 30 days of event

(37)EMISSION INFORMATION

REGULATED AIR POLLUTANT		<input type="checkbox"/> ¹ ACTUAL EMISSION RATE <input type="checkbox"/> ¹ UNCONTROLLED EMISSION RATE				ALLOWABLE BY RULE EMISSION RATE			² PERMITTED EMISSION RATE		
		LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	³ OTHER TERMS	⁴ DM	⁵ RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)
CARBON MONOXIDE (CO)	MAXIMUM:						()				
	TYPICAL:						()				
LEAD	MAXIMUM:						()				
	TYPICAL:						()				
NITROGEN OXIDES (NO _x)	MAXIMUM:						()				
	TYPICAL:						()				
PARTICULATE MATTER (PART)	MAXIMUM:						()				
	TYPICAL:						()				
PARTICULATE MATTER <= 10 MICROMETERS (PM10)	MAXIMUM:						()				
	TYPICAL:						()				
SULFUR DIOXIDE (SO ₂)	MAXIMUM:						()				
	TYPICAL:						()				
VOLATILE ORGANIC MATERIAL (VOM)	MAXIMUM:						()				
	TYPICAL:						()				
OTHER, SPECIFY:	MAXIMUM:						()				
	TYPICAL:						()				
EXAMPLE: PARTICULATE MATTER	MAXIMUM:	5.00	21.9	0.3 GR/DSCF		1	6.0 (LBS/HR)	212.321	26.28	5.5 LBS/HR	22
	TYPICAL:	4.00	14.4	0.24 GR/DSCF		4	5.5 (LBS/HR)	212.321	19.80		

See 260 CAAPP for Shredder Emissions Control System

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-5.

- ¹CHECK UNCONTROLLED EMISSION RATE BOX IF CONTROL EQUIPMENT IS USED, OTHERWISE CHECK AND PROVIDE THE ACTUAL EMISSION RATE TO ATMOSPHERE, INCLUDING INDOORS. SEE INSTRUCTIONS.
- ²PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.
- ³PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.)
- ⁴DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)
- ⁵RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

R 000089

EXHAUST POINT INFORMATION

THIS SECTION SHOULD NOT BE COMPLETED IF EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT.

39) FLOW DIAGRAM DESIGNATION OF EXHAUST POINT:

Exhaust through Shredder Emissions Control System

40) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS.

41) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT):

42) DISCHARGE HEIGHT ABOVE GRADE (FT):

43) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):

44) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA.

45) EXIT GAS FLOW RATE	a) MAXIMUM (ACFM):	b) TYPICAL (ACFM):
------------------------	--------------------	--------------------

46) EXIT GAS TEMPERATURE	a) MAXIMUM (°F):	b) TYPICAL (°F):
--------------------------	------------------	------------------

47) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD):

48) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:

NAME	FLOW DIAGRAM DESIGNATION
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	

THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.

49a) LATITUDE:

c) LONGITUDE:

50) UTM ZONE:

b) UTM VERTICAL (KM):

d) UTM HORIZONTAL (KM):



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

FOR APPLICANT'S USE	
Revision No.:	_____
Date:	_____
Page:	_____ of _____
Source Designation:	_____

AIR POLLUTION CONTROL EQUIPMENT DATA AND INFORMATION	FOR AGENCY USE ONLY
	ID NUMBER:
	CONTROL EQUIPMENT #:
DATE:	

THIS FORM MUST BE COMPLETED FOR EACH AIR POLLUTION CONTROL EQUIPMENT. COMPLETE AND PROVIDE THIS FORM IN ADDITION TO THE APPLICABLE ADDENDUM FORM 260-A THROUGH 260-K. A SEPARATE FORM MUST BE COMPLETED FOR EACH MODE OF OPERATION OF AIR POLLUTION CONTROL EQUIPMENT FOR WHICH A PERMIT IS BEING SOUGHT.

SOURCE INFORMATION	
1) SOURCE NAME: General III, LLC	
2) DATE FORM PREPARED: September 2019	3) SOURCE ID NO. (IF KNOWN):

GENERAL INFORMATION	
4) NAME OF AIR POLLUTION CONTROL EQUIPMENT AND/OR CONTROL SYSTEM: Metal Shredder Emissions Control System consisting of a Cyclone, Roll-Media Filter, Regenerative Thermal Oxidizer (RTO) and Packed Tower Scrubber	
5) FLOW DIAGRAM DESIGNATION OF CONTROL EQUIPMENT AND/OR CONTROL SYSTEM: Metal Shredder Emissions Control System	
6) MANUFACTURER OF CONTROL EQUIPMENT (IF KNOWN): Pedcon, Inc. (Cyclone and Roll-Media Filter) and Catalytic Products International, Inc. (RTO/Scrubber)	
7) MODEL NUMBER (IF KNOWN):	8) SERIAL NUMBER (IF KNOWN):
9) DATES OF COMMENCING CONSTRUCTION, OPERATION AND/OR MOST RECENT MODIFICATION OF THIS EQUIPMENT (ACTUAL OR PLANNED)	a) CONSTRUCTION (MONTH/YEAR): Jan 2021
	b) OPERATION (MONTH/YEAR):
	c) LATEST MODIFICATION (MONTH/YEAR):
10) BRIEFLY DESCRIBE MODIFICATION (IF APPLICABLE): NA	

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

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11) LIST ALL EMISSION UNITS AND OTHER CONTROL EQUIPMENT DUCTING EMISSIONS TO THIS CONTROL EQUIPMENT:

NAME	DESIGNATION OR CODE NUMBER
Metal Shredder	Metal Shredder

12) DOES THE CONTROL EQUIPMENT HAVE MORE THAN ONE MODE OF OPERATION? YES NO

IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE AIR POLLUTION CONTROL EQUIPMENT FORM 260-CAAPP MUST BE COMPLETED FOR EACH MODE):

13) IDENTIFY ALL ATTACHMENTS TO THIS FORM RELATED TO THIS AIR POLLUTION CONTROL EQUIPMENT (E.G., TECHNICAL DRAWINGS):

Forms 260B, 260C, and 260G.

OPERATING SCHEDULE

14) IDENTIFY ANY PERIOD WHEN THE CONTROL EQUIPMENT WILL NOT BE OPERATING DUE TO SCHEDULED MAINTENANCE AND/OR REPAIRS WHEN THE FEEDING EMISSION UNIT(S) TO THIS CONTROL EQUIPMENT IS/ARE IN OPERATION:

None

15a) IDENTIFY ANY PERIODS DURING OPERATION OF THE FEEDING EMISSION UNIT(S) WHEN THE CONTROL EQUIPMENT IS/ARE NOT USED:

None

b) IS THIS CONTROL EQUIPMENT IN OPERATION AT ALL OTHER TIMES THAT THE FEEDING EMISSION UNIT(S) IS/ARE IN OPERATION? YES NO

IF NO, EXPLAIN AND PROVIDE THE DURATION OF THE CONTROL EQUIPMENT DOWNTIME:

APPLICABLE RULES

16) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.207(b)(1), 81% OVERALL & 90% CONTROL DEVICE EFF.):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)

17) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	RECORDKEEPING RULE(S)	REQUIREMENT(S)

See Section 4.0 of Application

18) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)

19) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

20) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT :

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

COMPLIANCE INFORMATION	
21) IS THE CONTROL SYSTEM IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS? IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
22) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:	
Roll-Media Filter <ul style="list-style-type: none"> • Initial compliance will be demonstrated by operating the roll-media filter in accordance with manufacturer's instructions. 	
RTO <ul style="list-style-type: none"> • Initial compliance will be demonstrated by operating the RTO in accordance with manufacturer's instructions and maintaining the oxidizer at the manufacturer's recommended operating temperature. 	
Scrubber <ul style="list-style-type: none"> • Initial compliance will be demonstrated by operating the scrubber in accordance with manufacturer's recommendations. 	
23) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:	
Roll-Media Filter <ul style="list-style-type: none"> • Maintaining differential pressure across the filter at a value that is greater than the parameter values determined during a successful emission test. 	
RTO <ul style="list-style-type: none"> • Maintaining operating temperature and by operating and maintaining the RTO in accordance with parameter values determined during a successful emission test. 	
Scrubber <ul style="list-style-type: none"> • Ongoing compliance will be demonstrated by operating the scrubber in accordance with parameter values determined during a successful emission test. 	

TESTING, MONITORING, RECORDKEEPING AND REPORTING			
24a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):			
PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
Roll-Media Filter	Inches WC	Differential Pressure Sensor	Continuous
Combustion Chamber Temp	°F	Thermocouple	Continuous
Scrubber Differential Press.	Inches WC	Differential Pressure Sensor	Continuous
Scrubber liquid flow rate	gpm	Liquid Flow meter	Continuous
Scrubbant pH	Unitless	pH probe	Continuous

24b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
Roll-Media Filter	Data logger	Environmental Manager	Environmental Manager
Combustion Chamber Temp	Data logger	Environmental Manager	Environmental Manager
Scrubber Differential Press.	Data logger	Environmental Manager	Environmental Manager
Scrubber liquid flow rate	Data logger	Environmental Manager	Environmental Manager
Scrubbant pH	Data logger	Environmental Manager	Environmental Manager

c) IS COMPLIANCE OF THE CONTROL EQUIPMENT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? YES NO
 IF NO, EXPLAIN:

d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND/OR SUBMITTAL TO THE AGENCY UPON REQUEST? YES NO
 IF NO, EXPLAIN:

25a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE:

See Item 24a above

b) WHAT OPERATING PARAMETER(S) IS(ARE) BEING MONITORED (E.G., COMBUSTION CHAMBER TEMPERATURE)?
See Item 24a above.

c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., EXIT OF COMBUSTION CHAMBER):

Roll-media filter differential pressure sensors will be located on the upstream and downstream side of the filter material.

RTO combustion chamber temperature thermocouple will be centrally located in the combustion chamber.

Scrubber differential pressure sensors will be located above demister and below the packing.

Scrubber liquid flow meter will be located on the scrubber water recirculation system downstream of the recirculation pump.

Scrubber pH monitor will be located in the scrubber sump near the inlet to the recirculation pump.

25d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE? YES NO
 IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:

25e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS? YES NO
 IF NO, EXPLAIN:
All monitoring devices will be reviewed for accuracy in accordance with manufacturers recommendations for operation, maintenance, and calibration.

25f) IS EACH MONITOR OPERATED AT ALL TIMES THE CONTROL EQUIPMENT IS IN OPERATION? YES NO
 IF NO, EXPLAIN:

26) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY, OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 260-1:

TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS
NA				

27) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:

REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY
Annual Emissions	Annual Emissions Report	Annually
Emission Deviations	Emission Deviation Report	Within 30 days of event

CAPTURE AND CONTROL

28) DESCRIBE THE CAPTURE SYSTEM USED TO CONTAIN, COLLECT, AND TRANSPORT EMISSIONS TO THE CONTROL EQUIPMENT. INCLUDE ALL HOODS, DUCTS, FANS, ETC. ALSO INCLUDE THE METHOD OF CAPTURE USED AT EACH EMISSION POINT. (IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 260-2):
An emissions capture hood will be located above the shredder. An induced draft fan will draw air through a closed duct to the emissions control system.

29) ARE FEATURES OF THE CAPTURE SYSTEM ACCURATELY DEPICTED IN THE FLOW DIAGRAM CONTAINED IN THIS APPLICATION? YES NO

IF NO, A SKETCH SHOWING THE FEATURES OF THE CAPTURE SYSTEM SHOULD BE ATTACHED AND LABELED AS EXHIBIT 260-3:

30) PROVIDE THE ACTUAL (MINIMUM AND TYPICAL) CAPTURE SYSTEM EFFICIENCY, CONTROL EQUIPMENT DESTRUCTION/REMOVAL EFFICIENCY, AND THE OVERALL REDUCTION EFFICIENCY PROVIDED BY THE COMBINATION OF THE CAPTURE SYSTEM AND CONTROL EQUIPMENT FOR EACH REGULATED AIR POLLUTANT TO BE CONTROLLED. ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH THESE EFFICIENCIES WERE BASED AND LABEL AS EXHIBIT 260-4:

a) CONTROL PERFORMANCE:

REGULATED AIR POLLUTANT	CAPTURE SYSTEM EFFICIENCY (%)		CONTROL EQUIPMENT EFFICIENCY (%)		OVERALL REDUCTION EFFICIENCY (%)	
	(MIN)	(TYP)	(MIN)	(TYP)	(MIN)	(TYP)
i. VOM (controlled by RTO)	> 95	> 95	98	98	93	93
ii. Acid Gases (controlled by scrubber)	100	100	>99	> 99	> 99	> 99
iii.						

iv. EXPLAIN ANY OTHER REQUIRED LIMITS ON CONTROL EQUIPMENT PERFORMANCE SUCH AS OUTLET CONCENTRATION, COOLANT TEMPERATURE, ETC.:

None

b) METHOD USED TO DETERMINE EACH OF THE ABOVE EFFICIENCIES (E.G., STACK TEST, MATERIAL BALANCE, MANUFACTURER'S GUARANTEE, ETC.) AND THE DATE LAST TESTED, IF APPLICABLE:

EFFICIENCY DETERMINATION METHOD	DATE LAST TESTED
CAPTURE: VOM engineering estimates / observations Acid Gases – closed ducting from RTO to scrubber	NA
CONTROL: VOM/HAP – RTO manufacturer's guarantee Acid Gases – Scrubber manufacturer's guarantee	NA
OVERALL: capture % multiplied by control %	NA

c) REQUIRED PERFORMANCE:

REGULATED AIR POLLUTANT	CAPTURE SYSTEM EFFICIENCY (%)	CONTROL EQUIPMENT EFFICIENCY (%)	OVERALL REDUCTION EFFICIENCY (%)	APPLICABLE RULE
i. VOM			85%	35 IAC 218.301
ii. Acid Gases				None
iii.				

iv. EXPLAIN ANY OTHER REQUIRED LIMITS ON CONTROL EQUIPMENT PERFORMANCE SUCH AS OUTLET CONCENTRATION, COOLANT TEMPERATURE, ETC.:

None

(31)EMISSION INFORMATION

REGULATED AIR POLLUTANT	1ACTUAL EMISSION RATE					ALLOWABLE BY RULE EMISSION RATE			2PERMITTED EMISSION RATE	
	LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	3OTHER TERMS	3OTHER TERMS	4DM	5RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)
CARBON MONOXIDE (CO)	MAXIMUM:					()				
	TYPICAL:					()				
LEAD	MAXIMUM:					()				
	TYPICAL:					()				
NITROGEN OXIDES (NOx)	MAXIMUM:	See Tables 3-1A through 3-1E in Section 3 of this application.				()				
	TYPICAL:					()				
PARTICULATE MATTER (PART)	MAXIMUM:					()				
	TYPICAL:					()				
PARTICULATE MATTER <= 10 MICROMETERS (PM10)	MAXIMUM:					()				
	TYPICAL:					()				
SULFUR DIOXIDE (SO2)	MAXIMUM:					()				
	TYPICAL:					()				
VOLATILE ORGANIC MATERIAL (VOM)	MAXIMUM:					()				
	TYPICAL:					()				
OTHER, SPECIFY:	MAXIMUM:					()				
	TYPICAL:					()				
EXAMPLE: PARTICULATE MATTER	MAXIMUM:	5.00	21.9	0.3 GR/DSCF	1	6.0 (LBS/HR)	212.321	26.28	5.5 LBS/HR	22
	TYPICAL:	4.00	14.4	0.24 GR/DSCF	4	5.5 (LBS/HR)	212.321	19.80		

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 260-5.

- 1 PROVIDE CONTROLLED EMISSIONS (E.G., THE EMISSIONS THAT WOULD RESULT AFTER ALL CONTROL AND CAPTURE EFFICIENCIES ARE ACCOUNTED FOR).
- 2 PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.
- 3 PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.)
- 4 DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)
- 5 RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

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EXHAUST POINT INFORMATION		
33) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS. Shredder emissions control system will be vented to the atmosphere through an unobstructed circular vertical stack located on top of the scrubber vessel.		
34) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT): Approximately 690 ft		
35) DISCHARGE HEIGHT ABOVE GRADE (FT): Approximately 41 ft		
36) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):		
37) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA. Approximately 6 ft		
38) EXIT GAS FLOW RATE	a) MAXIMUM (ACFM): 80,000	b) TYPICAL (ACFM): 70,000
39) EXIT GAS TEMPERATURE	a) MAXIMUM (°F): 140	b) TYPICAL (°F): 120
40) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD): Vertical		
41) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:		
NAME	FLOW DIAGRAM DESIGNATION	
a) Metal shredder	Metal shredder	
b) Cyclone	Cyclone	
c) Roll-Media Filter	o	
d) Regenerative Thermal Oxidizer	RTO	
e) Scrubber	Scrubber	
f)		
g)		

42) WHAT PERCENTAGE OF THE CONTROL EQUIPMENT EMISSIONS ARE BEING DUCTED TO THIS EXHAUST POINT (%)? 100%
43) IF THE PERCENTAGE OF THE CONTROL EQUIPMENT EMISSIONS BEING DUCTED TO THE EXHAUST POINT IS NOT 100%, THEN EXPLAIN WHERE THE REMAINING EMISSIONS ARE BEING EXHAUSTED TO:

THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.		
44a) LATITUDE: Approx 41° 41' 04" N	b) LONGITUDE: Approx 87° 32' 58" W	
45) UTM ZONE:	b) UTM VERTICAL (KM):	c) UTM HORIZONTAL (KM):



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FOR APPLICANT'S USE	
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SUPPLEMENTAL FORM AIR POLLUTION CONTROL EQUIPMENT AFTERBURNER (260B)	FOR AGENCY USE ONLY
	ID NUMBER: _____
	CONTROL EQUIPMENT#: _____
	DATE: _____

DATA AND INFORMATION	
1) FLOW DIAGRAM DESIGNATION OF AFTERBURNER: Metal Shredder RTO	
2) FUEL USED IN BURNERS: <input checked="" type="checkbox"/> NATURAL GAS <input type="checkbox"/> FUEL OIL; NUMBER: _____ <input type="checkbox"/> OTHER, SPECIFY: _____	
3) BURNERS PER AFTERBURNER 1 AT 15.0 (MILLION BTU/HR, EACH)	
4) MINIMUM COMBUSTION CHAMBER TEMPERATURE (DEGREES FAHRENHEIT): 1,400° F	
5) IS A CATALYST USED?: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, CATALYST MATERIAL: _____	
6) EXPECTED FREQUENCY OF CATALYST REPLACEMENT: NA	7) DATE CATALYST WAS LAST REPLACED (MONTH/YEAR): NA
8) EXPLAIN DEGRADATION OR PERFORMANCE INDICATOR CRITERIA DETERMINING CATALYST REPLACEMENT: NA	
9a) IS A HEAT EXCHANGER USED?: IF YES, DESCRIBE: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO RTO uses ceramic media to capture heat from afterburner exhaust to preheat the incoming gas stream.	
b) HEAT EXCHANGER SURFACE AREA (FT ²):	c) AVERAGE THERMAL EFFICIENCY (%): 95%
10) DESCRIBE METHOD OF GAS MIXING USED: Inherent to design of RTO (change of direction of gas flow, combustion air injection, and turbulence from natural gas burner in afterburner section).	
11) RANGE OF RETENTION TIME: 1/2 TO 1 SEC	12) COMBUSTION CHAMBER LENGTH (FEET):

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13) COMBUSTION CHAMBER CROSS SECTIONAL AREA (SQUARE FEET):

14) INLET EMISSION STREAM PARAMETERS:

	MAX	TYPICAL
PRESSURE (mmHG):	Varies	Varies
HEAT CONTENT (BTU/SCF):	NA	NA
OXYGEN CONTENT (%):	Ambient	Ambient
MOISTURE CONTENT (%):	Approx 4%	Approx 5%

ARE HALOGENATED ORGANICS PRESENT? YES NO

ARE PARTICULATES PRESENT? YES NO

ARE METALS PRESENT? YES NO

15) AFTERBURNER OPERATING PARAMETERS:

	DURING MAXIMUM OPERATION OF FEEDING UNIT(S)	DURING TYPICAL OPERATION OF FEEDING UNIT(S)
COMBUSTION CHAMBER TEMPERATURE (DEGREES FAHRENHEIT):	1,500° F	> 1,400° F
INLET GAS TEMPERATURE (DEGREES FAHRENHEIT):	Ambient	Ambient
INLET FLOW RATE (SCFM):	Approx. 70,000	Approx. 60,000
EFFICIENCY (VOM REDUCTION):	98 %	98 %
EFFICIENCY (OTHER; SPECIFY CONTAMINANT: Organic HAPs CO):	98 % > 95 %	98 % > 95 %

16) FOR THERMAL AFTERBURNERS, IS THE COMBUSTION CHAMBER TEMPERATURE CONTINUOUSLY MONITORED AND RECORDED? YES NO

17) FOR CATALYTIC AFTERBURNERS, IS THE TEMPERATURE RISE ACROSS THE CATALYST BED CONTINUOUSLY MONITORED AND RECORDED? YES NO
NA

18) IS THE VOM CONCENTRATION OF EXHAUST MONITORED AND RECORDED? YES NO

19) IS THE OPERATION OF THE AFTERBURNER DISCONTINUED DURING THE NON-OZONE SEASON (SEPTEMBER 1 TO MAY 31)? YES NO



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SUPPLEMENTAL FORM AIR POLLUTION CONTROL EQUIPMENT FILTER (260C)	FOR AGENCY USE ONLY
	ID NUMBER: _____
	CONTROL EQUIPMENT #: _____
	DATE: _____

DATA AND INFORMATION							
1) FLOW DIAGRAM DESIGNATION OF FILTER: Roll-Media Filter							
2) FILTER CONFIGURATION (CHECK ONE): <input type="checkbox"/> OPEN PRESSURE <input checked="" type="checkbox"/> CLOSED PRESSURE <input type="checkbox"/> CLOSED SUCTION <input type="checkbox"/> OTHER, SPECIFY: _____							
3) DESCRIBE FILTER MATERIAL: Polyester felt							
4) FILTERING AREA (SQUARE FEET): 108 sq feet	5) AIR TO CLOTH RATIO (FEET/MIN):						
6) CLEANING METHOD <input type="checkbox"/> SHAKER <input type="checkbox"/> REVERSE AIR <input type="checkbox"/> PULSE AIR <input type="checkbox"/> PULSE JET <input checked="" type="checkbox"/> OTHER, SPECIFY: Roll-Media Filter – filter is continuously replaced							
7) NORMAL RANGE OF PRESSURE DROP: 20 TO 35 (INCH H ₂ O)							
8a) INLET EMISSION STREAM PARAMETERS:							
MOISTURE CONTENT (% BY VOLUME):	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">MAX</td> <td style="text-align: center;">TYPICAL</td> </tr> <tr> <td style="text-align: center;">saturated</td> <td style="text-align: center;">saturated</td> </tr> <tr> <td style="text-align: center;">varies</td> <td style="text-align: center;">varies</td> </tr> </table>	MAX	TYPICAL	saturated	saturated	varies	varies
MAX	TYPICAL						
saturated	saturated						
varies	varies						
PARTICULATE INLET LOADING (GRAINS/SCF):	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">varies</td> <td style="text-align: center;">varies</td> </tr> </table>	varies	varies				
varies	varies						
b) MEAN PARTICLE DIAMETER (MICRONS): varies							

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9) FILTER OPERATING PARAMETERS:

	DURING MAXIMUM OPERATION OF FEEDING UNIT(S)	DURING TYPICAL OPERATION OF FEEDING UNIT(S)
INLET FLOW RATE (SCFM):	Approx. 70,000	Approx. 60,000
INLET GAS TEMPERATURE (DEGREES FAHRENHEIT):	Ambient	Ambient
EFFICIENCY (PM REDUCTION):	>99	>95
EFFICIENCY (PM10 REDUCTION):	>99	>95

10) HOW IS FILTER MONITORED FOR INDICATIONS OF DETERIORATION (E.G., BROKEN BAGS)?

CONTINUOUS OPACITY
 PRESSURE DROP
 ALARMS-AUDIBLE TO PROCESS OPERATOR

VISUAL OPACITY READINGS, FREQUENCY: _____

OTHER, SPECIFY: _____

11) DESCRIBE ANY RECORDING DEVICE AND FREQUENCY OF LOG ENTRIES:

Differential pressure across the filter is monitored continuously and recorded at least once every 15 minutes.

12) DESCRIBE ANY FILTER SEEDING BEING PERFORMED:

None



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SUPPLEMENTAL FORM AIR POLLUTION CONTROL EQUIPMENT PACKED TOWER SCRUBBER (260G)	FOR AGENCY USE ONLY
	ID NUMBER: _____
	CONTROL EQUIPMENT #: _____
	DATE: _____

NOTE: FOR PACKED COLUMN SCRUBBERS, FORM 260g SHOULD BE COMPLETED RATHER THAN FORM 260H.

DATA AND INFORMATION	
2)	FLOW DIAGRAM DESIGNATION OF FILTER: Metal Shredder Quench/Scrubber
3)	SCRUBBANT (LIQUID): Water with NaOH addition controlled by pH analyzer
4)	IS SCRUBBANT RECYCLED BACK INTO CONTROL SYSTEM? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, DESCRIBE METHOD BY WHICH SCRUBBANT SATURATION IS AVOIDED AND THE DESIRED CONTROL EFFICIENCY IS MAINTAINED? Scrubber blow down controlled based on monitored parameters.
5)	TYPE OF PACKING USED: Polypropylene

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6) PACKING VOLUME (FT ³):	7) COLUMN DIAMETER (FEET): Approximately 14 ft	
8) COLUMN HEIGHT – PACKED (FEET): Approximately 6 to 8 ft	9) COLUMN WEIGHT (LB):	
10) PRESSURE DROP (INCHES H ₂ O): Approximately 10 to 14	11) SLOPE OF EQUILIBRIUM CURVE (LB PER MOLE LIQUID / LB PER MOLE GAS):	
12) INLET EMISSIONS STREAM PARAMETERS:		
PRESSURE (mmHg):	MAXIMUM varies	TYPICAL varies
MOISTURE CONTENT (%):	saturated	saturated
RELATIVE HUMIDITY:	100%	100%
13) SCRUBBER OPERATING PARAMETERS:		
INLET GAS TEMPERATURE (DEGREES °F): (approx)	DURING MAXIMUM OPERATION OF FEEDING UNIT(S) 300	DURING TYPICAL OPERATION OF FEEDING UNIT(S) 175
INLET GAS FLOW RATE (SCFM): (approx)	80,000	70,000
SCRUBBANT RATE (GAL/MIN): (approx)	1,000	800
INLET LIQUID FLOW RATE (GAL/MIN): (approx)	varies	varies
OUTLET LIQUID FLOW RATE (GAL/MIN): (approx)	varies	varies
EFFICIENCY (PM REDUCTION) (%):	NA	NA
EFFICIENCY (OTHER; SPECIFY REGULATED AIR POLLUTANT): <u>HAPs (HCl – HF)</u>	99%	99%



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PROCESS EMISSION UNIT DATA AND INFORMATION	FOR AGENCY USE ONLY
	ID NUMBER:
	EMISSION POINT #:
	DATE:

SOURCE INFORMATION	
1) SOURCE NAME: General III, LLC	
2) DATE FORM PREPARED September 2019	3) SOURCE ID NO. (IF KNOWN):

GENERAL INFORMATION	
4) NAME OF EMISSION UNIT: Ferrous Material Processing System	
5) NAME OF PROCESS: Ferrous Material Processing System	
6) DESCRIPTION OF PROCESS: Separation of ferrous scrap metal from shredded material includes conveyors, magnetic separators, Z-Box separators, and stockpiling.	
7) DESCRIPTION OF ITEM OR MATERIAL PRODUCED OR ACTIVITY ACCOMPLISHED: Scrap metal is shredded to a size suitable for processing for recovery of ferrous metals	
8) FLOW DIAGRAM DESIGNATION OF EMISSION UNIT: Ferrous Material Processing System	
9) MANUFACTURER OF EMISSION UNIT (IF KNOWN): To Be Determined (TBD)	
10) MODEL NUMBER (IF KNOWN): TBD	11) SERIAL NUMBER (IF KNOWN): TBD
12) DATES OF COMMENCING CONSTRUCTION, OPERATION AND/OR MOST RECENT MODIFICATION OF THIS EMISSION UNIT (ACTUAL OR PLANNED)	a) CONSTRUCTION (MONTH/YEAR): June 2020
	b) OPERATION (MONTH/YEAR):
	c) LATEST MODIFICATION (MONTH/YEAR):
13) DESCRIPTION OF MODIFICATION (IF APPLICABLE):	

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14) DOES THE EMISSION UNIT HAVE MORE THAN ONE MODE OF OPERATION? YES NO
 IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE PROCESS EMISSION UNIT FORM 220-CAAPP MUST BE COMPLETED FOR EACH MODE):

15) PROVIDE THE NAME AND DESIGNATION OF ALL AIR POLLUTION CONTROL EQUIPMENT CONTROLLING THIS EMISSION UNIT, IF APPLICABLE (FORM 260-CAAPP AND THE APPROPRIATE 260-CAAPP ADDENDUM FORM MUST BE COMPLETED FOR EACH ITEM OF AIR POLLUTION CONTROL EQUIPMENT):
None

16) WILL EMISSIONS DURING STARTUP EXCEED EITHER THE ALLOWABLE EMISSION RATE PURSUANT TO A SPECIFIC RULE, OR THE ALLOWABLE EMISSION LIMIT AS ESTABLISHED BY AN EXISTING OR PROPOSED PERMIT CONDITION? YES NO
 IF YES, COMPLETE AND ATTACH FORM 203-CAAPP, "REQUEST TO OPERATE WITH EXCESS EMISSIONS DURING STARTUP OF EQUIPMENT".

17) PROVIDE ANY LIMITATIONS ON SOURCE OPERATION AFFECTING EMISSIONS OR ANY WORK PRACTICE STANDARDS (E.G., ONLY ONE UNIT IS OPERATED AT A TIME):
Scheduled maintenance and malfunctions when equipment must be taken offline.

OPERATING INFORMATION

18) ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSION RELATED, FROM WHICH THE FOLLOWING OPERATING INFORMATION, MATERIAL USAGE INFORMATION AND FUEL USAGE DATA WERE BASED AND LABEL AS EXHIBIT 220-1. REFER TO SPECIAL NOTES OF FORM 202-CAAPP.

19a) MAXIMUM OPERATING HOURS	HOURS/DAY: 14	DAYS/WEEK: 6	WEEKS/YEAR: 52	
b) TYPICAL OPERATING HOURS	HOURS/DAY: 10	DAYS/WEEK: 6	WEEKS/YEAR: 52	
20) ANNUAL THROUGHPUT	DEC-FEB(%): 22	MAR-MAY(%): 26	JUN-AUG(%): 26	SEP-NOV(%): 26

MATERIAL USAGE INFORMATION

21a) RAW MATERIALS	APPROX MAXIMUM RATES		APPROX TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Shredded Scrap Metal		1,000,000		750,000

21b) PRODUCTS	APPROX MAXIMUM RATES		APPROX TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Ferrous Metal		734,000		550,000
Auto Shredder Residue (ASR)		258,000		195,000

21c) BY-PRODUCT MATERIALS	APPROX MAXIMUM RATES		APPROX TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Fluff		8,000		3,400

FUEL USAGE DATA		
22a) MAXIMUM FIRING RATE (MILLION BTU/HR): None	b) TYPICAL FIRING RATE (MILLION BTU/HR):	c) DESIGN CAPACITY FIRING RATE (MILLION BTU/HR):
d) FUEL TYPE: <input type="checkbox"/> NATURAL GAS <input type="checkbox"/> FUEL OIL: GRADE NUMBER _____ <input type="checkbox"/> COAL <input type="checkbox"/> OTHER IF MORE THAN ONE FUEL IS USED, ATTACH AN EXPLANATION AND LABEL AS EXHIBIT 220-2.		
e) TYPICAL HEAT CONTENT OF FUEL (BTU/LB, BTU/GAL OR BTU/SCF):	f) TYPICAL SULFUR CONTENT (WT %, NA FOR NATURAL GAS):	
g) TYPICAL ASH CONTENT (WT %, NA FOR NATURAL GAS):	h) ANNUAL FUEL USAGE (SPECIFY UNITS, E.G., SCF/YEAR, GAL/YEAR, TON/YEAR):	
23) ARE COMBUSTION EMISSIONS DUCTED TO THE SAME STACK OR CONTROL AS PROCESS UNIT EMISSIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, IDENTIFY THE EXHAUST POINT FOR COMBUSTION EMISSIONS:		

APPLICABLE RULES

24) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.204(j)(4), 3.5 LBS/GAL):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)

25) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	RECORDKEEPING RULE(S)	REQUIREMENT(S)

See Section 4 of Permit Application

26) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)

27) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

28) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT :

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

29) DOES THE EMISSION UNIT QUALIFY FOR AN EXEMPTION FROM AN OTHERWISE APPLICABLE RULE? YES NO

IF YES, THEN LIST BOTH THE RULE FROM WHICH IT IS EXEMPT AND THE RULE WHICH ALLOWS THE EXEMPTION. PROVIDE A DETAILED EXPLANATION JUSTIFYING THE EXEMPTION. INCLUDE DETAILED SUPPORTING DATA AND CALCULATIONS. ATTACH AND LABEL AS EXHIBIT 220-3, OR REFER TO OTHER ATTACHMENT(S) WHICH ADDRESS AND JUSTIFY THIS EXEMPTION.

COMPLIANCE INFORMATION

30) IS THE EMISSION UNIT IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS? YES NO

IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.

31) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:

Visual observations and emission calculations

32) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:

Visual observations and emission calculations

TESTING, MONITORING, RECORDKEEPING AND REPORTING

33a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):

PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
Emissions	ton/mo & tons/yr	Calculations	Monthly
Shredder Throughput Rate	ton/mo & tons/yr	Calculations	Monthly

33b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
Emissions	Spreadsheet	Environmental Manager	Environmental Manager
Shredder Feed Rate	Production Logs	Environmental Manager	Environmental Manager

c) IS COMPLIANCE OF THE EMISSION UNIT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? YES NO

IF NO, EXPLAIN:

d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND SUBMITTAL TO THE AGENCY UPON REQUEST? YES NO

IF NO, EXPLAIN:

34a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE:

Visual observations and emission calculations

b) WHAT PARAMETER(S) IS (ARE) BEING MONITORED (E.G., VOM EMISSIONS TO ATMOSPHERE)?

Shredder throughput

c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., IN STACK MONITOR 3 FEET FROM EXIT):

Belt scale data is adjusted based on monthly records reflecting purchases, shipments, and change in inventory.

34d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE? YES NO
 IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:
NA

e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS? YES NO
 IF NO, EXPLAIN:
NA

f) IS EACH MONITOR OPERATED AT ALL TIMES THE ASSOCIATED EMISSION UNIT IS IN OPERATION? YES NO
 IF NO, EXPLAIN:
NA

35) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 220-4:

TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS
NA				

36) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:

REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY
Annual Emissions	Annual Emissions Report	Annually
Emission Deviations	Emissions Deviation Report	Within 30 days of event

(37)EMISSION INFORMATION

REGULATED AIR POLLUTANT		<input type="checkbox"/> ¹ ACTUAL EMISSION RATE <input type="checkbox"/> ¹ UNCONTROLLED EMISSION RATE					ALLOWABLE BY RULE EMISSION RATE			² PERMITTED EMISSION RATE	
		LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	³ OTHER TERMS	⁴ DM	⁵ RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)
CARBON MONOXIDE (CO)	MAXIMUM:						()				
	TYPICAL:						()				
LEAD	MAXIMUM:						()				
	TYPICAL:						()				
NITROGEN OXIDES (NOx)	MAXIMUM:	See Permit Application – Table 3-2					()				
	TYPICAL:						()				
PARTICULATE MATTER (PART)	MAXIMUM:						()				
	TYPICAL:						()				
PARTICULATE MATTER <= 10 MICROMETERS (PM10)	MAXIMUM:						()				
	TYPICAL:						()				
SULFUR DIOXIDE (SO2)	MAXIMUM:						()				
	TYPICAL:						()				
VOLATILE ORGANIC MATERIAL (VOM)	MAXIMUM:						()				
	TYPICAL:						()				
OTHER, SPECIFY:	MAXIMUM:						()				
	TYPICAL:						()				
EXAMPLE: PARTICULATE MATTER	MAXIMUM:	5.00	21.9	0.3 GR/DSCF		1	6.0 (LBS/HR)	212.321	26.28	5.5 LBS/HR	22
	TYPICAL:	4.00	14.4	0.24 GR/DSCF		4	5.5 (LBS/HR)	212.321	19.80		

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-5.

¹CHECK UNCONTROLLED EMISSION RATE BOX IF CONTROL EQUIPMENT IS USED, OTHERWISE CHECK AND PROVIDE THE ACTUAL EMISSION RATE TO ATMOSPHERE, INCLUDING INDOORS. SEE INSTRUCTIONS.

²PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.

³PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.)

⁴DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)

⁵RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

R 000115

(38) HAZARDOUS AIR POLLUTANT EMISSION INFORMATION

HAP INFORMATION		<input type="checkbox"/> ¹ ACTUAL EMISSION RATE <input type="checkbox"/> ¹ UNCONTROLLED EMISSION RATE				ALLOWABLE BY RULE		
NAME OF HAP EMITTED	² CAS NUMBER	POUNDS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	⁴ DM	⁵ RATE OR STANDARD	APPLICABLE RULE	
		MAXIMUM:						
		TYPICAL:						
		MAXIMUM:	See Permit Application – Table 3-8					
		TYPICAL:						
		MAXIMUM:						
		TYPICAL:						
		MAXIMUM:						
		TYPICAL:						
		MAXIMUM:						
		TYPICAL:						
		MAXIMUM:						
		TYPICAL:						
		MAXIMUM:						
		TYPICAL:						
		MAXIMUM:						
		TYPICAL:						
<i>EXAMPLE:</i>		MAXIMUM:	10.0	1.2		2		
<i>Benzene</i>	71432	TYPICAL:	8.0	0.8		2		
						98% by wt control device leak-tight trucks	CFR 61 61.302(b),(d)	

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-6.

¹PROVIDE UNCONTROLLED EMISSIONS IF CONTROL EQUIPMENT IS USED. OTHERWISE, PROVIDE ACTUAL EMISSIONS TO THE ATMOSPHERE, INCLUDING INDOORS. CHECK BOX TO SPECIFY.
²CAS - CHEMICAL ABSTRACT SERVICE NUMBER.
³PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G., PPM, GR/DSCF, ETC.).
⁴DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS, 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS).
⁵RATE - ALLOWABLE EMISSION RATE OR STANDARD SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

R 000116

EXHAUST POINT INFORMATION		
THIS SECTION SHOULD NOT BE COMPLETED IF EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT.		
39) FLOW DIAGRAM DESIGNATION OF EXHAUST POINT: NA - equipment does not vent through a stack		
40) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS.		
41) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT):		
42) DISCHARGE HEIGHT ABOVE GRADE (FT):		
43) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):		
44) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA.		
45) EXIT GAS FLOW RATE	a) MAXIMUM (ACFM):	b) TYPICAL (ACFM):
46) EXIT GAS TEMPERATURE	a) MAXIMUM (°F):	b) TYPICAL (°F):
47) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD):		
48) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:		
NAME		FLOW DIAGRAM DESIGNATION
a)		
b)		
c)		
d)		
e)		
f)		
g)		
h)		
i)		
THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.		
49a) LATITUDE:		c) LONGITUDE:
50) UTM ZONE:	b) UTM VERTICAL (KM):	d) UTM HORIZONTAL (KM):



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

FOR APPLICANT'S USE

Revision No.: _____

Date: _____

Page: _____ of _____

Source Designation: _____

PROCESS EMISSION UNIT DATA AND INFORMATION	FOR AGENCY USE ONLY
	ID NUMBER: _____
	EMISSION POINT #: _____
	DATE: _____

SOURCE INFORMATION	
1) SOURCE NAME: General III, LLC	
2) DATE FORM PREPARED September 2019	3) SOURCE ID NO. (IF KNOWN): _____

GENERAL INFORMATION	
4) NAME OF EMISSION UNIT: Non-Ferrous Material Processing System	
5) NAME OF PROCESS: Non-Ferrous Material Processing System	
6) DESCRIPTION OF PROCESS: Separation and recovery of non-ferrous metals from ASR including feed hoppers, conveyors, magnetic separators, screens, shakers, eddy current separators, wind sifters, induction separators, polishers, and stockpiles. Select equipment and conveyors are located inside of a building and are connected to dust collectors, 3 of which vent back into the building and one that vents to atmosphere.	
7) DESCRIPTION OF ITEM OR MATERIAL PRODUCED OR ACTIVITY ACCOMPLISHED: Ferrous and non-ferrous metals, including aluminum, stainless steel, zinc, copper, etc.	
8) FLOW DIAGRAM DESIGNATION OF EMISSION UNIT: Non-Ferrous Material Processing System	
9) MANUFACTURER OF EMISSION UNIT (IF KNOWN): Multiple equipment manufacturers	
10) MODEL NUMBER (IF KNOWN): _____	11) SERIAL NUMBER (IF KNOWN): _____
12) DATES OF COMMENCING CONSTRUCTION, OPERATION AND/OR MOST RECENT MODIFICATION OF THIS EMISSION UNIT (ACTUAL OR PLANNED)	a) CONSTRUCTION (MONTH/YEAR): June 2020
	b) OPERATION (MONTH/YEAR): _____
	c) LATEST MODIFICATION (MONTH/YEAR): _____
13) DESCRIPTION OF MODIFICATION (IF APPLICABLE): _____	

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

APPLICATION PAGE _____

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14) DOES THE EMISSION UNIT HAVE MORE THAN ONE MODE OF OPERATION? YES NO
 IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE PROCESS EMISSION UNIT FORM 220-CAAPP MUST BE COMPLETED FOR EACH MODE):

15) PROVIDE THE NAME AND DESIGNATION OF ALL AIR POLLUTION CONTROL EQUIPMENT CONTROLLING THIS EMISSION UNIT, IF APPLICABLE (FORM 260-CAAPP AND THE APPROPRIATE 260-CAAPP ADDENDUM FORM MUST BE COMPLETED FOR EACH ITEM OF AIR POLLUTION CONTROL EQUIPMENT):
There are four identical dust collectors that remove particulate matter from emission collection points connected to various equipment in the Fines Processing Building. Three dust collectors (DC-02 through DC-04) vent treated air back into the building and are therefore, not control devices. Only DC-01 vents to atmosphere (see 260 CAAPP – DC-01).

16) WILL EMISSIONS DURING STARTUP EXCEED EITHER THE ALLOWABLE EMISSION RATE PURSUANT TO A SPECIFIC RULE, OR THE ALLOWABLE EMISSION LIMIT AS ESTABLISHED BY AN EXISTING OR PROPOSED PERMIT CONDITION? YES NO
 IF YES, COMPLETE AND ATTACH FORM 203-CAAPP, "REQUEST TO OPERATE WITH EXCESS EMISSIONS DURING STARTUP OF EQUIPMENT".

17) PROVIDE ANY LIMITATIONS ON SOURCE OPERATION AFFECTING EMISSIONS OR ANY WORK PRACTICE STANDARDS (E.G., ONLY ONE UNIT IS OPERATED AT A TIME):
Scheduled maintenance and malfunctions when equipment must be taken offline.

OPERATING INFORMATION				
18) ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSION RELATED, FROM WHICH THE FOLLOWING OPERATING INFORMATION, MATERIAL USAGE INFORMATION AND FUEL USAGE DATA WERE BASED AND LABEL AS EXHIBIT 220-1. REFER TO SPECIAL NOTES OF FORM 202-CAAPP.				
19a) MAXIMUM OPERATING HOURS	HOURS/DAY: 18	DAYS/WEEK: 6	WEEKS/YEAR: 52	
b) TYPICAL OPERATING HOURS	HOURS/DAY: 12	DAYS/WEEK: 6	WEEKS/YEAR: 52	
20) ANNUAL THROUGHPUT	DEC-FEB(%): 22	MAR-MAY(%): 26	JUN-AUG(%): 26	SEP-NOV(%): 26

MATERIAL USAGE INFORMATION						
21a) RAW MATERIALS	APPROX MAXIMUM RATES			APPROX TYPICAL RATES		
	LBS/HR		TONS/YEAR	LBS/HR		TONS/YEAR
ASR			258,000			193,500

21b) PRODUCTS	APPROX MAXIMUM RATES		APPROX TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Ferrous and Non-Ferrous metals		57,500		43,100

21c) BY-PRODUCT MATERIALS	APPROX MAXIMUM RATES		APPROX TYPICAL RATES	
	LBS/HR	TONS/YEAR	LBS/HR	TONS/YEAR
Waste Residue		200,500		105,400

FUEL USAGE DATA		
22a) MAXIMUM FIRING RATE (MILLION BTU/HR): None	b) TYPICAL FIRING RATE (MILLION BTU/HR):	c) DESIGN CAPACITY FIRING RATE (MILLION BTU/HR):
d) FUEL TYPE: <input type="checkbox"/> NATURAL GAS <input type="checkbox"/> FUEL OIL: GRADE NUMBER _____ <input type="checkbox"/> COAL <input type="checkbox"/> OTHER IF MORE THAN ONE FUEL IS USED, ATTACH AN EXPLANATION AND LABEL AS EXHIBIT 220-2.		
e) TYPICAL HEAT CONTENT OF FUEL (BTU/LB, BTU/GAL OR BTU/SCF):	f) TYPICAL SULFUR CONTENT (WT %., NA FOR NATURAL GAS):	
g) TYPICAL ASH CONTENT (WT %., NA FOR NATURAL GAS):	h) ANNUAL FUEL USAGE (SPECIFY UNITS, E.G., SCF/YEAR, GAL/YEAR, TON/YEAR):	
23) ARE COMBUSTION EMISSIONS DUCTED TO THE SAME STACK OR CONTROL AS PROCESS UNIT EMISSIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, IDENTIFY THE EXHAUST POINT FOR COMBUSTION EMISSIONS:		

APPLICABLE RULES

24) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.204(j)(4), 3.5 LBS/GAL):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)

25) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)		REQUIREMENT(S)
	See Section 4 of Permit Application	

26) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)

27) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

28) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT :

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

29) DOES THE EMISSION UNIT QUALIFY FOR AN EXEMPTION FROM AN OTHERWISE APPLICABLE RULE? YES NO

IF YES, THEN LIST BOTH THE RULE FROM WHICH IT IS EXEMPT AND THE RULE WHICH ALLOWS THE EXEMPTION. PROVIDE A DETAILED EXPLANATION JUSTIFYING THE EXEMPTION. INCLUDE DETAILED SUPPORTING DATA AND CALCULATIONS. ATTACH AND LABEL AS EXHIBIT 220-3, OR REFER TO OTHER ATTACHMENT(S) WHICH ADDRESS AND JUSTIFY THIS EXEMPTION.

COMPLIANCE INFORMATION

30) IS THE EMISSION UNIT IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS? YES NO

IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.

31) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:

ASR throughput rate

Uncontrolled Emission Points - visual observations

Dust Collector DC-01 – See 260 CAAPP for DC-01

32) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:

ASR throughput rate

Uncontrolled Emission Points - visual observations and emission calculations

Dust Collector DC-01 – See 260 CAAPP for DC-01

TESTING, MONITORING, RECORDKEEPING AND REPORTING

33a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):

PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
Emissions	ton/mo & tons/yr	Calculation	Monthly
ASR Feed Rate	ton/mo & tons/yr	Calculation	Monthly

33b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
Emissions	Spreadsheet	Environmental Manager	Environmental Manager
ASR Feed Rate	Production Logs	Environmental Manager	Environmental Manager

c) IS COMPLIANCE OF THE EMISSION UNIT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? YES NO

IF NO, EXPLAIN:

d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND SUBMITTAL TO THE AGENCY UPON REQUEST? YES NO

IF NO, EXPLAIN:

34a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE:

- ASR Throughput**
- Uncontrolled Emission Points – periodic visual observations**
- Dust Collector DC-01 – See 260 CAAPP for DC-01**

b) WHAT PARAMETER(S) IS (ARE) BEING MONITORED (E.G., VOM EMISSIONS TO ATMOSPHERE)?

- ASR Throughput**
- Uncontrolled Emission Points – ASR Feed Rate used to calculate emissions**
- Dust Collector DC-01 – See 260 CAAPP for DC-01**

c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., IN STACK MONITOR 3 FEET FROM EXIT):

- ASR Throughput**
- Uncontrolled Emission Points – NA**
- Dust Collector DC-01 – See 260 CAAPP for DC-01**

34d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE? YES NO
 IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:
Uncontrolled Emission Points – NA
Dust Collector DC-01 – See 260 CAAPP for DC-01

e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS? YES NO
 IF NO, EXPLAIN:
Uncontrolled Emission Points – NA
Dust Collector DC-01 – See 260 CAAPP for DC-01

f) IS EACH MONITOR OPERATED AT ALL TIMES THE ASSOCIATED EMISSION UNIT IS IN OPERATION? YES NO
 IF NO, EXPLAIN:
Uncontrolled Emission Points – NA
Dust Collector DC-01 – See 260 CAAPP for DC-01

35) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 220-4:

TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS
NA				

36) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:

REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY
Annual Emissions	Annual Emissions Report	Annually
Emission Deviations	Emissions Deviation Report	Within 30 days of event

(37)EMISSION INFORMATION

REGULATED AIR POLLUTANT		<input type="checkbox"/> ¹ ACTUAL EMISSION RATE <input type="checkbox"/> ¹ UNCONTROLLED EMISSION RATE					ALLOWABLE BY RULE EMISSION RATE			² PERMITTED EMISSION RATE	
		LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	³ OTHER TERMS	⁴ DM	⁵ RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)
CARBON MONOXIDE (CO)	MAXIMUM:						()				
	TYPICAL:						()				
LEAD	MAXIMUM:						()				
	TYPICAL:						()				
NITROGEN OXIDES (NOx)	MAXIMUM:	See Permit Application - Table 3-3					()				
	TYPICAL:						()				
PARTICULATE MATTER (PART)	MAXIMUM:						()				
	TYPICAL:						()				
PARTICULATE MATTER <= 10 MICROMETERS (PM10)	MAXIMUM:						()				
	TYPICAL:						()				
SULFUR DIOXIDE (SO2)	MAXIMUM:						()				
	TYPICAL:						()				
VOLATILE ORGANIC MATERIAL (VOM)	MAXIMUM:						()				
	TYPICAL:						()				
OTHER, SPECIFY:	MAXIMUM:						()				
	TYPICAL:						()				
EXAMPLE: PARTICULATE MATTER	MAXIMUM:	5.00	21.9	0.3 GR/DSCF		1	6.0 (LBS/HR)	212.321	26.28	5.5 LBS/HR	22
	TYPICAL:	4.00	14.4	0.24 GR/DSCF		4	5.5 (LBS/HR)	212.321	19.80		

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-5.

- ¹CHECK UNCONTROLLED EMISSION RATE BOX IF CONTROL EQUIPMENT IS USED, OTHERWISE CHECK AND PROVIDE THE ACTUAL EMISSION RATE TO ATMOSPHERE, INCLUDING INDOORS. SEE INSTRUCTIONS.
- ²PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.
- ³PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.)
- ⁴DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)
- ⁵RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

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R 000125

(38) HAZARDOUS AIR POLLUTANT EMISSION INFORMATION

HAP INFORMATION		<input type="checkbox"/> ¹ ACTUAL EMISSION RATE <input type="checkbox"/> ¹ UNCONTROLLED EMISSION RATE				ALLOWABLE BY RULE	
NAME OF HAP EMITTED	² CAS NUMBER	POUNDS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	⁴ DM	⁵ RATE OR STANDARD	APPLICABLE RULE
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
		MAXIMUM:					
		TYPICAL:					
<i>EXAMPLE:</i>		MAXIMUM:	10.0	1.2	2	98% by wt control device	CFR 61
<i>Benzene</i>	71432	TYPICAL:	8.0	0.8	2	leak-tight trucks	61.302(b),(d)

See Permit Application - Table 3-8

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 220-6.

- ¹PROVIDE UNCONTROLLED EMISSIONS IF CONTROL EQUIPMENT IS USED. OTHERWISE, PROVIDE ACTUAL EMISSIONS TO THE ATMOSPHERE, INCLUDING INDOORS. CHECK BOX TO SPECIFY.
- ²CAS - CHEMICAL ABSTRACT SERVICE NUMBER.
- ³PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G., PPM, GR/DSCF, ETC.).
- ⁴DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS).
- ⁵RATE - ALLOWABLE EMISSION RATE OR STANDARD SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

R 000126

EXHAUST POINT INFORMATION		
THIS SECTION SHOULD NOT BE COMPLETED IF EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT.		
39) FLOW DIAGRAM DESIGNATION OF EXHAUST POINT: Uncontrolled Equipment – NA Dust Collector DC-01 – see 260 CAAPP for DC-01		
40) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS.		
41) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT):		
42) DISCHARGE HEIGHT ABOVE GRADE (FT):		
43) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):		
44) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA.		
45) EXIT GAS FLOW RATE	a) MAXIMUM (ACFM):	b) TYPICAL (ACFM):
46) EXIT GAS TEMPERATURE	a) MAXIMUM (°F):	b) TYPICAL (°F):
47) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD):		
48) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:		
NAME	FLOW DIAGRAM DESIGNATION	
a)		
b)		
c)		
d)		
e)		
f)		
g)		
h)		
i)		
THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.		
49a) LATITUDE:		c) LONGITUDE:
50) UTM ZONE:	b) UTM VERTICAL (KM):	d) UTM HORIZONTAL (KM):



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

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Revision No.: _____
 Date: _____
 Page: _____ of _____
 Source Designation: _____

AIR POLLUTION CONTROL EQUIPMENT DATA AND INFORMATION	FOR AGENCY USE ONLY
	ID NUMBER: _____
	CONTROL EQUIPMENT #: _____
DATE: _____	

THIS FORM MUST BE COMPLETED FOR EACH AIR POLLUTION CONTROL EQUIPMENT. COMPLETE AND PROVIDE THIS FORM IN ADDITION TO THE APPLICABLE ADDENDUM FORM 260-A THROUGH 260-K. A SEPARATE FORM MUST BE COMPLETED FOR EACH MODE OF OPERATION OF AIR POLLUTION CONTROL EQUIPMENT FOR WHICH A PERMIT IS BEING SOUGHT.

SOURCE INFORMATION	
1) SOURCE NAME: General III, LLC	
2) DATE FORM PREPARED: September 2019	3) SOURCE ID NO. (IF KNOWN):

GENERAL INFORMATION	
4) NAME OF AIR POLLUTION CONTROL EQUIPMENT AND/OR CONTROL SYSTEM: Dust Collector – DC-01	
5) FLOW DIAGRAM DESIGNATION OF CONTROL EQUIPMENT AND/OR CONTROL SYSTEM: DC-01	
6) MANUFACTURER OF CONTROL EQUIPMENT (IF KNOWN): Camfil	
7) MODEL NUMBER (IF KNOWN): GS16	8) SERIAL NUMBER (IF KNOWN):
9) DATES OF COMMENCING CONSTRUCTION, OPERATION AND/OR MOST RECENT MODIFICATION OF THIS EQUIPMENT (ACTUAL OR PLANNED)	a) CONSTRUCTION (MONTH/YEAR): June 2020
	b) OPERATION (MONTH/YEAR):
	c) LATEST MODIFICATION (MONTH/YEAR):
10) BRIEFLY DESCRIBE MODIFICATION (IF APPLICABLE): NA	

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

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11) LIST ALL EMISSION UNITS AND OTHER CONTROL EQUIPMENT DUCTING EMISSIONS TO THIS CONTROL EQUIPMENT:

NAME	DESIGNATION OR CODE NUMBER
Non-Ferrous Induction Sorters	E-19, E-20, E-25, E-26, E-30, E-31, E37 & E-38

12) DOES THE CONTROL EQUIPMENT HAVE MORE THAN ONE MODE OF OPERATION? YES NO

IF YES, EXPLAIN AND IDENTIFY WHICH MODE IS COVERED BY THIS FORM (NOTE: A SEPARATE AIR POLLUTION CONTROL EQUIPMENT FORM 260-CAAPP MUST BE COMPLETED FOR EACH MODE):

13) IDENTIFY ALL ATTACHMENTS TO THIS FORM RELATED TO THIS AIR POLLUTION CONTROL EQUIPMENT(E.G., TECHNICAL DRAWINGS):

OPERATING SCHEDULE

14) IDENTIFY ANY PERIOD WHEN THE CONTROL EQUIPMENT WILL NOT BE OPERATING DUE TO SCHEDULED MAINTENANCE AND/OR REPAIRS WHEN THE FEEDING EMISSION UNIT(S) TO THIS CONTROL EQUIPMENT IS/ARE IN OPERATION:

None

15a) IDENTIFY ANY PERIODS DURING OPERATION OF THE FEEDING EMISSION UNIT(S) WHEN THE CONTROL EQUIPMENT IS/ARE NOT USED:

None

b) IS THIS CONTROL EQUIPMENT IN OPERATION AT ALL OTHER TIMES THAT THE FEEDING EMISSION UNIT(S) IS/ARE IN OPERATION? YES NO

IF NO, EXPLAIN AND PROVIDE THE DURATION OF THE CONTROL EQUIPMENT DOWNTIME:

APPLICABLE RULES

16) PROVIDE ANY SPECIFIC EMISSION STANDARD(S) AND LIMITATION(S) SET BY RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT (E.G., VOM, IAC 218.207(b)(1), 81% OVERALL & 90% CONTROL DEVICE EFF.):

REGULATED AIR POLLUTANT(S)	EMISSION STANDARD(S)	REQUIREMENT(S)

17) PROVIDE ANY SPECIFIC RECORDKEEPING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	RECORDKEEPING RULE(S)	REQUIREMENT(S)

18) PROVIDE ANY SPECIFIC REPORTING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	REPORTING RULE(S)	REQUIREMENT(S)
	See Section 4 of the application.	

19) PROVIDE ANY SPECIFIC MONITORING RULE(S) WHICH ARE APPLICABLE TO THIS EMISSION UNIT:

REGULATED AIR POLLUTANT(S)	MONITORING RULE(S)	REQUIREMENT(S)

20) PROVIDE ANY SPECIFIC TESTING RULES AND/OR PROCEDURES WHICH ARE APPLICABLE TO THIS EMISSION UNIT :

REGULATED AIR POLLUTANT(S)	TESTING RULE(S)	REQUIREMENT(S)

COMPLIANCE INFORMATION	
21) IS THE CONTROL SYSTEM IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS? IF NO, THEN FORM 294-CAAPP "COMPLIANCE PLAN/SCHEDULE OF COMPLIANCE -- ADDENDUM FOR NON COMPLYING EMISSION UNITS" MUST BE COMPLETED AND SUBMITTED WITH THIS APPLICATION.	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
22) EXPLANATION OF HOW INITIAL COMPLIANCE IS TO BE, OR WAS PREVIOUSLY, DEMONSTRATED:	
<p>Operating equipment in accordance with manufacturer's recommendations.</p>	
23) EXPLANATION OF HOW ONGOING COMPLIANCE WILL BE DEMONSTRATED:	
<p>Operating equipment in accordance with manufacturer's recommendations.</p>	

TESTING, MONITORING, RECORDKEEPING AND REPORTING			
24a) LIST THE PARAMETERS THAT RELATE TO AIR EMISSIONS FOR WHICH RECORDS ARE BEING MAINTAINED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE. INCLUDE THE UNIT OF MEASUREMENT, THE METHOD OF MEASUREMENT, AND THE FREQUENCY OF SUCH RECORDS (E.G., HOURLY, DAILY, WEEKLY):			
PARAMETER	UNIT OF MEASUREMENT	METHOD OF MEASUREMENT	FREQUENCY
Operating Hours	Hours	Production Logs	Daily
Differential Pressure	Inches of WC	Differential Pressure Gauge	Daily

24b) BRIEFLY DESCRIBE THE METHOD BY WHICH RECORDS WILL BE CREATED AND MAINTAINED. FOR EACH RECORDED PARAMETER INCLUDE THE METHOD OF RECORDKEEPING, TITLE OF PERSON RESPONSIBLE FOR RECORDKEEPING, AND TITLE OF PERSON TO CONTACT FOR REVIEW OF RECORDS:

PARAMETER	METHOD OF RECORDKEEPING	TITLE OF PERSON RESPONSIBLE	TITLE OF CONTACT PERSON
Operating Hours	Production Logs	Environmental Manager	Environmental Manager
Differential Pressure Gauge	Logs	Environmental Manager	Environmental Manager

c) IS COMPLIANCE OF THE CONTROL EQUIPMENT READILY DEMONSTRATED BY REVIEW OF THE RECORDS? YES NO
 IF NO, EXPLAIN:

d) ARE ALL RECORDS READILY AVAILABLE FOR INSPECTION, COPYING AND/OR SUBMITTAL TO THE AGENCY UPON REQUEST? YES NO
 IF NO, EXPLAIN:

25a) DESCRIBE ANY MONITORS OR MONITORING ACTIVITIES USED TO DETERMINE FEES, RULE APPLICABILITY OR COMPLIANCE:

Differential pressure gauge installed to measure the pressure drop across the filter media.

b) WHAT OPERATING PARAMETER(S) IS(ARE) BEING MONITORED (E.G., COMBUSTION CHAMBER TEMPERATURE)?

Differential Pressure

c) DESCRIBE THE LOCATION OF EACH MONITOR (E.G., EXIT OF COMBUSTION CHAMBER):

Monitor located on filter housing or adjacent structural support.

25d) IS EACH MONITOR EQUIPPED WITH A RECORDING DEVICE? YES NO
 IF NO, LIST ALL MONITORS WITHOUT A RECORDING DEVICE:

e) IS EACH MONITOR REVIEWED FOR ACCURACY ON AT LEAST A QUARTERLY BASIS? YES NO
 IF NO, EXPLAIN:

f) IS EACH MONITOR OPERATED AT ALL TIMES THE CONTROL EQUIPMENT IS IN OPERATION? YES NO
 IF NO, EXPLAIN:

26) PROVIDE INFORMATION ON THE MOST RECENT TESTS, IF ANY, IN WHICH THE RESULTS ARE USED FOR PURPOSES OF THE DETERMINATION OF FEES, RULE APPLICABILITY, OR COMPLIANCE. INCLUDE THE TEST DATE, TEST METHOD USED, TESTING COMPANY, OPERATING CONDITIONS EXISTING DURING THE TEST AND A SUMMARY OF RESULTS. IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 260-1:

TEST DATE	TEST METHOD	TESTING COMPANY	OPERATING CONDITIONS	SUMMARY OF RESULTS
NA				

27) DESCRIBE ALL REPORTING REQUIREMENTS AND PROVIDE THE TITLE AND FREQUENCY OF REPORT SUBMITTALS TO THE AGENCY:

REPORTING REQUIREMENTS	TITLE OF REPORT	FREQUENCY
Annual Emissions	Annual Emissions Report	Annually
Emission Deviations	Emission Deviation Report	Within 30 days of event

CAPTURE AND CONTROL

28) DESCRIBE THE CAPTURE SYSTEM USED TO CONTAIN, COLLECT, AND TRANSPORT EMISSIONS TO THE CONTROL EQUIPMENT. INCLUDE ALL HOODS, DUCTS, FANS, ETC. ALSO INCLUDE THE METHOD OF CAPTURE USED AT EACH EMISSION POINT. (IF ADDITIONAL SPACE IS NEEDED, ATTACH AND LABEL AS EXHIBIT 260-2):

Dust Collector fan pulls air from emission unit pickup points through a system of ductwork to the dust collector.

29) ARE FEATURES OF THE CAPTURE SYSTEM ACCURATELY DEPICTED IN THE FLOW DIAGRAM CONTAINED IN THIS APPLICATION YES NO

IF NO, A SKETCH SHOWING THE FEATURES OF THE CAPTURE SYSTEM SHOULD BE ATTACHED AND LABELED AS EXHIBIT 260-3:

30) PROVIDE THE ACTUAL (MINIMUM AND TYPICAL) CAPTURE SYSTEM EFFICIENCY, CONTROL EQUIPMENT DESTRUCTION/REMOVAL EFFICIENCY, AND THE OVERALL REDUCTION EFFICIENCY PROVIDED BY THE COMBINATION OF THE CAPTURE SYSTEM AND CONTROL EQUIPMENT FOR EACH REGULATED AIR POLLUTANT TO BE CONTROLLED. ATTACH THE CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH THESE EFFICIENCIES WERE BASED AND LABEL AS EXHIBIT 260-4:

a) CONTROL PERFORMANCE:

	REGULATED AIR POLLUTANT	CAPTURE SYSTEM EFFICIENCY (%)		CONTROL EQUIPMENT EFFICIENCY (%)		OVERALL REDUCTION EFFICIENCY (%)	
		(MIN)	(TYP)	(MIN)	(TYP)	(MIN)	(TYP)
i.	Particulate	100	100	99.9	99.9	99.9	99.9
ii.							
iii.							

iv. EXPLAIN ANY OTHER REQUIRED LIMITS ON CONTROL EQUIPMENT PERFORMANCE SUCH AS OUTLET CONCENTRATION, COOLANT TEMPERATURE, ETC.:

0.03 gr/dscf pursuant to 35 IAC 212.315.

b) METHOD USED TO DETERMINE EACH OF THE ABOVE EFFICIENCIES (E.G., STACK TEST, MATERIAL BALANCE, MANUFACTURER'S GUARANTEE, ETC.) AND THE DATE LAST TESTED, IF APPLICABLE:

EFFICIENCY DETERMINATION METHOD	DATE LAST TESTED
CAPTURE: Engineering estimate	NA
CONTROL: Vendor's filter performance data	NA
OVERALL: Engineering estimate	NA

c) REQUIRED PERFORMANCE:

	REGULATED AIR POLLUTANT	CAPTURE SYSTEM EFFICIENCY (%)	CONTROL EQUIPMENT EFFICIENCY (%)	OVERALL REDUCTION EFFICIENCY (%)	APPLICABLE RULE
i.					
ii.					
iii.					

iv. EXPLAIN ANY OTHER REQUIRED LIMITS ON CONTROL EQUIPMENT PERFORMANCE SUCH AS OUTLET CONCENTRATION, COOLANT TEMPERATURE, ETC.:

(31)EMISSION INFORMATION

REGULATED AIR POLLUTANT	¹ ACTUAL EMISSION RATE					ALLOWABLE BY RULE EMISSION RATE			² PERMITTED EMISSION RATE		
	LBS PER HOUR (LBS/HR)	TONS PER YEAR (TONS/YR)	³ OTHER TERMS	³ OTHER TERMS	⁴ DM	⁵ RATE (UNITS)	APPLICABLE RULES	TONS PER YEAR (TONS/YR)	RATE (UNITS)	TONS PER YEAR (TONS/YR)	
CARBON MONOXIDE (CO)	MAXIMUM:					()					
	TYPICAL:					()					
LEAD	MAXIMUM:					()					
	TYPICAL:					()					
NITROGEN OXIDES (NOx)	MAXIMUM:	See Application Table 3-3 Row 138				()					
	TYPICAL:					()					
PARTICULATE MATTER (PART)	MAXIMUM:					()					
	TYPICAL:					()					
PARTICULATE MATTER <= 10 MICROMETERS (PM10)	MAXIMUM:					()					
	TYPICAL:					()					
SULFUR DIOXIDE (SO2)	MAXIMUM:					()					
	TYPICAL:					()					
VOLATILE ORGANIC MATERIAL (VOM)	MAXIMUM:					()					
	TYPICAL:					()					
OTHER, SPECIFY:	MAXIMUM:					()					
	TYPICAL:					()					
EXAMPLE: PARTICULATE MATTER	MAXIMUM:	5.00	21.9	0.3 GR/DSCF		1	6.0 (LBS/HR)	212.321	26.28	5.5 LBS/HR	22
	TYPICAL:	4.00	14.4	0.24 GR/DSCF		4	5.5 (LBS/HR)	212.321	19.80		

IMPORTANT: ATTACH CALCULATIONS, TO THE EXTENT THEY ARE AIR EMISSIONS RELATED, ON WHICH EMISSIONS WERE DETERMINED AND LABEL AS EXHIBIT 260-5.

- 1 PROVIDE CONTROLLED EMISSIONS (E.G., THE EMISSIONS THAT WOULD RESULT AFTER ALL CONTROL AND CAPTURE EFFICIENCIES ARE ACCOUNTED FOR).
- 2 PROVIDE THE EMISSION RATE THAT WILL BE USED AS A PERMIT SPECIAL CONDITION. THIS LIMIT WILL BE USED TO DETERMINE THE PERMIT FEE.
- 3 PLEASE PROVIDE ANY OTHER EMISSION RATE WHICH IS COMMONLY USED, REQUIRED BY A SPECIFIC LIMITATION OR THAT WAS MEASURED (E.G. PPM, GR/DSCF, ETC.)
- 4 DM - DETERMINATION METHOD: 1) STACK TEST, 2) MATERIAL BALANCE, 3) STANDARD EMISSION FACTOR (AP-42 OR AIRS), 4) ENGINEERING ESTIMATE, 5) SPECIAL EMISSION FACTOR (NOT AP-42 OR AIRS)
- 5 RATE - ALLOWABLE EMISSION RATE SPECIFIED BY MOST STRINGENT APPLICABLE RULE.

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EXHAUST POINT INFORMATION		
33) DESCRIPTION OF EXHAUST POINT (STACK, VENT, ROOF MONITOR, INDOORS, ETC.). IF THE EXHAUST POINT DISCHARGES INDOORS, DO NOT COMPLETE THE REMAINING ITEMS. Circular discharge stack, unobstructed, venting vertically		
34) DISTANCE TO NEAREST PLANT BOUNDARY FROM EXHAUST POINT DISCHARGE (FT): Approximately 875 feet		
35) DISCHARGE HEIGHT ABOVE GRADE (FT): Approximately 47 feet		
36) GOOD ENGINEERING PRACTICE (GEP) HEIGHT, IF KNOWN (FT):		
37) DIAMETER OF EXHAUST POINT (FT): NOTE: FOR A NON CIRCULAR EXHAUST POINT, THE DIAMETER IS 1.128 TIMES THE SQUARE ROOT OF THE AREA. Approximately 2 feet		
38) EXIT GAS FLOW RATE	a) MAXIMUM (ACFM): 12,000	b) TYPICAL (ACFM): 12,000
39) EXIT GAS TEMPERATURE	a) MAXIMUM (°F): ambient	b) TYPICAL (°F): ambient
40) DIRECTION OF EXHAUST (VERTICAL, LATERAL, DOWNWARD): Vertical		
41) LIST ALL EMISSION UNITS AND CONTROL DEVICES SERVED BY THIS EXHAUST POINT:		
NAME	FLOW DIAGRAM DESIGNATION	
a) Dust Collector	DC-01	
b)		
c)		
d)		
e)		
f)		
g)		

42) WHAT PERCENTAGE OF THE CONTROL EQUIPMENT EMISSIONS ARE BEING DUCTED TO THIS EXHAUST POINT (%)? 100
43) IF THE PERCENTAGE OF THE CONTROL EQUIPMENT EMISSIONS BEING DUCTED TO THE EXHAUST POINT IS NOT 100%, THEN EXPLAIN WHERE THE REMAINING EMISSIONS ARE BEING EXHAUSTED TO:

THE FOLLOWING INFORMATION NEED ONLY BE SUPPLIED IF READILY AVAILABLE.		
44a) LATITUDE: Approximately 41° 41' 02' N	b) LONGITUDE: Approximately 87° 32' 54' N	
45) UTM ZONE:	b) UTM VERTICAL (KM):	c) UTM HORIZONTAL (KM):



ILLINOIS ENVIRONMENTAL PROTECTION
 AGENCY DIVISION OF AIR POLLUTION CONTROL-PERMIT SECTION
 P.O. BOX 19506
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Revision No.:	_____
Date:	_____
Page:	_____ of _____
Source Designation:	_____

SUPPLEMENTAL FORM AIR POLLUTION CONTROL EQUIPMENT FILTER (260C)	FOR AGENCY USE ONLY
	ID NUMBER: _____
	CONTROL EQUIPMENT #: _____
	DATE: _____

DATA AND INFORMATION							
1) FLOW DIAGRAM DESIGNATION OF FILTER: Dust Collector DC-01							
2) FILTER CONFIGURATION (CHECK ONE): <input type="checkbox"/> OPEN PRESSURE <input checked="" type="checkbox"/> CLOSED PRESSURE <input type="checkbox"/> CLOSED SUCTION <input type="checkbox"/> OTHER, SPECIFY: _____							
3) DESCRIBE FILTER MATERIAL: Laminated polyester							
4) FILTERING AREA (SQUARE FEET): 5,200	5) AIR TO CLOTH RATIO (FEET/MIN): 2.31:1						
6) CLEANING METHOD: <input type="checkbox"/> SHAKER <input type="checkbox"/> REVERSE AIR <input checked="" type="checkbox"/> PULSE AIR <input type="checkbox"/> PULSE JET <input type="checkbox"/> OTHER, SPECIFY: _____							
7) NORMAL RANGE OF PRESSURE DROP: _____ TO _____ (INCH H ₂ O)							
8a) INLET EMISSION STREAM PARAMETERS:							
MOISTURE CONTENT (% BY VOLUME):	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th style="padding: 2px;">MAX</th> <th style="padding: 2px;">TYPICAL</th> </tr> <tr> <td style="text-align: center; padding: 2px;">ambient</td> <td style="text-align: center; padding: 2px;">ambient</td> </tr> <tr> <td style="text-align: center; padding: 2px;">varies</td> <td style="text-align: center; padding: 2px;">varies</td> </tr> </table>	MAX	TYPICAL	ambient	ambient	varies	varies
MAX	TYPICAL						
ambient	ambient						
varies	varies						
PARTICULATE INLET LOADING (GRAINS/SCF):	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th style="padding: 2px;">MAX</th> <th style="padding: 2px;">TYPICAL</th> </tr> <tr> <td style="text-align: center; padding: 2px;">varies</td> <td style="text-align: center; padding: 2px;">varies</td> </tr> </table>	MAX	TYPICAL	varies	varies		
MAX	TYPICAL						
varies	varies						
b) MEAN PARTICLE DIAMETER (MICRONS): varies							

THIS AGENCY IS AUTHORIZED TO REQUIRE THIS INFORMATION UNDER ILLINOIS REVISED STATUTES, 1991, AS AMENDED 1992, CHAPTER 111 1/2, PAR. 1039.5. DISCLOSURE OF THIS INFORMATION IS REQUIRED UNDER THAT SECTION. FAILURE TO DO SO MAY PREVENT THIS FORM FROM BEING PROCESSED AND COULD RESULT IN THE APPLICATION BEING DENIED. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

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9) FILTER OPERATING PARAMETERS:

	DURING MAXIMUM OPERATION OF FEEDING UNIT(S)	DURING TYPICAL OPERATION OF FEEDING UNIT(S)
INLET FLOW RATE (SCFM):	12,000	12,000
INLET GAS TEMPERATURE (DEGREES FAHRENHEIT):	ambient	ambient
EFFICIENCY (PM REDUCTION):	>99.90	>99.90
EFFICIENCY (PM10 REDUCTION):	>99	>99

10) HOW IS FILTER MONITORED FOR INDICATIONS OF DETERIORATION (E.G., BROKEN BAGS)?

CONTINUOUS OPACITY
 PRESSURE DROP
 ALARMS-AUDIBLE TO PROCESS OPERATOR

VISUAL OPACITY READINGS, FREQUENCY: _____

OTHER, SPECIFY: _____

11) DESCRIBE ANY RECORDING DEVICE AND FREQUENCY OF LOG ENTRIES:

Operating logs

12) DESCRIBE ANY FILTER SEEDING BEING PERFORMED:

None



**Construction Permit Application for New
Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

September 20, 2019

APPENDIX B

**ROLL MEDIA FILTER STACK TEST REPORT
GENERAL II, LLC – CHICAGO, ILLINOIS
(FORMERLY GENERAL IRON INDUSTRIES, INC.)
PERFORMED MAY/JUNE 2018**





June 25, 2018

R17421-3

Compliance Tracker, AE-18J
 Air Enforcement and Compliance Assurance Branch
 US Environmental Protection Agency - Region 5
 77 W Jackson Boulevard
 Chicago, IL 60604

*Copy on Electronic Media
 Delivered to USEPA Region V
 Chicago, Illinois*

**Shredder Emissions Test Report - Total Hydrocarbons, Particulate, and Metals
 General Iron Industries, Inc. – 1909 N. Clifton Avenue – Chicago, Illinois 60614**

To Whom This May Concern:

On behalf of General Iron Industries, Inc. (General Iron), please find attached the report of total hydrocarbon (THC), filterable particulate matter (PM) and metals emissions testing from the existing hammermill shredder located at General Iron Industries in Chicago, Illinois.

These tests were performed in response to requirements specified in the United States Environmental Protection Agency's (USEPA's) *Request to Provide Information Pursuant to the Clean Air Act* (information request) dated November 16, 2017, and in accordance with the USEPA approved test protocol dated May 23, 2018.

The attached test report was prepared to provide the required information identified in Appendix B, Item 7 of the above-referenced USEPA information request.

In addition to the testing required by the information request, General Iron voluntarily decided to surpass the USEPA testing requirements and perform an impact assessment for the metals emissions on the surrounding community. The results of this analysis show that metals emissions from the shredder are far below the identified health-based standards, as described in Section 5 of the attached report.

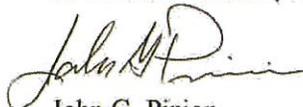
Based on the results of the required emissions testing and the additional metals impact evaluation, we can reasonably conclude that:

1. Actual THC emissions from the shredder over the past 5 years were less than 89 tons per year, which demonstrates that emissions from this shredder do not exceed the current VOC major source threshold of 100 tpy.
2. PM/PM₁₀ rate of 1.9 lb/hour is well below the limits in the current IEPA Lifetime Operation Permit.
3. Evaluation of the metals, as described above, demonstrates that related off-site impacts are far below the health-based standards identified in Section 5.

RK **edder Emission Test Report**
& ASSOCIATES, INC. **ustries, Inc. - Chicago Illinois**
Page 2

If you have any questions, or require any additional information please do not hesitate to contact Mr. Jim Kallas, Environmental Manager for General Iron 847-508-9170 (jim@general-iron.com) or me at 630-393-9000 (jpinion@rka-inc.com).

Yours very truly,
RK & Associates, Inc.



John G. Pinion
Principal Engineer

**Shredder Emissions Test Report for
Total Hydrocarbons, Particulate, and Metals**

General Iron Industries, Inc. – Chicago, Illinois

IEPA Bureau of Air Site ID No.: 031600BTB

June 25, 2018

R17421-3

Prepared for:

**General Iron Industries, Inc.
1909 N. Clifton, Avenue
Chicago, Illinois 60614**

Submitted to:

**Compliance Tracker, AE-18J
Air Enforcement and Compliance Assurance Branch
US Environmental Protection Agency - Region 5
77 W Jackson Boulevard
Chicago, IL 60604**



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



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APPENDICES

Appendix A	Report of VOC Emission Testing on the Shredder Exhaust at the General Iron Facility Located in Chicago, Illinois Prepared by Stack Test Group, Inc.
Appendix B	Test Report Particulate Matter and Total Select Metals Hammermill Shredder General Iron Industries, Inc. – Chicago, Illinois, prepared by Montrose Air Quality Services and Dated June 21, 2018

1.0 INTRODUCTION

General Iron Industries, Inc. (General Iron) is an existing scrap metal recycling facility located at 1909 N. Clifton Avenue, Chicago, Illinois (see Figure 1). General Iron receives and shreds mixed recyclable metal in various forms to produce uniform grades of ferrous and non-ferrous metals. Existing scrap handling and processing activities include receiving, sorting, shredding, metal separation and recovery of ferrous and nonferrous metals.

General Iron currently operates under an Illinois Environmental Protection Agency (IEPA) Lifetime Operating Permit (Application No. 81050001; Site ID No. 031600BTB) most recently revised and reissued on September 1, 2004.

General Iron received a *Request to Provide Information Pursuant to the Clean Air Act* (Information Request) from the United States Environmental Protection Agency (USEPA) requiring that General Iron conduct emissions testing to quantify emissions for total hydrocarbons, methane, ethane, particulate matter (PM), and metals from its hammermill shredder.

Specifically, in Appendix B, Item 1 of the information request, USEPA is requiring General Iron to...

... *perform emission testing at the facility to determine:*

- a. *The total gaseous organic compound emission rate as volatile organic compounds (VOC) of the hammermill shredder using EPA Reference Methods 1 – 4 and Method 25A. Methane and ethane concentrations shall be determined using Method 18 and subtracted from the total hydrocarbon concentration measured following Method 25A to determine VOC concentrations;*
- b. *Particulate Matter emission rate using EPA Reference Methods 1 – 4 and Method 5; and,*
- c. *Metal emission rates of the hammermill shredder using EPA Methods 1 – 4 and Method 29.*

A revised protocol, dated May 23, 2018, was submitted to USEPA and approved. Testing for total hydrocarbon (THC) was performed by Stack Test Group on May 25, 2018, in accordance with the approved protocol. Testing for PM and Metals was performed by Montrose Environmental Services on June 13 and 14, 2018, in accordance with the approved protocol.

In addition to the testing required by the information request, General Iron voluntarily decided to surpass the USEPA testing requirements and perform an impact assessment for the metals emissions on the surrounding community. The results of this analysis show that metals emissions from the shredder are far below the identified health-based standards, as described in Section 5 of the attached report.



Based on the results of the required emissions testing and the additional metals impact evaluation, we can reasonably conclude that:

1. Actual THC emissions from the shredder over the past 5 years were less than 89 tons per year, which demonstrates that emissions from this shredder do not exceed the current VOC major source threshold of 100 tpy.
2. PM/PM₁₀ rate of 1.9 lb/hour is well below the limits in the current IEPA Lifetime Operation Permit.
3. Evaluation of the metals, as described above, demonstrates that related off-site impacts are far below the health-based standards identified in Section 5.

The testing was witnessed by Mr. Scott Connolly, Environmental Engineer, from USEPA Region V and at USEPA's request, by Mr. Kevin Mattison, a stack testing specialist from Illinois Environmental Protection Agency (IEPA).

The Information Request requires that a complete report of emissions be submitted within 30 days of completion of the tests. This test report fulfills this requirement.

1.1 Facility Location

General Iron is located at 1909 N Clifton Avenue in Chicago (Cook County) Illinois as shown in Figure 1. A Facility Layout map is presented in Figure 2. Facility contact information is provided in Section 1.2.

1.2 Project Contact Information

<u>Business Name:</u>	General Iron Industries, Inc.
<u>Source Location:</u>	1909 N. Clifton Avenue – Chicago, Illinois 60614 Cook County Illinois
<u>Latitude/Longitude</u>	41.915823° N / -87.658231° W – Intersection of N Clifton Ave. and N Kingsbury Street - Front Gate
<u>Office/Mailing Address:</u>	1909 N. Clifton Avenue – Chicago, Illinois 60614
<u>General Iron</u>	Mr. Jim Kallas - Environmental Manager
<u>Contact:</u>	847-508-9170 – jim@general-iron.com
<u>IEPA Site ID No.:</u>	031600BTB
<u>SIC Code:</u>	5093 – Scrap and Waste Materials
<u>NAICS Code:</u>	423930 – Recyclable Material Merchant Wholesalers
<u>THC Emission Testing</u>	Stack Test Group
<u>Contractor</u>	1500 Boyce Memorial Drive - Ottawa, Illinois 61350 815-433-0545
<u>PM/Metals Emissions</u>	Montrose Air Quality Services, LLC
<u>Testing Contractor</u>	1370 Brummel Avenue Elk Grove Village, Illinois 60007 630-860-4740
<u>RKA Contact for</u>	John Pinion - Principal Engineer
<u>Emission Testing</u>	2S631 Route 59, Suite B - Warrenville, Illinois 60555 630-393-9000 jpinion@rka-inc.com

1.3 Report Certification

The Certification Statement required by the Information Request for all submittals is provided below.

Certification Statement:

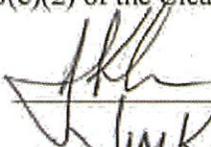
I certify under penalty of law that I have examined and am familiar with the information in the enclosed documents, including all attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are, to the best of my knowledge and belief, true and complete. I am aware that there are significant penalties for knowingly submitting false statements and information including the possibility of fines or imprisonment pursuant to Section 113(c)(2) of the Clean Air Act and 18 U.S.C. §§ 1001 and 1341.

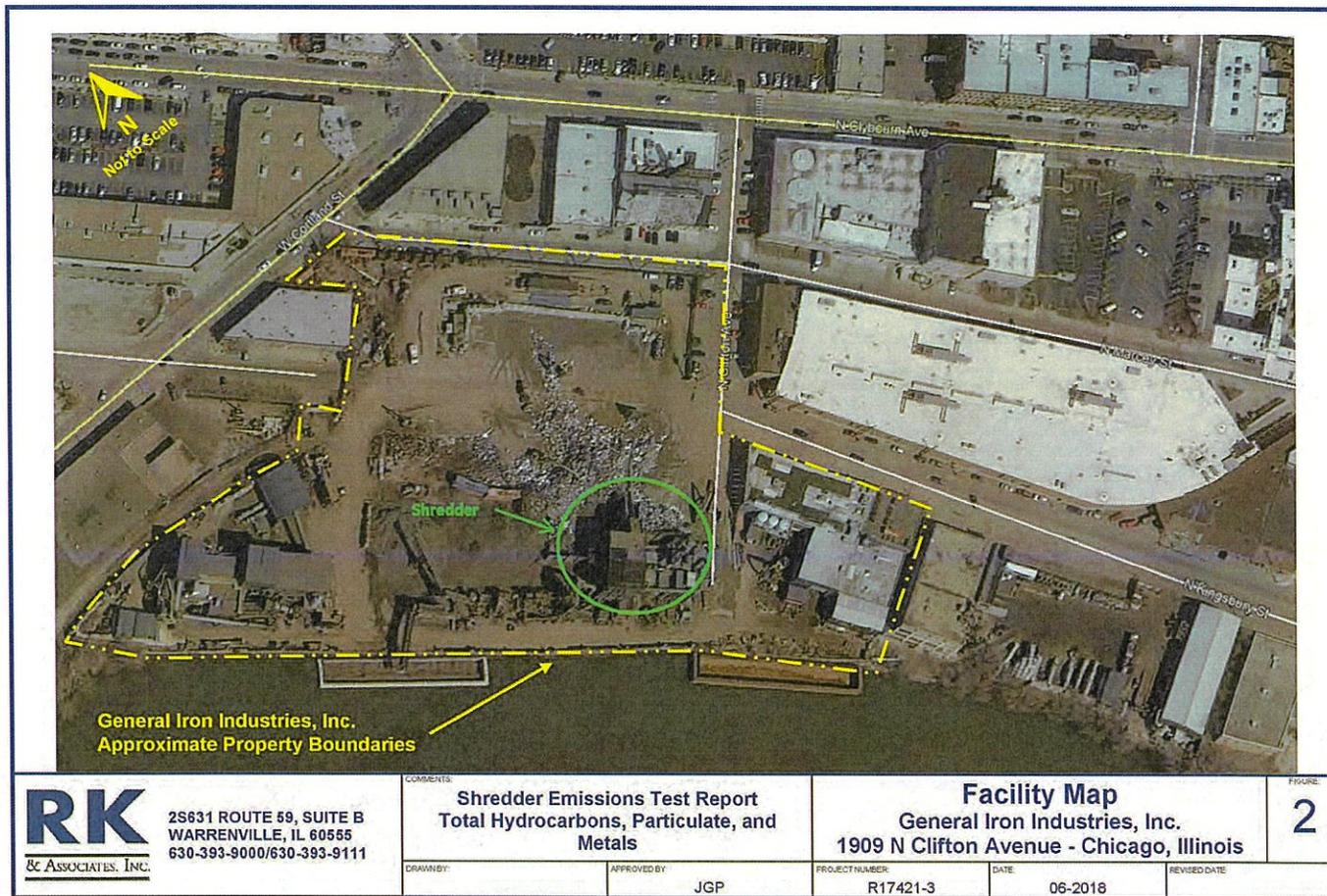
Signature: _____

Date: _____

Name: _____

Attachment: _____


JIM KALLAS
Shredder Air Emission Test Report
General Iron Industries, Inc. – Chicago, Illinois



General Iron Industries, Inc.
Chicago, Illinois

Shredder Emissions Test Report for
Total Hydrocarbons, Particulate, and Metals
June 25, 2018

2.0 SUMMARY OF RESULTS

Detailed testing reports of THC and PM/Metals are presented in Appendices A and B respectively. THC emissions are discussed in Section 2.1 and PM/Metals emissions are discussed in Section 2.2.

2.1 THC Emissions

2.1.1 THC Test Results

THC testing was performed by Stack Test Group on May 25, 2018. Detailed information from sample collection and analyses is presented in Stack Test Group's report presented in Appendix A of this document.

Table 2-1 below presents a summary of THC emission testing including the shredder feed rate, Uncorrected and Corrected THC emissions, and the corrected THC emission factor.

Table 2-1
Summary of Shredder THC Emission Testing - May 25, 2018^a
General Iron - Chicago, Illinois

Parameter	Run 1	Run 2	Run 3	Average
Date:	5/25/2018	5/25/2018	5/25/2018	
Start Time:	08:35AM	09:49AM	11:05AM	
Finish Time:	09:35AM	10:48 AM	12:26 PM	
Shredder Feed Rate (tph):	396.34	389.69	384.37	390.13
Stack Diameter, inches:	50	50	50	
Barometric Pressure, inches Hg:	29.33	29.33	29.33	
Static Pressure in Stack, Inches H ₂ O:	-0.81	-0.81	-0.81	
Duration of Sample, minutes:	60	60	60	
Stack Gas Temperature, degrees F:	114.1	116.8	119.1	116.7
% Carbon Dioxide:	0.2	0.2	0.1	0.2
% Oxygen:	20.5	20.5	20.7	20.6
% Moisture:	4.1	3.77	3.86	3.91
Stack Gas Flow Rate, DSCFM:	60,258	60,953	61,197	60,803
VOC Calculations (Uncorrected)				
PPMvw as Propane:	281.0	169.9	270.3	240.4
LBS/DSCF	3.21E-05	1.94E-05	3.09E-05	2.75E-05
LBS/HR	121.0	73.7	117.9	104.2
THC from VOM-Exempt Compounds				
PPMvw as Propane (see Table 2-2):	10.7	28.0	27.6	20.1
VOC Calculations (Corrected)				
PPMvw as Propane:	268.8	146.6	241.4	218.9
LBS/DSCF	3.07E-05	1.67E-05	2.76E-05	2.50E-05
LBS/HR	115.72	63.61	105.27	94.87
LB-THC/TON SHREDDER FEED	0.2920	0.1632	0.2739	0.2430

a. See Appendix C of Stack Test Group THC Test Report attached in Appendix A of this document.



Summary of Results

Uncorrected THC represents the 'raw' THC emissions measured during the test using Method 25A. No methane or ethane was detected in the samples collected.

Integrated exhaust gas samples were collected in Tedlar bags during each THC test run. Stack Test Group submitted the Tedlar Bag samples to DAT Laboratory in Plain City, Ohio. The gas samples were analyzed in accordance with USEPA Method TO-15 for the purposes of identifying compounds in the exhaust that are specifically exempt from the federal definition of Volatile Organic Compound (VOC) in 40 CFR 51.100(s).

The laboratory then prepared a 100 ppm sample of each VOC-exempt compound that had a three-sample average that exceeded the method detection limit. These samples were sent to Stack Test Group to measure an instrument response factor for each compound using the same Method 25A analyzer used during the testing. An instrument response factor is the ratio of the ppm of VOC-exempt compound to the corresponding ppm of THC. The average concentration of VOC-exempt compounds identified in the three TO-15 samples were then multiplied by the corresponding compound-specific instrument response factor to determine the concentration (ppm) of THC that could be subtracted from the raw data.

The total THC corresponding to the VOC-exempt compounds was then subtracted from the raw THC and is reported as the 'Corrected THC'. Table 2-2 identifies the VOC-Exempt compounds subtracted from the raw THC data.

The corrected THC, in Table 2-1 above, is the final result from these tests. Dividing the corrected THC (lb/hr) by the gross shredder feed rate (tph) yields a THC emission factor in units of lb-THC per ton of shredder feed. The shredder feed rate for the THC tests consisted of 21.3% end of life vehicles (ELVs) and 78.7% mixed recyclable metals. The average THC emission factor for this set of tests (as shown in Table 2-1 above) is 0.2430 lb/ton.

This emission factor may be applied to past actual shredder material feed rates to estimate past actual THC emissions. Information previously submitted in response to the EPA 114 Information Request included actual monthly shredder feed rates (tons per month) from July 2012 through December 2017. The maximum 12 consecutive month shredder feed rate was 729,790 tons from April 2016 through March 2017. Based on the above, application of the measured THC emission factor to the maximum annual shredder feed rate yields a maximum actual annual THC emission rate of 88.68 tons, which demonstrates that actual emissions from the shredder do not exceed the current VOC major source threshold of 100 tpy.

Table 2-2

 Measured Response Factors for VOC Exempt Compounds^a
 General Iron - Chicago, Illinois

VOM Exempt Compound	Concentration in Sample PPM	FID Response (ppm)			Average	Measured Response Factor
		Trial 1	Trial 2	Trial 3		
Chloromethane	100	67.1	67.0	67.0	67.0	0.67
Freon 22	100	47.50	47.70	47.80	47.70	0.48
Freon 12	100	117.60	117.40	117.80	117.60	1.18
Freon 152a	100	114.90	115.00	115.00	115.00	1.15
Freon 134a	100	114.80	115.10	115.20	115.00	1.15
Octamethylcyclotetrasiloxane	100	114.80	114.90	114.90	114.90	1.15
Acetone	Response Factor obtained from Instrument Manufacturer					
Methylene Chloride	Response Factor obtained from Instrument Manufacturer					
Tetrachloroethylene	Response Factor obtained from Instrument Manufacturer					
Freon 11	Sample of Freon 11 was not available. The Freon 11 response factor is an estimated response factor based on the results of other Freon response factor testing					

a. See Appendix G of Stack Test Group THC Test Report attached in Appendix A of this document for details.

 Corrected THC by Removal of VOC-Exempt Compounds^d
 General Iron - Chicago, Illinois

VOM Exempt Compound	Parameter	Run 1	Run 2	Run 3	Average	Response Factor
Chloromethane	TO-15 (PPM)	0.02	0.02	0.02	0.02	0.67 ^a
	Adjusted THC (PPM)	0.01	0.01	0.01	0.01	
Freon 22	TO-15 (PPM)	8.34	2.83	0.00	3.72	0.48 ^a
	Adjusted THC (PPM)	3.98	1.35	0.00	1.78	
Freon 12	TO-15 (PPM)	0.88	0.41	0.89	0.73	1.18 ^a
	Adjusted THC (PPM)	1.03	0.48	1.05	0.85	
Freon 152a	TO-15 (PPM)	0.00	3.84	1.56	1.80	1.15 ^a
	Adjusted THC (PPM)	0.00	4.42	1.79	2.07	
Freon 134a	TO-15 (PPM)	0.02	0.02	0.02	0.02	1.15 ^a
	Adjusted THC (PPM)	0.02	0.02	0.02	0.02	
Octamethylcyclotetrasiloxane	TO-15 (PPM)	2.14	0.00	0.00	0.71	1.15 ^b
	Adjusted THC (PPM)	2.46	0.00	0.00	0.82	
Acetone	TO-15 (PPM)	2.71	14.73	29.91	15.80	0.72 ^b
	Adjusted THC (PPM)	1.95	10.61	21.54	11.40	
Methylene Chloride	TO-15 (PPM)	0.22	0.18	0.18	0.20	1.00 ^b
	Adjusted THC (PPM)	0.24	0.20	0.20	0.20	
Tetrachloroethylene	TO-15 (PPM)	0.03	0.03	0.04	0.03	1.30 ^b
	Adjusted THC (PPM)	0.04	0.04	0.05	0.04	
Freon 11	TO-15 (PPM)	2.00	10.21	5.98	6.10	0.48 ^c
	Adjusted THC (PPM)	0.95	4.87	2.85	2.90	
Methane	TO-15 (PPM)	3.29	3.10	3.40	3.26	0.33
	Adjusted THC (PPM)	1.10	1.03	1.13	1.09	
Ethane	TO-15 (PPM)	0.63	0.45	0.46	0.51	0.66
	Adjusted THC (PPM)	0.42	0.30	0.30	0.34	
Total THC from VOC Exempt Compounds		12.20	23.33	28.94	21.52	

a. Measured instrument response factor.

b. Instrument response factor from instrument manufacturer.

c. Instrument response factor for Freon 11 is conservatively assumed to be equal to the response factor for Freon 22.

d. See Appendix C of Stack Test Group THC Test Report attached in Appendix A of this document for details.

Uncorrected THC	PPM	281.0	169.9	270.3	240.4
Corrected THC	PPM	268.8	146.6	241.4	218.9

2.1.2 Process and Control Equipment Data – THC Testing

The following presents the process and control equipment data recorded during the test.

Shredder Feed Rate:

Table 2-3 presents a summary of shredder feed rate. A calibrated belt scale measures the total ferrous metal produced by the shredding operation. Based on recent facility operating data, the ferrous production rate is multiplied by a factor of 1.33 to estimate the gross shredder feed rate.

Table 2-3
Summary of Shredder Feed Rates for THC Emission Testing
General Iron Industries - Chicago, Illinois

Parameter	Units	Test Data from May 25, 2018			
		Run 1	Run 2	Run 3	Average
Pollutant		THC	THC	THC	THC
Test Method:		25A	25A	25A	25A
Start Time:		8:35 AM	9:49 AM	11:05 AM	
Stop Time:		9:35 AM	10:49 AM	12:26 PM	
Interruptions:		None	None	Note 1	
Duration:	minutes	60.0	60.0	60.0	60.0
Ferrous Metal Produced During Test Run	tons/hour	298	293	289	293
Factor to Convert Ferrous Produced to Gross Shredder Feed Rate	$\frac{\text{ton of gross feed}}{\text{ton of ferrous produced}}$	1.33	1.33	1.33	1.33
Hourly Gross Feed Rate to Shredder	tons/hour	396.3	389.7	384.4	390.1
Number of ELVs ² Processed During Three Test Runs		189.00			
Average Weight of ELVs Processed ³	ton/ELV	1.32			
Tons of ELVs Fed	tons	248.9			
Average Weight of ELVs Fed as % of Gross Shredder Feed	%	21.3%			

- Run 3 testing was interrupted twice due to loss of feed to the shredder;
 - 11:19 to 11:30 AM (11-minutes) due to a feed roll jam
 - 11:33 to 11:43 AM (10-minutes) due to a feed discharge conveyor jam.

2. ELV = End of Life Vehicle.

- A total of 201 ELVs (264.75-tons) were stockpiled for this test. These values were derived from summing the number of ELVs and corresponding weight of each load of ELVs. These data demonstrate that the average weight of ELVs stockpiled for this test was 1.32-tons.

End of life vehicles (ELVs) were fed to the shredder during this test. Based on recent operating data, the facility estimates that approximately 20% of total shredder feed is comprised of ELVs. The goal during this test was for ELVs to make up approximately 20% of the gross shredder feed rate.

ELVs were stockpiled for this test. The gross weight and number of ELVs in each incoming load of ELVs placed in the stockpile was recorded. A total of 201 ELVs weighing 264.75 tons were stockpiled for processing during the THC testing. The average weight of ELVs in this stockpile was 1.32 tons.

Ferrous production is electronically monitored in the control room from a totalizer on the calibrated belt scale. The value from the totalizer was manually recorded at the start and end of each test to identify the total mass of ferrous scrap produced. This value was multiplied by the conversion factor of 1.33 to

estimate the gross shredder feed rate. During testing, the number of cars fed to the shredder was manually recorded. A total of 189 cars (248.9 tons) were fed to the shredder during the three THC test runs.

As shown in Table 2-3 above, the total tons of material processed during the three tests was 1,170.4 tons, which included 248.94 tons of ELVs. Based on the above, ELVs comprised 21.3% of the total mass of material process in the shredder. This is consistent with recent levels of ELV processing.

Shredder Water Injection:

Water is injected into the shredder as a safety measure. Heat from shredding converts the water to steam. The steam expands to displace ambient air from the interior of the shredder to reduce the volume of oxygen in the shredder to minimize the potential for deflagrations. The water feed rate is manually controlled such that the non-metal material discharged from the shredder contains some moisture. Water feed rate was manually recorded during the THC emissions tests. The average water injection rates from each THC test is shown in Table 2-4 below.

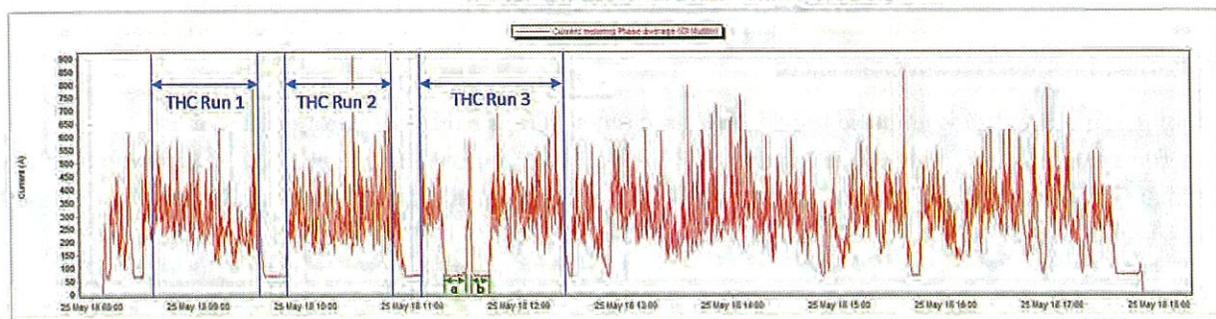
Table 2-4
Shredder Water Injection Rates
General Iron Industries - Chicago, Illinois

Test	Date	gpm
Run 1	5/25/18	42
Run 2	5/25/18	41
Run 3	5/25/18	41

Shredder Motor Amperage:

The amperage of the electric motor that powers the shredder is electronically recorded. Motor amperage is a function of the type and rate of material fed to the shredder. As shown in Table 2-5 below, the motor amperage indicates that the type and rate of material fed to the shredder was consistent during all three THC test runs.

Table 2-5 Shredder Motor Amperage
General Iron Industries - Chicago, Illinois



Shredder Emissions Capture:

An emissions capture hood is suspended over the top of the shredder. The hood is equipped with rubber curtains that extend downward to the top of the shredder to minimize the open area. The only opening to atmosphere is at the shredder feed chute, which is blocked by the feed rolls and incoming material. The placement of the hood and the air flow is maintained to minimize the amount of steam escaping the hood.

Although it is not possible to directly, or indirectly, measure the capture efficiency of the hood, it was the opinion of the USEPA and IEPA inspectors observing the test, that the hood appeared to provide > 95% capture of steam created in the shredder.

2.1.3 Errors During Testing – THC Testing

There were no errors during THC emission testing.

2.1.4 Deviation of Reference Test Methods – THC Testing

There were no deviations from the reference test methods as described in the approved test protocol.

2.1.5 Production Rates During Testing – THC Testing

The shredder production rate during THC testing is presented in Section 2.1.2 above.

2.2 PM/Metals Emissions

2.2.1 PM/Metals Test Results

PM/Metals emissions testing was performed using a single Method 29 sampling apparatus. Combining PM and Metals into a single test apparatus was approved by USEPA and IEPA observers on site at the initiation of testing on June 13, 2018. PM/Metals emissions testing was performed by Montrose Air Quality Services on June 13 and 14, 2018. Detailed information from sample collection and analyses is presented in the Montrose Air Quality Services test report presented in Appendix B of this document.

Table 2-6 below presents a summary of PM and Metals emissions testing including the shredder feed rate. PM emission rates averaged 1.9 lb/hr, which is significantly below the permitted PM emission limits from the current Lifetime Operation Permit of 67 lb/hr.

All of the filterable PM is assumed to be PM₁₀ based on the performance of the roll media filter; therefore, measured filterable PM is assumed to be PM₁₀. The reported hourly PM/PM₁₀ emission rate of 1.9 lb/hr is also significantly below the permitted PM₁₀ emission limit from the current Lifetime Operation Permit of 34 lb/hr.

Table 2-6 Shredder PM/Metals Emissions Summary - June 13 & 14, 2018
General Iron Industries - Chicago, Illinois

Parameter	June 13, 2018	June 13, 2018	June 13, 2018	June 14, 2018	June 14, 2018	Average Runs 1, 2, 4, 5 lb/hr
	Run 1 lb/hr	Run 2 lb/hr	Run 3 lb/hr	Run 4 lb/hr	Run 5 lb/hr	
Start Time:	11:49	15:15	Run 3 failed the post test leak check due to a broken glass probe liner. With the concurrence of the IEPA observer on site to witness the leak check, Run 3 was deemed to be invalid and samples were not submitted for analysis.	10:56	13:45	
End Time:	13:40	17:09		12:45	15:33	
Particulate	1.55	2.09		2.21	1.75	1.90
Antimony	0.0000667	0.0000874		0.0000778	0.0000504	0.0000706
Arsenic	0.0000300	0.0000351		<0.0000238	<0.0000237	0.0000282
Barium	0.000551	0.00109		0.000469	0.000411	0.000630
Beryllium	<0.00000583	<0.00000583		<0.00000595	<0.00000592	<0.0000059
Cadmium	0.000398	0.000231		0.000226	0.000188	0.0002608
Chromium	0.000288	0.000365		0.000289	0.000235	0.0002943
Cobalt	<0.0000233	0.0000318		<0.0000238	<0.0000237	0.0000257
Copper	0.000315	0.000714		0.000369	0.00109	0.0006220
Lead	0.00105	0.00171		0.00114	0.000727	0.0011568
Manganese	0.000857	0.00111		0.00114	0.000738	0.0009613
Nickel	0.000349	0.000588		0.000284	0.000198	0.000355
Phosphorus	0.00388	0.00451		0.00319	0.00292	0.00363
Selenium	0.000149	0.000269		<0.0000238	0.0000434	0.0001213
Thallium	<0.0000233	<0.0000233		<0.0000238	<0.0000237	<0.0000235
Silver	0.0000233	0.0000233		0.000337	<0.0000237	0.0001018
Zinc	0.0705	0.0795		0.0654	0.0563	0.0679
Mercury	0.0291	0.0117		0.0368	0.00243	0.0200

Table 2-7 identifies the average shredder feed rate from Runs 1, 2, 4, and 5.

**Table 2-7 Summary of Shredder Feed Rates for PM and Metals Emission Testing
General Iron Industries - Chicago, Illinois**

Parameter	Units	Test Data from June 13 & 14, 2018				
		Run 1	Run 2	Run 4	Run 5	Average
Pollutant		PM/Metals	PM/Metals	PM/Metals	PM/Metals	PM/Metals
Test Method:		M29	M29	M29	M29	M29
Start Time:		11:49 AM	3:15 PM	10:56 AM	1:45 PM	
Stop Time:		1:40 PM	5:09 PM	12:45 PM	3:33 PM	
Test Run Duration (includes traverse change)		111.0	114.0	109.0	108.0	
Sample Collection Time	minutes	96.0	96.0	96.0	96.0	
Shredder Feed Interruptions		None	None	None	None	
Hourly Rate of Ferrous Metal Production	tons/hour	303.38	303.89	300.00	304.04	302.83
Factor to Convert Ferrous Produced to Gross Shredder Feed	$\frac{\text{ton of gross feed}}{\text{ton of ferrous produced}}$	1.33	1.33	1.33	1.33	1.33
Gross Feed to Shredder During Testing Period	tons/hour	403.50	404.18	399.00	404.37	402.76
Hourly Rate of ELVs ¹ Fed to Shredder	tons/hour	70.33	74.08	91.10	85.05	80.14
ELVs Fed as % of Gross Shredder Feed	%	17.4%	18.3%	22.8%	21.0%	19.9%
Average Weight of ELVs Processed ³	ton/ELV	1.46	1.45	1.44	1.55	1.48
No. of ELVs Fed	# of ELVs	89	97	118	95	100

1. ELV = End of Life Vehicle.

As shown in Table 2-7 above, the demonstrated gross shredder feed rates were consistent with the targeted gross feed rate of 400 tph. ELVs ranged from 17.4% of gross shredder feed in Run 1 to 22.8% of gross shredder feed in Run 4. The average ELV feed rate was 19.9% of the gross shredder feed rate, which was consistent with the targeted ELV feed rate of 20%.

PM and Metals emission factors were calculated by dividing the average hourly emission rate by the average hourly shredder gross feed rate. Table 2-9 presents a summary of PM and Metal emission factors.

The PM and Metal emission factors in Table 2-8 can be combined with the past maximum actual annual shredder feed rate identified in Section 2.1.1 above to estimate maximum annual emissions from the shredder.

**Table 2-8 Shredder PM/Metals Emission Factors
General Iron Industries - Chicago, Illinois**

Parameter	June 13, 2018 Run 1 lb/ton of Feed	June 13, 2018 Run 2 lb/ton of Feed	June 13, 2018 Run 3 lb/ton of Feed	June 14, 2018 Run 4 lb/ton of Feed	June 14, 2018 Run 5 lb/ton of Feed	Average Runs 1, 2, 4, 5 lb/ton of Feed
Shredder Feed Rate (tph)	403.50	404.18		399.00	404.37	402.76
Particulate	3.84E-03	5.17E-03		5.54E-03	4.33E-03	4.72E-03
Antimony	1.65E-07	2.16E-07		1.95E-07	1.25E-07	1.75E-07
Arsenic	7.43E-08	8.68E-08		5.96E-08	5.86E-08	6.99E-08
Barium	1.37E-06	2.70E-06		1.18E-06	1.02E-06	1.56E-06
Beryllium	1.44E-08	1.44E-08		1.49E-08	1.46E-08	1.46E-08
Cadmium	9.86E-07	5.72E-07		5.66E-07	4.65E-07	6.47E-07
Chromium	7.14E-07	9.03E-07		7.24E-07	5.81E-07	7.31E-07
Cobalt	5.77E-08	7.87E-08		5.96E-08	5.86E-08	6.37E-08
Copper	7.81E-07	1.77E-06		9.25E-07	2.70E-06	1.54E-06
Lead	2.60E-06	4.23E-06		2.86E-06	1.80E-06	2.87E-06
Manganese	2.12E-06	2.75E-06		2.86E-06	1.83E-06	2.39E-06
Nickel	8.65E-07	1.45E-06		7.12E-07	4.90E-07	8.80E-07
Phosphorus	9.62E-06	1.12E-05		7.99E-06	7.22E-06	9.00E-06
Selenium	3.69E-07	6.66E-07		5.96E-08	1.07E-07	3.00E-07
Thallium	5.77E-08	5.76E-08		5.96E-08	5.86E-08	5.84E-08
Silver	5.77E-08	5.76E-08		8.45E-07	5.86E-08	2.55E-07
Zinc	1.75E-04	1.97E-04		1.64E-04	1.39E-04	1.69E-04
Mercury	7.21E-05	2.89E-05		9.22E-05	6.01E-06	4.98E-05

2.2.2 Process and Control Equipment Data – PM/Metals Emissions Testing

The following presents the process and control equipment data recorded during the PM/Metals emissions testing.

Shredder Feed Rate:

Table 2-7 above, presents a summary of shredder feed rate. A calibrated belt scale measures the total ferrous metal produced by the shredding operation. Based on recent facility operating data, the ferrous production rate is multiplied by a factor of 1.33 to estimate the gross shredder feed rate.

End of life vehicles (ELVs) were fed to the shredder during this test. Based on recent operating data, the facility estimates that approximately 20% of total shredder feed is comprised of ELVs. The goal during this test was for ELVs to make up approximately 20% of the gross shredder feed rate.

ELVs were stockpiled for these tests. The gross weight and number of ELVs in each incoming load of ELVs placed in the stockpile was recorded.

Ferrous production is electronically monitored in the control room from a totalizer on the calibrated belt scale. The value from the totalizer was manually recorded at the start and end of each test to identify the total mass of ferrous scrap produced. This value was multiplied by the conversion factor of 1.33 to estimate the gross shredder feed rate. During testing, the number of cars fed to the shredder was manually recorded. A total of 320.42 tons of ELVs were fed to the shredder during the four PM/Metals test runs.

The total tons of material shredded during the four PM/Metals tests was 1,611.05 tons, which included 320.42 tons of ELVs. Based on the above, ELVs comprised 19.9% of the total mass of material processed in the shredder. This is consistent with recent ELV processing rates.

Shredder Water Injection:

Water is injected into the shredder as a safety measure. Heat from shredding converts the water to steam. The steam expands to displace ambient air from the interior of the shredder to reduce the volume of oxygen in the shredder to minimize the potential for deflagrations. The water feed rate is manually controlled such that the non-metal material discharged from the shredder contains some moisture. Water feed rate was manually recorded during the PM/Metals emissions tests. The average water injection rates from each PM/metals emission test is shown in Table 2-9 below.

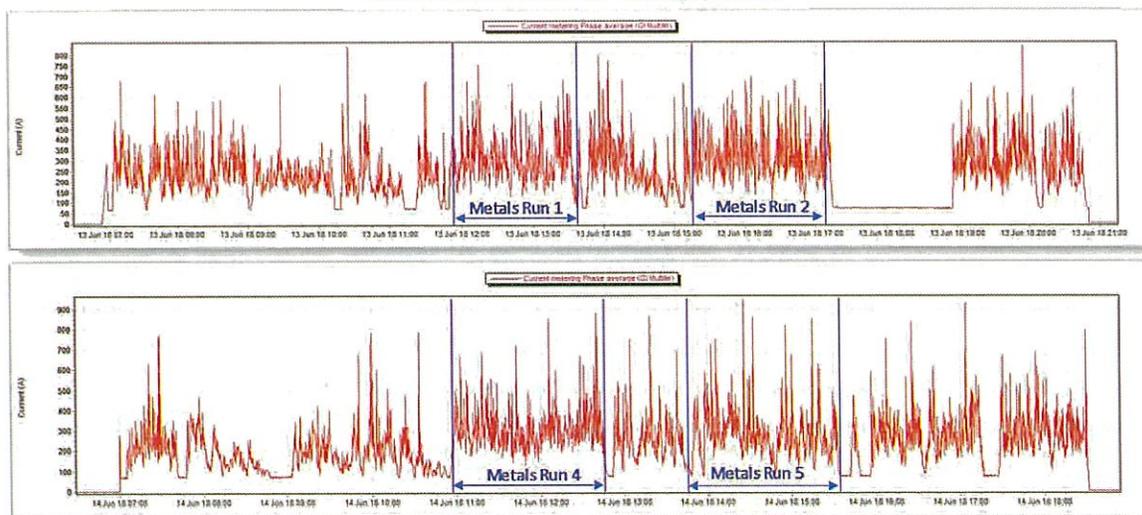
Table 2-9
Shredder Water Injection Rates
PM/Metals Emission Testing
General Iron Industries - Chicago, Illinois

Test	Date	gpm
Run 1	6/13/18	45
Run 2	6/13/18	47
Run 4	6/14/18	45
Run 5	6/14/18	46

Shredder Motor Amperage:

The amperage of the electric motor that powers the shredder is electronically recorded. Motor amperage is a function of the type and rate of material fed to the shredder. As shown in Table 2-10 below, the motor amperage indicates that the type and rate of material fed to the shredder was consistent during all four PM/Metals test runs.

Table 2-10 Shredder Motor Amperage
PM/Metals Emissions Testing - June 13 & 14, 2018
General Iron Industries - Chicago, Illinois



Shredder Emissions Capture:

An emissions capture hood is suspended over the top of the shredder. The hood is equipped with rubber curtains that extend downward to the top of the shredder to minimize the open area. The only opening to atmosphere is at the shredder feed chute, which is blocked by the feed rolls and incoming material. The placement of the hood and the air flow is maintained to minimize the amount of steam escaping the hood.

Although it is not possible to directly, or indirectly, measure the capture efficiency of the hood, it was the opinion of the USEPA and IEPA inspectors observing the test, that the hood appeared to provide > 95% capture of steam created in the shredder.

2.2.3 Errors During Testing – PM/Metals

There were no process errors or upsets during PM/Metals emissions testing.

During Test Run 2, an operator mistakenly advanced the roll filter material approximately three times further than when the filter material is advanced automatically. Because there were no obvious visual indications that the samples were affected by this error, a decision was made to send the Run 2 samples for analysis and conduct a fourth test run in the event that analytical results confirmed that this error negatively impacted the samples. In the event that analysis confirmed no impacts to Run 2, the test would include the results of all four test runs in the reported average results. The USEPA and IEPA observers present during Run 2 concurred with this decision.

Test Run No. 3 was performed on June 13, 2018, however, the post-test leak check failed due to a broken glass liner in the sampling probe. A failed leak check indicates that ambient air may have been leaking into the sampling apparatus diluting or replacing process exhaust gas. Due to the failed leak check, this run was considered invalid and the samples were not sent for analysis. The IEPA observer, present at the time of the leak check concurred with this conclusion and agreed that the samples should not be sent for analysis.

There were no other errors identified during the PM /Metals emissions testing.

2.2.4 Deviation of Reference Test Methods – PM/Metals

Prior to the initiation of PM/Metals emissions testing, the USEPA and IEPA observers were consulted to request approval to measure PM emissions as part of the Method 29 Metals test to eliminate the need to perform a separate Method 5 test for PM. Combining PM and Metals in a single Method 29 test is done routinely, has no impact on the validity of either test, and is not prohibited by Method 29. When PM and Metals are combined in a Method 29 test, the filter and front half probe are first dried and weighed to obtain the PM emissions data and are then digested and analyzed for metals in accordance with Method 29. Upon receipt of verbal approval from both the USEPA and IEPA observers, a single Method 29 test was performed to measure both PM and Metals. Based on the above, this change was not a deviation from the reference method but was a deviation from the protocol.

There were no other deviations from the reference test methods as described in the approved test protocol.

2.2.5 Production Rates During Testing – PM/Metals

The shredder production rate during PM and Metals emissions testing is presented in Section 2.2.2 above.

2.2.6 Metals Audit Samples

A total selected metals (TSM) audit sample, prepared by ERA, was sent to the laboratory selected for analysis with the metals test samples. The purpose of the audit sample is to evaluate the accuracy of the analytical results. Detailed results from analysis of the audit sample are presented in Montrose Air Quality Services' report in Appendix B of this document.

The results of the audit sample were 'Acceptable' for all metals with the exception of Cadmium. The term 'Acceptable' as used above refers only to the accuracy and reliability of the analytical results and do not infer noncompliance with any applicable limit. The audit sample was prepared with 20.6 ug/filter of cadmium and required an analytical response of 16.5 to 24.7 ug/filter. The reported value from the lab was 16 ug/filter, which is just below the minimum required response. ERA verbally reported the result to Kevin Mattison of IEPA.

It is our understanding that the metals laboratory will conduct additional analyses to determine the potential source of the error. It is possible that the cadmium results reported in this document may be adjusted slightly based on any correction factor that may be identified. In the event that the reported cadmium results require adjustment, a supplemental report will be prepared and submitted to USEPA and IEPA. Because the error was so small, Kevin Mattison of IEPA indicated that any change to the reported cadmium emission rates would be minimal.

All other metals in the audit sample had an "Acceptable Result."



3.0 FACILITY OPERATIONS

The following information presents a process description of the hammermill shredder and roll filter particulate control device operated during THC and Metals emissions testing.

3.1 Hammermill Shredder and Operating Parameters

The actual shredder feed rate is dependent on the type and consistency of the feed material and the ability to consistently feed the mixed recyclable metal to the shredder. Based on monthly shredder operating data (monthly tons of material processed and daily operating hours) previously submitted to USEPA in response to the 114 Information Request, during the period of July 2012 through December 2017, the average gross shredder feed rate was approximately 313.9 tph. This value more accurately represents long term operation of the shredder.

During the limited testing period, General Iron selected a target gross shredder feed rate of 400 tph (with 20% comprised of ELVs). Data presented in Sections 2.1.2 and 2.2.2 of this test report demonstrate that the facility met its targeted feed rate. It should be noted however, that it is not possible to sustain a feed rate of 400 tph over a long period of time because the amount of material entering the facility on a day-to-day basis is not sufficient to sustain this rate.

Based on recent operating data, the facility estimates that shredder feed is comprised of approximately 20% end of life vehicles (ELVs) and 80% mixed recyclable metal. Shredded metal is discharged by conveyor and travels over two drum magnets, to separate ferrous and non-ferrous metal. Ferrous metal is then routed through a Z-Box separator to remove any remaining light materials. Metal discharged from the Z-Box separator is then conveyed to stockpiles. In the Z-Box separator, shredded metal passes through a rising column of air. A fan and ducting system maintains an upward flow of air through the Z-Box (counter current to the direction of the shredded metal). Shredded metal falls downward through the rising column of air and is discharged at the bottom of the Z-Box over a conveyORIZED belt scale. The belt scale measures the net mass of shredded metal produced (tph). The amount of ferrous metal produced is multiplied by a factor of 1.33, based on recent operating data, to estimate the gross shredder feed rate.

The upward flow of air through the Z-Box removes light material. The air stream carries this light material to an integral cyclone that disengages the material from the air stream. Light material is discharged from the bottom of the cyclone where it is collected for further processing. The majority of the air exiting from the top of the cyclone is recycled through the fan, back to the bottom of the Z-Box.

The shredder is equipped with an integral water injection system to minimize the potential for fires and deflagrations within the shredder. The shredder is located within an enclosure consisting of curtain walls on four sides, and solid plate and metal grating on the roof. The water injection rate is monitored by a flow meter and the flow rate is electronically recorded.



A flow diagram of the shredder is presented in Figure 3.

3.2 Cyclone and Roll Filter PM Control System

An exhaust hood, located above the shredder, is equipped with rubber curtains extending downward to the top of the shredder to enhance emissions capture efficiency. An induced draft fan draws exhaust from the shredder through the exhaust hood, a cyclone and roll media filter for control of particulate matter before being discharged to the atmosphere.

The roll filter is essentially a rectangular section of duct measuring approximately 18 ft by 6 ft. A roll of unused filter material is placed on the supply side of the filter media system and fed through the rectangular section of duct to a take-up roll. The unit is designed so that the air flow passes downward through the filter. The filter periodically advances automatically.

3.3 Shredder Throughput

The feed rate of the shredder is monitored by measuring the production of ferrous metal. A material conversion factor is used to convert ferrous metal produced to gross shredder feed rate. A discussion of the demonstrated shredder feed rate with respect to shredder throughput is presented in Section 3.1 above.



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Process Description and Proposed Operating Conditions

Hammermill Shredder Flow Diagram

- A. Shredder Feed Conveyor
- B. Shredder Enclosure
- C. Z-Box
- D. Z-Box Cyclone
- E. Shredder Exhaust Cyclone
- F. Shredder Exhaust Roll media filter and Induced Draft Fan
- G. Test Ports on Horizontal Duct
- H. Ferrous Material Belt Scale
- I. Shredder Exhaust
(exhaust gases discharge to the interior of the shredder enclosure and are released to the atmosphere through an area of expanded metal grating on the roof of the shredder enclosure)



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COMMENTS: Shredder Emissions Test Report Total Hydrocarbons, Particulate, and Metals		Shredder Flow Diagram General Iron Industries, Inc. – Chicago, Illinois		FIGURE 3
DRAWN BY:	APPROVED BY: JGP	PROJECT NUMBER: R17421-3	DATE DRAWN: 06-2018	REVISED DATE:



4.0 SAMPLING AND ANALYTICAL PROCEDURES

Sampling and analytical procedures are presented in the THC and PM/Metals test reports presented in Appendix A and B of this document.

4.1 THC Emission Testing

The required detailed sampling and analytical data for THC emission testing is presented in Stack Test Group's detailed test reports presented in Appendix A of this document.

4.2 PM/Metals Emissions Testing

The required detailed sampling and analytical data for PM/Metals emissions testing is presented in Montrose Environmental Service's detailed test reports presented in Appendix B of this document.

4.3 Appendices (detailed testing information)

The required detailed sampling and analytical data for the THC and PM/Metals tests are presented in the detailed test reports presented in Appendix A and B of this document respectively.

5.0 HEALTH EFFECTS SCREENING FOR METALS

The test results required by the USEPA information request are presented in Section 2.2 of this report. General Iron has voluntarily decided to surpass the USEPA testing requirements and provide the following impact assessment for the metals emissions on the surrounding community.

There are no IEPA or USEPA regulations limiting emissions of specific metals or requiring an ambient impact analysis. In an effort to identify a standard for metals emissions, regulations from other states in Region V were reviewed. The State of Wisconsin has a 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. Wisconsin's air toxics rule (NR 445) sets health-based emission standards for about 550 air toxics, also known as hazardous air pollutants (HAPs), to protect people from air emissions that are known or suspected to cause cancer or other serious health problems. These problems include asthma, respiratory damage, kidney failure, heart failure, infertility, and birth defects. Facilities seeking an air emissions permit in Wisconsin must demonstrate compliance with applicable requirements of this rule in a construction permit application.

NR 445 can be used as a screening tool to assess the potential impacts from metals emissions from the shredder. 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.

The results of this analysis show that metals emissions from the shredder are far below the health-based standards identified in NR 445.

In order to use NR 445 as a screening tool for metals emissions from the shredder, the estimated off-site impacts must be identified. For this purpose, and in accordance with NR 445, an air dispersion modeling analysis was performed as described in Section 5.1 below.

5.1 Air Dispersion Modeling

EPA refined dispersion model, AERMOD (version 16216r), was used to predict maximum off-site concentrations of the metals identified by the recent air emission testing program described herein.

Commercially available hourly meteorological data for the years 2012 through 2016, measured at Midway Airport, was used for modeling to predict the maximum 1-Hr, 24-Hr, and annual average concentrations ($\mu\text{g}/\text{m}^3$) of each identified organic compound and metals.

Each of General Iron's buildings on the site was set up in the model to take into account building wake effects. Based on the orientation of the shredder exhaust stack, and on advice of IEPA air dispersion



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Health Effects Screening for Metals

modeling experts, the shredder emissions were modeled as a volume source with a unitized pollutant emission rate of 1 lb/hr. Particulate deposition was not included in this modeling analysis. Modeling of shredder emissions was performed using the average shredder feed rate demonstrated during the period of July 2012 through December 2017.

A total 5,568 receptors were identified in the model by establishing a rectangular receptor, centered on the shredder emission point, with grid with spacing of 25-m from the property line out to 500-m and a spacing of 100-m from a distance of 500-m to 2,500-m from the property line. Receptors were also placed on the property line. Based on our experience, this receptor grid was extended to a distance that would ensure that the maximum off-site impacts would be identified (i.e. a maximum ground level impact would not occur further than 2,500-meters from the property line.)

In all cases, the modeling results identified the point of maximum impact at or near the property line. Based on principles of air dispersion modeling, the mathematical relationship between the mass emission rate (lb/hr) from the stack and the maximum off site impact concentration ($\mu\text{g}/\text{m}^3$) is identical for all pollutants. Therefore, the off-site impacts for any pollutant can be determined simply by multiplying the predicted off-site impact concentration ($\mu\text{g}/\text{m}^3$) by the measured mass emission rate in lbs/hr. If the measured mass pollution emission rate is 2 lb/hr, the predicted impact would be twice as much as the modeled impact at an emission rate of 1 lb/hr. The predicted pollutant-specific impacts can then be compared to concentration-based standards, such as those in NR 445.

5.2 WDNR's NR 445 Standards for Metals

According to NR 445.08(2)(b)(c), for each hazardous air contaminant, a permittee shall either limit the ambient air concentration off the source property to less than the ambient air standard concentration allowed under column (g) of the Tables A or B of s. NR 445.07; or not cause an ambient air concentration off the source property that results in an inhalation impact greater than 1×10^{-6} . Specific compounds may have more than one standard based on a non-carcinogenic and carcinogenic health effects.

5.2.1 Non-Carcinogenic Metals

According to NR 445.08(2)(b), for acute and chronic non-carcinogens, any air toxic pollutant that has a standard expressed as an ambient air concentration in Table A or B of s. NR 445.07, the off-property ambient air concentration must be less than the maximum allowable concentration identified in column (g) of the tables.

The modeled maximum off-site concentrations were compared with the allowable concentration ($\mu\text{g}/\text{m}^3$) in column (g) of NR 445 for the corresponding averaging time period listed in column (h). The results of this analysis show that metals emissions from the shredder are far below the health-based standards identified in NR 445.

5.2.2 Carcinogenic Metals

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 (1×10^{-6}).

The inhalation impact is determined by the following equation:

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

where:

inhalation impact concentration annual average is the annual average concentration of a contaminant in ($\mu\text{g}/\text{m}^3$)

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 ($\mu\text{g}/\text{m}^3$)⁻¹

The predicted (modeled) maximum annual concentrations were multiplied by the compounds corresponding unit risk factor, and then compared to a value of 1 in 1,000,000. The results of this analysis show that metals emissions from the shredder are far below the health-based standards identified in NR 445.

5.3 Comparison of Predicted Off-Site Metals Impacts with NR 445

Table 5-1 identifies the predicted maximum off-site metals impacts ($\mu\text{g}/\text{m}^3$) to the applicable NR 445 standards for non-carcinogenic and carcinogenic metals identified from the recent metals emissions testing. The measured metal emission rates were calculated using the actual average shredder feed rate demonstrated from July 2012 through December of 2017.

NR 445 identifies standards for all of the identified metals except lead, silver and zinc. The predicted maximum off-site concentrations of all other identified metals were far below the applicable NR 445 standards.

5.4 Conclusions

The results of this analysis show that metals emissions from the shredder are far below the health-based standards identified in NR 445.



Health Effects Screening for Metals

**Table 5-1 Comparison to NR 445 for Metals for Both Carcinogens and Non-Carcinogens
Shredder Metals Emissions from Testing Conducted June 13 & 14, 2018 - General Iron Industries - Chicago, Illinois
Using Average Metal Emission Rates from Runs 1, 2, 4, and 5 (all test runs)**

Metals	Shredder Metal Emission Test Results					Modeled Maximum Results ⁽³⁾		NR 445 Ambient Air Standard for Non-Carcinogens		NR 445 for Carcinogens			Complies with NR 445
	Mass Emission Rates Reflect Actual Average Shredder Feed Rate					24 Hour (ug/m ³)	Annual (ug/m ³)	24 Hour (ug/m ³)	Annual (ug/m ³)	Unit Risk Factor (ug/m ³) ⁻¹	Source	Inhalation Impact ⁽⁴⁾ < 1.0E-06	
	Run 1 6/13/2018 lb/hr	Run 2 6/13/2018 lb/hr	Run 4 6/14/2018 lb/hr	Run 5 6/14/2018 lb/hr	Average Runs 1,2,4,5 lb/hr								
	Modeled Maximum Impact for Unit Emission (1 lb/hr)					6.45135	0.64704						
Antimony	0.0000519	0.0000679	0.0000612	0.0000391	0.0000550	0.0004	0.00004	12.00	NA				Yes
Arsenic	0.0000233	0.0000273	0.0000187	0.0000184	0.0000219	0.0001	0.00001	NA	Carcinogen	0.00430	IRIS	6.10E-08	Yes
Barium	0.0004286	0.0008465	0.0003690	0.0003190	0.000491	0.0032	0.0003	12.00	NA				Yes
Beryllium	0.00000454	0.00000453	0.00000468	0.00000460	0.00000458	0.000030	0.000003	NA	Carcinogen 0.02	0.00240	IRIS	7.12E-09	Yes
Cadmium	0.0003096	0.0001794	0.0001778	0.0001459	0.000203	0.0013	0.0001	NA	Carcinogen	0.00180	IRIS	2.37E-07	Yes
Chromium ⁽¹⁾	0.000224	0.000283	0.000227	0.000182	0.000229	0.0015	0.0001	12.00	NA				Yes
Cobalt	0.0000181	0.0000247	0.0000187	0.0000184	0.0000200	0.0001	0.0000	0.48	NA				Yes
Copper	0.000245	0.000555	0.000290	0.000846	0.000484	0.0031	0.0003	24.00	NA				Yes
Lead ⁽²⁾	0.00082	0.00133	0.00090	0.00056	0.00090	0.0058	0.0006	NA	NA				NA
Manganese	0.000667	0.000862	0.000897	0.000573	0.000750	0.0048	0.0005	4.80	NA				Yes
Nickel	0.000272	0.000457	0.000223	0.000154	0.000276	0.0018	0.0002	NA	Carcinogen	0.00026	CAL	4.65E-08	Yes
Phosphorus	0.00302	0.00350	0.00251	0.00227	0.00282	0.0182	0.0018	2.43	NA				Yes
Selenium	0.000116	0.000209	0.000019	0.000034	0.000094	0.0006	0.0001	4.80	NA				Yes
Thallium	0.0000181	0.0000181	0.0000187	0.0000184	0.0000183	0.0001	0.00001	2.40	NA				Yes
Silver ⁽²⁾	0.0000181	0.0000181	0.0002651	0.0000184	0.0000799	0.0005	0.0001	NA	NA				NA
Zinc ⁽²⁾	0.0548	0.0617	0.0515	0.0437	0.0529	0.3415	0.0343	NA	NA				NA
Mercury	0.0226	0.0091	0.0290	0.0019	0.0156	0.1009	0.0101	0.60	0.30				Yes



**Shredder Emissions Test Report for
Total Hydrocarbons, Particulate, and Metals
General Iron Industries, Inc. – Chicago, Illinois
IEPA Bureau of Air Site ID No.: 031600BTB**

JUNE 25, 2018

APPENDIX A –

**Report of VOC Emission Testing on the Shredder Exhaust at
the General Iron Facility Located in Chicago, Illinois**

Prepared by Stack Test Group, Inc.



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**REPORT OF VOC EMISSION TESTING ON THE SHREDDER EXHAUST AT THE
GENERAL IRON FACILITY LOCATED IN CHICAGO, ILLINOIS**

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MAY 25, 2018
STACK TEST GROUP, INC. PROJECT NO. 18-3042

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1.0 EXECUTIVE SUMMARY

On May 25, 2018, The Stack Test Group, Inc. performed volatile organic compound (VOC) emission testing on the shredder exhaust at the General Iron facility located in Chicago, IL. Three one-hour tests were conducted on this source for the VOC emission testing. Presented below are the average results of these tests.

Shredder Exhaust Stack:

VOC Concentration:	240.4 PPM as Propane Uncorrected
VOC Concentration:	104.20 Pounds per Hour Uncorrected
VOC Concentration:	218.9 PPM as Propane Corrected*
VOC Concentration:	94.87 Pounds per Hour Corrected*

*VOC corrected refers to correcting for exempt compounds

2.0 INTRODUCTION

On May 25, 2018, The Stack Test Group, Inc. performed volatile organic compound (VOC) emission testing on the shredder exhaust at the General Iron facility located in Chicago, IL.

Testing was conducted while General Iron personnel operated the shredder and corresponding control equipment under normal conditions. A copy of the operating data is included.

Testing was conducted by Mr. Bill J. Byczynski, Mr. Nicholas Sergenti, Mr. Lee Kennedy and Mr. Benjamin Byczynski of the Stack Test Group, Inc. Testing was under the direction of Ms. Ann M. Zwick of Freeborn & Peters, LLC. Testing was witnessed by Mr. Kevin Mattison of the Illinois Environmental Protection Agency (IEPA) and Mr. Scott Connolly of the U.S. EPA.

A TO-15 sample was integrated simultaneously with the Method 25A testing. The samples were sent to the laboratory and analyzed for exempt VOC compounds per Method TO-15. A response factor was then developed on the FID used in this test series. The response factor for each compound was used in subtracting the exempt VOC compounds from the total VOC readings.

All testing followed the guidelines of U.S. EPA Reference Methods 1 through 4, 25A and TO-15. This report contains a summary of results for the above-mentioned tests and all the supporting field, process, and computer generated data.

At the beginning of the test series, the analyzer was calibrated and then checked for calibration error by introducing zero, low-range, mid-range and high-range calibration gases to the back of the analyzers. Before and after each individual test run, a system bias was performed by introducing a zero and mid-range propane calibration gas to the outlet of the probe. Calibration gases used were U.S. EPA Protocol 1 certified.

3.3.2 Sample Duration and Frequency

The Method 25A train samples were collected in triplicate with each test lasting sixty minutes in duration.

3.3.3 Calibrations

All sampling equipment was calibrated according to the procedures outlined in EPA Reference Method 25A. Copies of the FID calibrations are included in Appendix D.

4.0 TEST RESULTS

Presented in this section are the results of this test series. Test results are reported in Table 4.1. Table 4.1 reports the results for the shredder exhaust including stack gas temperature, percent carbon dioxide and oxygen, percent moisture, molecular weight of the stack gas dry and wet, velocity in feet per second (fps), and flow rate in actual cubic feet per minute (acfm), standard cubic feet per minute (scfm), and dry standard cubic feet per minute (dscfm).

Tables 4.1 also presents the VOC results for the shredder exhaust. The VOC results are presented in terms of parts per million as propane uncorrected, ppm as propane corrected, pounds per standard cubic feet (lb/scf), and pounds per hour (lb/hr). The exempt VOC compounds are also listed in Table 4.1 in terms of ppm. The exempt VOC compounds are subtracted from the total VOC uncorrected ppm to obtain the corrected ppm.

Copies of the calculations used to determine these emission rates may be found in Appendix A. Copies of the field data sheets are presented in Appendix B. Copies of equipment calibrations are presented in Appendix D.

Table 4.1
VOC Results
General Iron
Chicago, IL
05/25/18
Shredder Exhaust

Test No:	<u>T1</u>	<u>T2</u>	<u>T3</u>	<u>Avg.</u>
Start Time:	08:35 AM	09:49 AM	11:05 AM	
Finish Time:	09:35 AM	10:48 AM	12:26 PM	
Stack Gas Temperature, °F:	114.1	116.8	119.1	116.7
% Carbon Dioxide:	0.2	0.2	0.1	0.2
% Oxygen:	20.5	20.5	20.7	20.6
% Moisture:	4.10	3.77	3.86	3.91
Molecular Weight dry, lb/lb-Mole:	28.85	28.85	28.84	28.85
Molecular Weight wet, lb/lb-Mole:	28.41	28.44	28.42	28.42
Velocity and Flow Results:				
Average Stack Gas Velocity FPS:	85.33	86.43	87.20	86.32
Stack Gas Flow Rate, ACFM:	69,834	70,734	71,364	70,644
Stack Gas Flow Rate, SCFM:	62,834	63,341	63,654	63,276
Stack Gas Flow Rate, DSCF/HR:	3,615,492	3,657,182	3,671,800	3,648,158
Stack Gas Flow Rate, DSCFM:	60,258	60,953	61,197	60,803
VOC Results (Uncorrected):				
PPM as Propane:	281.0	169.9	270.3	240.4
LBS/DSCF:	3.21E-05	1.94E-05	3.09E-05	2.75E-05
LBS/HR (as Propane):	120.98	73.74	117.89	104.20
VOC Results (Corrected):				
PPM as Propane:	268.8	146.6	241.4	218.9
LBS/DSCF:	3.07E-05	1.67E-05	2.76E-05	2.50E-05
LBS/HR (as Propane):	115.72	63.61	105.27	94.87

B-37

R 000178

G10000214

APPENDIX A
SAMPLE CALCULATIONS

GENERAL IRON
CHICAGO, IL

STG PROJECT No: 18-3042

SAMPLE CALCULATIONS

The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

1. Volume of water collected (wscf)

$$V_{wstd} = (0.04707)(V_{lc})$$

Where:

V_{lc}	total volume of liquid collected in impingers and silica gel (ml)
V_{wstd}	volume of water collected at standard conditions (ft ³)
0.04707	conversion factor (ft ³ /ml)

2. Volume of gas metered, standard conditions (dscf)

$$V_{mstd} = \frac{(17.64)(V_m) \left(P_{bar} + \frac{\Delta H}{13.6} \right) (Y_d)}{(460 + T_m)}$$

Where:

P_{bar}	barometric pressure (in. Hg)
T_m	average dry gas meter temperature (°F)
V_m	volume of gas sample through the dry gas meter at meter conditions (ft ³)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft ³)
Y_d	gas meter correction factor (dimensionless)
ΔH	average pressure drop across meter box orifice (in. H ₂ O)
17.64	conversion factor (°R/in. Hg)
13.6	conversion factor (in. H ₂ O/in. Hg)
460	°F to °R conversion constant

GENERAL IRON
CHICAGO, IL

STG PROJECT No: 18-3042

SAMPLE CALCULATIONS (CONTINUED)

3. Volume of gas metered, standard conditions (dscm)

$$V_{mstd(m)} = \frac{(V_{mstd(ft)})}{35.35}$$

Where:

$V_{mstd(ft)}$	volume of gas sample through the dry gas meter at standard conditions (ft ³)
$V_{mstd(m)}$	volume of gas sample through the dry gas meter at standard conditions (m ³)
35.35	conversion factor (ft ³ to m ³)
13.6	conversion factor (in. H ₂ O/in. Hg)

4. Sample gas pressure (in. Hg)

$$P_s = P_{bar} + \left(\frac{P_g}{13.6} \right)$$

Where:

P_{bar}	barometric pressure (in. Hg)
P_g	sample gas static pressure (in. H ₂ O)
P_s	absolute sample gas pressure (in. Hg)
13.6	conversion factor (in. H ₂ O/in. Hg)

5. Actual vapor pressure (in. Hg)¹

$$P_v = P_s$$

Where:

P_v	vapor pressure, actual (in. Hg)
P_s	absolute sample gas pressure (in. Hg)

6. Moisture content (%)

$$B_{wo} = \frac{V_{wstd}}{V_{mstd} + V_{wstd}}$$

Where:

B_{wo}	proportion of water vapor in the gas stream by volume (%)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft ³)
V_{wstd}	volume of water collected at standard conditions (ft ³)

¹ For effluent gas temperatures over 212°F, P_v is assumed to be equal to P_s .

GENERAL IRON
CHICAGO, IL

STG PROJECT No: 18-3042

SAMPLE CALCULATIONS (CONTINUED)

7. Saturated moisture content (%)

$$B_{ws} = \frac{(P_v)}{(P_s)}$$

Where:

B_{ws}	proportion of water vapor in the gas stream by volume at saturated conditions (%)
P_s	absolute sample gas pressure (in. Hg)
P_v	vapor pressure, actual (in. Hg)

Whichever moisture value is smaller is used for B_{wo} in the following calculations.

8. Molecular weight of dry gas stream (lb/lb·mole)

$$M_d = M_{CO_2} \frac{(CO_2)}{(100)} + M_{O_2} \frac{(O_2)}{(100)} + M_{CO+N_2} \frac{(CO+N_2)}{(100)}$$

Where:

M_d	dry molecular weight of sample gas (lb/lb·mole)
M_{CO_2}	molecular weight of carbon dioxide (lb/lb·mole)
M_{O_2}	molecular weight of oxygen (lb/lb·mole)
M_{CO+N_2}	molecular weight of carbon monoxide and nitrogen (lb/lb·mole)
CO_2	proportion of carbon dioxide in the gas stream by volume (%)
O_2	proportion of oxygen in the gas stream by volume (%)
$CO+N_2$	proportion of carbon monoxide and nitrogen in the gas stream by volume (%)
100	conversion factor (%)

9. Molecular weight of sample gas (lb/lb·mole)

$$M_s = (M_d)(1 - B_{wo}) + (M_{H_2O})(B_{wo})$$

Where:

B_{wo}	proportion of water vapor in the gas stream by volume
M_d	dry molecular weight of sample gas (lb/lb·mole)
M_{H_2O}	molecular weight of water (lb/lb·mole)
M_s	molecular weight of sample gas, wet basis (lb/lb·mole)

GENERAL IRON
CHICAGO, IL

STG PROJECT No: 18-3042

SAMPLE CALCULATIONS (CONTINUED)

10. Velocity of sample gas (ft/sec)

$$V_s = (K_p)(C_p)(\sqrt{\Delta P}) \left(\sqrt{\frac{(T_s + 460)}{(M_s)(P_s)}} \right)$$

Where:

K_p	velocity pressure coefficient (dimensionless)
C_p	pitot tube constant
M_s	molecular weight of sample gas, wet basis (lb/lb·mole)
P_s	absolute sample gas pressure (in. Hg)
T_s	average sample gas temperature (°F)
V_s	sample gas velocity (ft/sec)
$\sqrt{\Delta P}$	average square roots of velocity heads of sample gas (in. H ₂ O)
460	°F to °R conversion constant

11. Total flow of sample gas (acfm)

$$Q_a = (60)(A_s)(V_s)$$

Where:

A_s	cross sectional area of sampling location (ft ²)
Q_a	volumetric flow rate at actual conditions (acfm)
V_s	sample gas velocity (ft/sec)
60	conversion factor (sec/min)

12. Total flow of sample gas (dscfm)

$$Q_{std} = \frac{(Q_a)(P_s)(17.64)(1 - B_{wo})}{(T_s + 460)}$$

Where:

B_{wo}	proportion of water vapor in the gas stream by volume
P_s	absolute sample gas pressure (in. Hg)
Q_a	volumetric flow rate at actual conditions (acfm)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
T_s	average sample gas temperature (°F)
17.64	conversion factor (°R/in. Hg)
460	°F to °R conversion constant

GENERAL IRON
CHICAGO, IL

STG PROJECT No: 18-3042

SAMPLE CALCULATIONS (CONTINUED)

13. VOC concentration (lb/scf)

$$E_{lb/scf} = \frac{(ppm)(MW)}{(385.3 \times 10^6)}$$

Where:

$E_{lb/scf}$	emission rate
C_{ppm}	measured concentration in the gas stream (ppm _v)
MW	molecular weight of NMP (99.13)
385.3	conversion factor

14. VOC emission (lb/hr)

$$E_{lb/hr} = (lb/scf)(60)(scfm)$$

Where:

$E_{lb/hr}$	emission rate
$E_{lb/scf}$	concentration
SCFM	flow rate
$60_{min/hr}$	conversion factor

APPENDIX B
FIELD DATA SHEETS

FLOW / MOISTURE DATA SHEET

Location: GENERAL IRON

Unit: SHLENDER

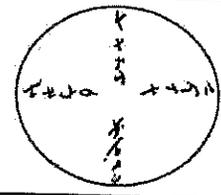
Run: 1

VOM Testing

Method 1-4, 25A

Inlet

Outlet

Client: <u>General Iron</u>	Meter Lk Ck Pre: <u>0.4 @ 23</u>		Bar. Press. (In. Hg): <u>29.33</u>
Plant: <u>CHICAGO IL</u>	Meter Lk Ck Post: <u>0.0 @ 6</u>		Pitot ID No.: <u>STG-7</u>
Meter Operator: <u>BR/MS</u>	Pitot Lk Ck: <u>+0.0 @ 7.1 -0.0 @ 6.6</u>		O ₂ (dry, vol. %): <u>SEE DATA</u>
Probe Operator: <u>LH</u>	Start Time (approx.): <u>0810 / 0835</u>		CO ₂ (dry, vol. %): <u>LOGGER</u>
Date: <u>5/25/18</u>	Stop Time (approx.): <u>9:35</u>		H ₂ O (condensate, ml): <u>34</u>
Meter Box No.: <u>70</u>	Static Press. (In. H ₂ O): <u>-0.81</u>		H ₂ O (silica gel, g): <u>6</u>
Y#: <u>0978</u>	Port Length (In.): <u>3.12</u>		Total H ₂ O: <u>40</u>
ΔH: <u>1.463</u>	First Point (all the way): <u>(In. H₂O)</u>	Duct Dimensions (In.): <u>50</u>	

Pre Velocity Traverse

Moisture Train

Post Velocity Traverse

Traverse Point Number	Pitot ΔP (In. H ₂ O)	Stack Temp. Ts (°F)	Milij/PL	Metered Vol. (ft ³)	Sample ΔH (In. H ₂ O)	Dry Gas Meter		Exit Temp. (°F)	Pump Vac (In. H ₂ O)	Pitot ΔP (In. H ₂ O)	Stack Temp. Ts (°F)	Notes
			5			Tmi (°F)	Tmo (°F)					
			Elapsed Time	<u>387.65</u>								
1	<u>2.1</u>	<u>112</u>	5	<u>375.81</u>	<u>1.5</u>	<u>71</u>	<u>70</u>	<u>55</u>	<u>3.0</u>	<u>1.4</u>	<u>116</u>	
2	<u>2.2</u>	<u>112</u>	10	<u>397.64</u>		<u>77</u>	<u>70</u>	<u>56</u>	<u>3.0</u>	<u>1.7</u>	<u>117</u>	
3	<u>2.2</u>	<u>112</u>	15	<u>399.46</u>		<u>74</u>	<u>72</u>	<u>55</u>	<u>3.0</u>	<u>1.7</u>	<u>117</u>	
4	<u>2.2</u>	<u>113</u>	20	<u>403.48</u>		<u>89</u>	<u>75</u>	<u>52</u>	<u>3.0</u>	<u>1.8</u>	<u>116</u>	
5	<u>2.2</u>	<u>113</u>	25	<u>407.29</u>		<u>96</u>	<u>77</u>	<u>54</u>	<u>3.0</u>	<u>1.7</u>	<u>116</u>	
6	<u>2.4</u>	<u>114</u>	30	<u>411.19</u>		<u>98</u>	<u>77</u>	<u>61</u>	<u>3.0</u>	<u>1.7</u>	<u>116</u>	
7	<u>2.5</u>	<u>114</u>	35	<u>415.13</u>		<u>98</u>	<u>80</u>	<u>62</u>	<u>3.0</u>	<u>1.9</u>	<u>117</u>	
8	<u>2.4</u>	<u>116</u>	40	<u>419.08</u>		<u>98</u>	<u>81</u>	<u>62</u>	<u>3.0</u>	<u>2.0</u>	<u>116</u>	
1	<u>2.2</u>	<u>104</u>	45	<u>423.04</u>		<u>98</u>	<u>82</u>	<u>63</u>	<u>3.0</u>	<u>1.5</u>	<u>118</u>	
2	<u>2.3</u>	<u>101</u>	50	<u>426.94</u>		<u>98</u>	<u>83</u>	<u>63</u>	<u>3.0</u>	<u>1.7</u>	<u>118</u>	
3	<u>2.4</u>	<u>108</u>	55	<u>431.01</u>		<u>98</u>	<u>84</u>	<u>64</u>	<u>3.0</u>	<u>1.6</u>	<u>118</u>	
4	<u>2.5</u>	<u>108</u>	60	<u>434.92</u>		<u>98</u>	<u>84</u>	<u>60</u>	<u>3.0</u>	<u>1.7</u>	<u>118</u>	
5	<u>2.5</u>	<u>109</u>								<u>1.8</u>	<u>118</u>	
6	<u>2.4</u>	<u>110</u>								<u>1.9</u>	<u>118</u>	
7	<u>2.4</u>	<u>108</u>								<u>2.0</u>	<u>118</u>	
8	<u>2.2</u>	<u>108</u>								<u>2.1</u>	<u>118</u>	

Avg.	<u>1.6222</u>	<u>110.94</u>	<u>1.50</u>	<u>84.50</u>	<u>1.3380</u>	<u>117.14</u>
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Stack Test Group, Inc.

1.4301

114.07

B-45

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G10000222

FLOW / MOISTURE DATA SHEET

Location: General Iron

Unit: Shredder

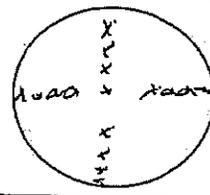
Inlet

Outlet

Run: 2

Jim Testing

Method 1-4, 25A

Client: <u>General Iron</u>	Meter Lk Ck Pre: <u>1.001 @ 18"</u>		Bar. Press. (In. Hg): <u>29.33</u>
Plant: <u>Chicago, IL</u>	Meter Lk Ck Post: <u>1.001 @ 6"</u>		Pitot ID No.: <u>576-7</u>
Meter Operator: <u>LWB</u>	Pitot Lk Ck: <u>1.00 @ 7.1 - .00 @ 6.6"</u>		O ₂ (dry, vol. %): <u>SEE</u>
Probe Operator: <u>LW</u>	Start Time (approx.): <u>9:44</u>		CO ₂ (dry, vol. %): <u>DATALOGGER</u>
Date: <u>5/23/14</u>	Stop Time (approx.): <u>10:49</u>		H ₂ O (condensate, ml): <u>37</u>
Meter Box No.: <u>70</u>	Static Press. (in. H ₂ O): <u>-0.41</u>		H ₂ O (silica gel, g): <u>308</u>
Yr: <u>0.978</u>	Port Length (in.): <u>8 in</u>	Total H ₂ O: <u>340</u>	
ΔH: <u>1.463</u>	First Point (all the way): (In) (out)	Duct Dimensions (In.): <u>5.0</u>	

Pre Velocity Traverse

Moisture Train

Post Velocity Traverse

Traverse Point Number	Pitot ΔP (in. H ₂ O)	Stack Temp. T _s (°F)	Moisture Train		Sample ΔH (in. H ₂ O)	Dry Gas Meter		Exit Temp. (°F)	Pump Vac (in. H ₂ O)	Pitot ΔP (in. H ₂ O)	Stack Temp. T _s (°F)	Notes
			Metered Vol. (ft ³)	Blanked Time		T _{mi} (°F)	T _{mo} (°F)					
1	1.9	116	435.04		1.2	85	85	50	2.0	1.6	113	
2	1.7	117	442.90			103	86	51	2.0	1.7	117	
3	1.7	117	446.57			103	86	51	2.0	1.9	119	
4	1.8	116	451.74			104	87	52	2.0	1.8	120	
5	1.7	116	455.86			103	88	53	2.0	2.0	120	
6	1.7	116	460.01			104	89	54	2.0	2.2	120	
7	1.9	117	464.17			103	89	56	2.0	2.0	120	
8	2.0	116	468.33			103	90	57	2.0	2.0	120	
1	1.5	118	472.56			103	90	58	2.0	2.0	111	
2	1.7	118	476.66			104	91	58	2.0	2.0	112	
3	1.6	118	480.89			104	92	60	2.0	1.8	118	
4	1.7	118	484.99			100	91	60	2.0	1.7	119	
5	1.8	118								1.6	119	
6	1.9	118								1.8	118	
7	2.0	118								1.9	109	
8	2.1	118								1.9	108	

Avg.	1.3380	117.19		95.04		15535	116.44
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1.4458

116.82

Stack Test Group, Inc.

R 000187

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FLOW / MOISTURE DATA SHEET

Location: General Iron

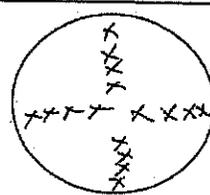
Unit: Shredder

Run: 3

VOM Testing

Method 1-4, ZSA

Inlet Outlet

Client: <u>General Iron</u>	Meter Lk Ck Pre: <u>.002 @ 20"</u>		Bar. Press. (In. Hg): <u>29.33</u>
Plant: <u>Chicago, IL</u>	Meter Lk Ck Post: <u>.002 @ 10"</u>		Pitot ID No.: <u>STG-7</u>
Meter Operator: <u>LW/BB</u>	Pitot Lk Ck: <u>+.00 @ 7.1 - .00 @ 6.6"</u>		O ₂ (dry, vol. %): <u>SEE</u>
Probe Operator: <u>LW</u>	Start Time (approx.): <u>11:05</u>		CO ₂ (dry, vol. %): <u>DATALOGGER</u>
Date: <u>5-25-13</u>	Stop Time (approx.): <u>12:26</u>		H ₂ O (condensate, ml): <u>30</u>
Meter Box No.: <u>70</u>	Static Press. (In. H ₂ O): <u>-0.81</u>		H ₂ O (silica gel, g): <u>9</u>
Yc: <u>0.978</u>	Port Length (in.): <u>9.1</u>		Total H ₂ O: <u>39</u>
ΔH: <u>1.463</u>	First Point (all the way): <u>(In) (Out)</u>	Duct Dimensions (in.): <u>60</u>	

Pre Velocity Traverse

Moisture Train

Post Velocity Traverse

Traverse Point Number	Pitot ΔP (In. H ₂ O)	Stack Temp (F)	Min/Max	Metered Vol. (ft ³)	Sample ΔH (In. H ₂ O)	Dry Gas Meter		Exit Temp (F)	Pump Vac (In. H ₂ O)	Pitot ΔP (In. H ₂ O)	Stack Temp (F)	Notes
			5			Time (F)	Time (F)					
			Blanked Time	<u>485.89</u>								
1	<u>1.6</u>	<u>113</u>	5	<u>489.92</u>	<u>1.5</u>	<u>101</u>	<u>91</u>	<u>53</u>	<u>3.0</u>	<u>1.9</u>	<u>120</u>	
2	<u>1.7</u>	<u>117</u>	10	<u>494.09</u>		<u>107</u>	<u>91</u>	<u>56</u>	<u>3.0</u>	<u>1.9</u>	<u>124</u>	
3	<u>1.9</u>	<u>119</u>	15	<u>498.25</u>		<u>108</u>	<u>92</u>	<u>57</u>	<u>3.0</u>	<u>1.7</u>	<u>124</u>	
4	<u>1.9</u>	<u>120</u>	20	<u>502.45</u>		<u>108</u>	<u>93</u>	<u>59</u>	<u>3.0</u>	<u>1.8</u>	<u>125</u>	
5	<u>2.0</u>	<u>120</u>	25	<u>506.67</u>		<u>104</u>	<u>93</u>	<u>61</u>	<u>3.0</u>	<u>1.7</u>	<u>125</u>	
6	<u>2.2</u>	<u>120</u>	30	<u>511.08</u>		<u>99</u>	<u>92</u>	<u>59</u>	<u>3.0</u>	<u>1.8</u>	<u>125</u>	
7	<u>2.2</u>	<u>120</u>	35	<u>515.24</u>		<u>107</u>	<u>93</u>	<u>64</u>	<u>3.0</u>	<u>1.7</u>	<u>125</u>	
8	<u>2.1</u>	<u>120</u>	40	<u>519.36</u>		<u>107</u>	<u>93</u>	<u>64</u>	<u>3.0</u>	<u>1.7</u>	<u>125</u>	
1	<u>2.0</u>	<u>111</u>	45	<u>523.50</u>		<u>106</u>	<u>94</u>	<u>63</u>	<u>3.0</u>	<u>2.0</u>	<u>125</u>	
2	<u>2.0</u>	<u>112</u>	50	<u>527.65</u>		<u>106</u>	<u>94</u>	<u>64</u>	<u>3.0</u>	<u>1.8</u>	<u>118</u>	
3	<u>1.8</u>	<u>114</u>	55	<u>531.82</u>		<u>106</u>	<u>95</u>	<u>64</u>	<u>3.0</u>	<u>1.6</u>	<u>120</u>	
4	<u>1.7</u>	<u>114</u>	60	<u>536.22</u>		<u>108</u>	<u>94</u>	<u>64</u>	<u>3.0</u>	<u>1.7</u>	<u>118</u>	
5	<u>1.6</u>	<u>119</u>								<u>2.0</u>	<u>119</u>	
6	<u>1.5</u>	<u>118</u>								<u>2.0</u>	<u>118</u>	
7	<u>1.9</u>	<u>109</u>								<u>2.0</u>	<u>118</u>	
8	<u>1.9</u>	<u>109</u>								<u>2.0</u>	<u>114</u>	

Avg.	<u>1.5635</u>	<u>116.44</u>			<u>99.68</u>	<u>123.10</u>	<u>121.75</u>
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1.4553

119.10

Stack Test Group, Inc.

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R 000188

G10000224

APPENDIX C
FIELD PARAMETER SHEET

STACK TEST GROUP, INC.
Air Quality Services

Exhaust VOC Sampling Train Calculations

Client: General Iron
Project No: 18-3042
Date: 05/25/18
Source: Shredder Exhaust

Test No:	T1	T2	T3	Avg.
Start Time:	08:35 AM	09:49 AM	11:05 AM	
Finish Time:	09:35 AM	10:48 AM	12:26 PM	
Pitot Cal. Factor:	0.84	0.84	0.84	
Meter Calibration Factor:	0.978	0.978	0.978	
Stack Length, inches:	0	0	0	
Stack Width, inches:	0	0	0	
Stack Diameter, inches:	50	50	50	
Barometric Pressure, inches Hg:	29.33	29.33	29.33	
Static Pressure in Stack, Inches H2O:	-0.81	-0.81	-0.81	
Duration of Sample, minutes:	60	60	60	
Meter Start Volume:	387.65	435.08	485.89	
Meter Final Volume:	434.92	484.98	536.22	
Average Meter Pressure, Inches H2O:	1.50	1.50	1.50	1.5000
Average Meter Temperature, degrees F:	84.5	95.04	99.58	93.0
Average Sqrt. Velocity Pressure:	1.4301	1.4458	1.4553	1.4437
Stack Gas Temperature, degrees F:	114.1	116.8	119.1	116.7
% Carbon Dioxide:	0.2	0.2	0.1	0.2
% Oxygen:	20.5	20.5	20.7	20.6
% Carbon Monoxide:	0.0	0.0	0.0	0.0
Liquid Volume Collected, milliliters:	40	38	39	39.0

Sample Train Calculations

Meter Volume, Actual:	47.270	49.900	50.330	49.167
Meter Volume, STP:	44.093	45.665	45.680	45.146
Volume of Water Vapor Condensed:	1.883	1.789	1.836	1.836
Total Gas Sampled:	45.976	47.454	47.516	46.982
% Moisture:	4.10	3.77	3.86	3.91
Area of Stack, Square Feet:	13.64	13.64	13.64	13.64
% Excess Air at Test Location:	4710.5	4710.5	9913.8	6444.9
Molecular Weight dry, lb/lb-Mole:	28.85	28.85	28.84	28.85
Molecular Weight wet, lb/lb-Mole:	28.41	28.44	28.42	28.42
Absolute Stack Gas Pressure, in Hg:	29.27	29.27	29.27	29.27

Velocity and Flow Calculations

Average Stack Gas Velocity FPS:	85.33	86.43	87.20	86.32
Stack Gas Flow Rate, ACFM:	69,834	70,734	71,364	70,644
Stack Gas Flow Rate, SCFM:	62,834	63,341	63,654	63,276
Stack Gas Flow Rate, DSCF/HR:	3,615,492	3,657,182	3,671,800	3,648,158
Stack Gas Flow Rate, DSCFM:	60,258	60,953	61,197	60,803

VOC Calculations (Uncorrected):

PPMw as Propane:	281.0	169.9	270.3	240.4
LBS/DSCF:	3.21E-05	1.94E-05	3.09E-05	2.75E-05
LBS/HR:	120.98	73.74	117.89	104.20

VOC Calculations (Corrected):

PPM Chloromethane:	0.02	0.02	0.02	0.02
PPM Chloromethane RF Adjusted:	0.01	0.01	0.01	0.01
PPM Freon 22:	8.34	2.83	0.00	3.72
PPM Freon 22 RF Adjusted:	3.98	1.35	0.00	1.78
PPM Freon 12:	0.88	0.41	0.89	0.73
PPM Freon 12 RF Adjusted:	1.03	0.48	1.05	0.85
PPM Freon 152A:	0.00	3.84	1.56	1.80
PPM Freon 152A RF Adjusted:	0.00	4.42	1.79	2.07
PPM Freon 134A:	0.02	0.02	0.02	0.02
PPM Freon 134A RF Adjusted:	0.02	0.02	0.02	0.02
PPM Octamethylcyclotetrasiloxane:	2.14	0.00	0.00	0.71
PPM Octamethylcyclotetrasiloxane RF Adjusted:	2.46	0.00	0.00	0.82
PPM Acetone:	2.71	14.73	29.91	15.8
PPM Acetone RF Adjusted:	1.95	10.61	21.54	11.4
PPM Methylene Chloride:	0.22	0.18	0.18	0.2
PPM Methylene Chloride RF Adjusted:	0.24	0.20	0.20	0.2
PPM Tetrachloroethylene:	0.03	0.03	0.04	0.0
PPM Tetrachloroethylene RF Adjusted:	0.04	0.04	0.05	0.0
PPM Freon 11**:	2.000	10.21	5.98	6.1
PPM Tetrachloroethylene RF Adjusted**:	0.95	4.87	2.85	2.9
PPM Methane (as Propane):	1.10	1.03	1.13	1.09
PPM Ethane (as Propane):	0.42	0.30	0.30	0.34
PPMv as Propane (Corrected):	268.8	146.6	241.4	218.9
LBS/DSCF (Corrected):	3.07E-05	1.67E-05	2.76E-05	2.50E-05
LBS/HR (Corrected):	115.72	63.61	105.27	94.87

* See Appendix G for response factor determinations for each compound.

** Freon 11 is an ESTIMATED response factor. The laboratory was not able to obtain a Freon 11 sample in order to develop a response factor by the issuance deadline of this report.

APPENDIX D
CALIBRATIONS

General Iron
 18-3042
 Chicago, Illinois
 EPA Method 25A
 Shredder Exhaust
 Exhaust Stack (1,000 Range)

Analyte	VOC		Wet
Initial Calibration	Value	Response	Calibration Error
***Span	1145.0		
High	916.0	927.0	1.20%
Mid	506.3	527.0	4.09%
Low	305.0	316.0	3.61%
Zero	0.0	1.0	0.09%

*Pre Upscale and Corrected Run Average cells must be adjusted if a high or low calibration gas is used for post calibration upscale checks.

***All Drift and Bias calculations for VOC are based off of the most lenient Span value possible (High Cal gas is 80% of Span). May not agree with report values if a more restrictive span is identified.

Type	Run Average	Pre Zero	Post Zero	*Pre Upscale	Post Upscale	Zero System Bias	Upscale System Bias	Zero Drift	Upscale Drift
Initial System Bias Check									
Run 1	281.0	1.0	10.0	527.0	522.0			0.79%	0.44%
Run 2	169.9	10.0	10.0	522.0	534.0			0.00%	1.05%
Run 3	270.3	10.0	11.0	534.0	529.0			0.09%	0.44%

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R 000193

G10000229

General Iron
 18-3042
 Chicago, Illinois
 EPA Method 25A
 Shredder Exhaust
 Exhaust Stack (10,000 range)

Analyte	VOC	Wet	
Initial Calibration	Value	Response	Calibration Error
***Span	10621.3		
High	8497.0	8421.0	0.89%
Mid	4988.0	4861.0	2.55%
Low	2976.0	2955.0	0.71%
Zero	0.0	1.0	0.01%

*Pre Upscale and Corrected Run Average cells must be adjusted if a high or low calibration gas is used for post calibration upscale checks.

***All Drift and Bias calculations for VOC are based off of the most lenient Span value possible (High Cal gas is 80% of Span). May not agree with report values if a more restrictive span is identified.

Type	Run Average	Pre Zero	Post Zero	*Pre Upscale	Post Upscale	Zero System Bias	Upscale System Bias	Zero Drift	Upscale Drift
Initial System Bias Check									
Run 1	281.0	1.0	10.0	4861.0	4900.0			0.08%	0.37%
Run 2	169.9	10.0	10.0	4861.0	4900.0			0.00%	0.37%
Run 3	270.3	10.0	11.0	4861.0	4900.0			0.01%	0.37%

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R 000194

G10000230

General Iron 18-3042
 Chicago, Illinois
 5/25/2018
 Shredder Exhaust

Analyte	Oxygen	Dry	
Initial Calibration	Value	Response	Calibration Error
High	23.20	23.20	0.00%
Mid	11.91	12.00	0.39%
Low (Zero)	0.00	0.00	0.00%

*Corrected Run Average and Upscale System Bias cell formulas must be adjusted if the high calibration gas is used for post calibration upscale checks.

Type	Run Average	Pre Zero	Post Zero	Pre Upscale	Post Upscale	*Corrected Run Average	Zero System Bias	*Upscale System Bias	Zero Drift	Upscale Drift
Initial System Bias Check			0.0		12.0		0.00%	0.00%		
Run 1	20.7	0.0	0.0	12.0	12.0	20.5	0.00%	0.00%	0.00%	0.00%
Run 2	20.7	0.0	0.0	12.0	12.0	20.5	0.00%	0.00%	0.00%	0.00%
Run 3	20.7	0.0	0.1	12.0	11.9	20.7	0.43%	0.43%	0.43%	0.43%

Analyte	Carbon Dioxide	Dry	
Initial Calibration	Value	Response	Calibration Error
High	24.01	24.00	0.04%
Mid	12.15	12.00	0.62%
Low (Zero)	0.00	0.10	0.42%

*Corrected Run Average and Upscale System Bias cell formulas must be adjusted if the high calibration gas is used for post calibration upscale checks.

Type	Run Average	Pre Zero	Post Zero	Pre Upscale	Post Upscale	*Corrected Run Average	Zero System Bias	*Upscale System Bias	Zero Drift	Upscale Drift
Initial System Bias Check			0.0		12.0		0.42%	0.00%		
Run 1	0.2	0.0	0.0	12.0	12.0	0.2	0.42%	0.00%	0.00%	0.00%
Run 2	0.2	0.0	0.1	12.0	12.0	0.2	0.00%	0.00%	0.42%	0.00%
Run 3	0.2	0.1	0.1	12.0	11.8	0.1	0.00%	0.83%	0.00%	0.83%

APEX INSTRUMENTS
EPA Method 5
522 Series Meter Box Calibration
Pre-Test Orifice Method
English Meter Box Units, English K' Factor

Filename: S:\Calibrations\MeterCals\Meter Cal Spread Sheet.xls]27100203
Revised: 7/21/95 Version: 2.2

Model #: Apex Method 5
Serial #: 70

Date: -----> 11/9/17
Barometric Pressure: -----> 29.65 (in. Hg)
Theoretical Critical Vacuum: ---> 13.99 (in. Hg)

!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)³/(deg R)^{0.5}/((in.Hg)²(min)).
!!!!!!!

----- DRY GAS METER READINGS -----

-CRITICAL ORIFICE READINGS-

dH (in H2O)	Time (min)	Volume		Volume Total (cu ft)	Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual - Ambient Temperature -			
		Initial (cu ft)	Final (cu ft)		Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)			Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.51	13.00	837.620	843.720	8.100	65.0	65.0	67.0	64.0	CJ48	0.350	23.0	68.0	68.0	68.0
0.93	10.00	843.940	850.140	6.200	68.0	64.0	71.0	66.0	CJ55	0.461	22.0	68.0	68.0	68.0
1.60	11.00	850.300	859.060	8.760	71.0	65.0	77.0	68.0	CJ63	0.598	20.0	68.0	68.0	68.0
3.00	19.00	859.250	880.000	20.750	76.0	67.0	91.0	73.0	CJ73	0.821	17.5	68.0	68.0	68.0
4.50	6.00	880.200	888.310	8.110	86.0	73.0	97.0	75.0	CJ81	1.012	15.0	68.0	68.0	68.0

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***** RESULTS *****

--- DRY GAS METER ---

----- ORIFICE -----

--- DRY GAS METER ---

----- ORIFICE -----

VOLUME CORRECTED	VOLUME CORRECTED
Vm(std) (cu ft)	Vm(std) (liters)
6.082	172.2
6.165	174.6
8.875	245.7
20.370	576.9
7.902	223.8

VOLUME CORRECTED	VOLUME CORRECTED	NOMINAL
Vcr(std) (cu ft)	Vcr(std) (liters)	Vcr (cu ft)
5.878	166.5	5.934
5.942	168.3	5.999
8.494	240.5	8.574
20.118	569.8	20.310
7.837	221.9	7.911

CALIBRATION FACTOR Y	
Value (number)	Variation (number)
0.968	-0.011
0.964	-0.014
0.979	0.001
0.988	0.010
0.992	0.014

CALIBRATION FACTOR dH@		
Value (in H2O)	Value (mm H2O)	Variation (in H2O)
1.400	35.56	-0.063
1.477	37.51	0.013
1.500	38.10	0.037
1.486	37.74	0.023
1.454	36.93	-0.009

Average Y ----->

0.978

1.463

37.17 <----- Average dH@

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/-0.02.

For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/-0.2.

SIGNED: A. A. Kalle

Date: 11-9-17

R 000196

G10000232

Pitot Tube
Calibration Sheet

Client General Iron

Plant Chicago, IL

Pitot ID P-7A-S-Type

External Tubing Diameter	<u>0.375</u>	inches
Base To Opening Plane Distance(P_a)	<u>0.521</u>	inches
Base To Opening Plane Distance(P_b)	<u>0.523</u>	inches
Pitot Coefficient	<u>0.84</u>	

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	Measured	Allowable
P_a/D_t	1.389	1.05-1.50
P_b/D_t	1.395	1.05-1.50
Angle α_1°	0.0	10.0
Angle α_2°	0.0	10.0
Angle β_1°	0.0	5.0
Angle β_2°	0.0	5.0
z (inches)	0	0.125 in.
w(inches)	0.000	0.031 in.

Signature R. Schueller

Date 1/5/2018

R 000197

Pyrometer Calibration Sheet

STG Project No. 18-3042

Client: General Iron

Chicago, IL

Date: 5/25/2018

Date Calibrated: 1/5/2018

Temperature Scale Used: °F

Probe No. STG-7A

Reference Used: Mercury Thermometer

Calibration Reference Settings °F	Pyrometer Reading °F
29	30
76	76
212	213

Calibrated by: R. Schueller

APPENDIX E
VOC DATALOGGER RECORDINGS

General Iron 18-3042
Chicago, Illinois
Shredder Exhaust
Method 25A
Run 1

Date	Time	O ₂ %	CO ₂ %	VOC PPMww
2018/05/25	8:35:00 AM	20.7	0.2	322
2018/05/25	8:36:00 AM	20.7	0.2	309
2018/05/25	8:37:00 AM	20.7	0.2	295
2018/05/25	8:38:00 AM	20.8	0.2	234
2018/05/25	8:39:00 AM	20.7	0.2	202
2018/05/25	8:40:00 AM	20.7	0.2	204
2018/05/25	8:41:00 AM	20.7	0.2	441
2018/05/25	8:42:00 AM	20.7	0.2	157
2018/05/25	8:43:00 AM	20.7	0.2	95
2018/05/25	8:44:00 AM	20.7	0.2	297
2018/05/25	8:45:00 AM	20.7	0.2	387
2018/05/25	8:46:00 AM	20.7	0.2	414
2018/05/25	8:47:00 AM	20.8	0.2	264
2018/05/25	8:48:00 AM	20.7	0.2	564
2018/05/25	8:49:00 AM	20.7	0.2	177
2018/05/25	8:50:00 AM	20.7	0.2	788
2018/05/25	8:51:00 AM	20.7	0.2	252
2018/05/25	8:52:00 AM	20.7	0.2	577
2018/05/25	8:53:00 AM	20.7	0.2	225
2018/05/25	8:54:00 AM	20.7	0.2	427
2018/05/25	8:55:00 AM	20.7	0.2	430
2018/05/25	8:56:00 AM	20.8	0.2	176
2018/05/25	8:57:00 AM	20.7	0.2	124
2018/05/25	8:58:00 AM	20.7	0.2	408
2018/05/25	8:59:00 AM	20.8	0.2	197
2018/05/25	9:00:00 AM	20.8	0.2	172
2018/05/25	9:01:00 AM	20.7	0.2	193
2018/05/25	9:02:00 AM	20.7	0.2	218
2018/05/25	9:03:00 AM	20.7	0.2	160
2018/05/25	9:04:00 AM	20.7	0.2	459
2018/05/25	9:05:00 AM	20.7	0.2	1062
2018/05/25	9:06:00 AM	20.7	0.2	355
2018/05/25	9:07:00 AM	20.7	0.2	211
2018/05/25	9:08:00 AM	20.7	0.2	772
2018/05/25	9:09:00 AM	20.7	0.2	181
2018/05/25	9:10:00 AM	20.8	0.2	42
2018/05/25	9:11:00 AM	20.7	0.2	449
2018/05/25	9:12:00 AM	20.7	0.2	296
2018/05/25	9:13:00 AM	20.7	0.2	213
2018/05/25	9:14:00 AM	20.7	0.2	174
2018/05/25	9:15:00 AM	20.7	0.2	104
2018/05/25	9:16:00 AM	20.7	0.2	321
2018/05/25	9:17:00 AM	20.7	0.2	163
2018/05/25	9:18:00 AM	20.7	0.2	242
2018/05/25	9:19:00 AM	20.7	0.2	357
2018/05/25	9:20:00 AM	20.7	0.2	52
2018/05/25	9:21:00 AM	20.7	0.2	100
2018/05/25	9:22:00 AM	20.7	0.2	214
2018/05/25	9:23:00 AM	20.8	0.2	183
2018/05/25	9:24:00 AM	20.7	0.2	288
2018/05/25	9:25:00 AM	20.7	0.2	212
2018/05/25	9:26:00 AM	20.7	0.2	111
2018/05/25	9:27:00 AM	20.7	0.2	194
2018/05/25	9:28:00 AM	20.7	0.2	292
2018/05/25	9:29:00 AM	20.7	0.2	184
2018/05/25	9:30:00 AM	20.7	0.2	190
2018/05/25	9:31:00 AM	20.7	0.2	177
2018/05/25	9:32:00 AM	20.7	0.2	255
2018/05/25	9:33:00 AM	20.7	0.2	209
2018/05/25	9:34:00 AM	20.7	0.2	87
	Avg.	20.7	0.2	281.0

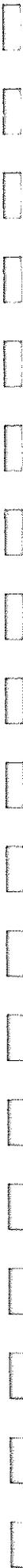
General Iron 18-3042
Chicago, Illinois
Shredder Exhaust
Method 25A
Run 2

Date	Time	O ₂ %	CO ₂ %	VOC PPMww
2018/05/25	9:49:00 AM	20.7	0.2	11
2018/05/25	9:50:00 AM	20.7	0.2	29
2018/05/25	9:51:00 AM	20.7	0.2	59
2018/05/25	9:52:00 AM	20.7	0.2	104
2018/05/25	9:53:00 AM	20.7	0.2	43
2018/05/25	9:54:00 AM	20.7	0.2	204
2018/05/25	9:55:00 AM	20.7	0.2	92
2018/05/25	9:56:00 AM	20.7	0.2	113
2018/05/25	9:57:00 AM	20.7	0.2	103
2018/05/25	9:58:00 AM	20.7	0.2	43
2018/05/25	9:59:00 AM	20.8	0.2	55
2018/05/25	10:00:00 AM	20.7	0.2	441
2018/05/25	10:01:00 AM	20.8	0.2	183
2018/05/25	10:02:00 AM	20.7	0.2	214
2018/05/25	10:03:00 AM	20.7	0.2	244
2018/05/25	10:04:00 AM	20.7	0.2	150
2018/05/25	10:05:00 AM	20.7	0.2	37
2018/05/25	10:06:00 AM	20.7	0.2	110
2018/05/25	10:07:00 AM	20.7	0.2	152
2018/05/25	10:08:00 AM	20.7	0.2	455
2018/05/25	10:09:00 AM	20.7	0.2	150
2018/05/25	10:10:00 AM	20.7	0.2	97
2018/05/25	10:11:00 AM	20.8	0.2	106
2018/05/25	10:12:00 AM	20.7	0.2	133
2018/05/25	10:13:00 AM	20.7	0.2	291
2018/05/25	10:14:00 AM	20.7	0.2	171
2018/05/25	10:15:00 AM	20.7	0.2	145
2018/05/25	10:16:00 AM	20.7	0.2	199
2018/05/25	10:17:00 AM	20.7	0.2	100
2018/05/25	10:18:00 AM	20.7	0.2	283
2018/05/25	10:19:00 AM	20.7	0.2	162
2018/05/25	10:20:00 AM	20.7	0.2	175
2018/05/25	10:21:00 AM	20.7	0.2	236
2018/05/25	10:22:00 AM	20.7	0.2	174
2018/05/25	10:23:00 AM	20.7	0.2	192
2018/05/25	10:24:00 AM	20.7	0.2	139
2018/05/25	10:25:00 AM	20.7	0.2	414
2018/05/25	10:26:00 AM	20.7	0.2	96
2018/05/25	10:27:00 AM	20.7	0.2	201
2018/05/25	10:28:00 AM	20.7	0.2	164
2018/05/25	10:29:00 AM	20.7	0.2	107
2018/05/25	10:30:00 AM	20.7	0.2	225
2018/05/25	10:31:00 AM	20.7	0.2	171
2018/05/25	10:32:00 AM	20.7	0.2	264
2018/05/25	10:33:00 AM	20.7	0.2	401
2018/05/25	10:34:00 AM	20.7	0.2	181
2018/05/25	10:35:00 AM	20.7	0.2	203
2018/05/25	10:36:00 AM	20.7	0.2	127
2018/05/25	10:37:00 AM	20.7	0.2	106
2018/05/25	10:38:00 AM	20.7	0.2	293
2018/05/25	10:39:00 AM	20.7	0.2	166
2018/05/25	10:40:00 AM	20.7	0.2	489
2018/05/25	10:41:00 AM	20.7	0.2	317
2018/05/25	10:42:00 AM	20.7	0.2	61
2018/05/25	10:43:00 AM	20.7	0.2	98
2018/05/25	10:44:00 AM	20.7	0.2	109
2018/05/25	10:45:00 AM	20.7	0.2	92
2018/05/25	10:46:00 AM	20.7	0.2	66
2018/05/25	10:47:00 AM	20.7	0.2	145
2018/05/25	10:48:00 AM	20.7	0.2	102
	Avg.	20.7	0.2	169.9

General Iron 18-3042
 Chicago, Illinois
 Shredder Exhaust
 Method 25A
 Run 3

Date	Time	O ₂ %	CO ₂ %	VOC PPMvw
2018/05/25	11:05:00 AM	20.7	0.2	11
2018/05/25	11:06:00 AM	20.7	0.2	20
2018/05/25	11:07:00 AM	20.7	0.2	76
2018/05/25	11:08:00 AM	20.7	0.2	1934
2018/05/25	11:09:00 AM	20.7	0.2	404
2018/05/25	11:10:00 AM	20.7	0.2	92
2018/05/25	11:11:00 AM	20.7	0.2	80
2018/05/25	11:12:00 AM	20.7	0.2	96
2018/05/25	11:13:00 AM	20.7	0.2	117
2018/05/25	11:14:00 AM	20.7	0.2	101
2018/05/25	11:15:00 AM	20.7	0.2	156
2018/05/25	11:16:00 AM	20.7	0.2	102
2018/05/25	11:17:00 AM	20.7	0.2	125
2018/05/25	11:18:00 AM	20.7	0.2	62
2018/05/25	11:19:00 AM	20.7	0.2	41
2018/05/25	11:20:00 AM	20.7	0.2	29
2018/05/25	11:21:00 AM	20.7	0.2	23
2018/05/25	11:22:00 AM	20.7	0.2	20
2018/05/25	11:23:00 AM	20.8	0.2	18
2018/05/25	11:24:00 AM	20.7	0.2	17
2018/05/25	11:25:00 AM	20.7	0.2	15
2018/05/25	11:26:00 AM	20.7	0.2	15
2018/05/25	11:27:00 AM	20.7	0.2	17
2018/05/25	11:28:00 AM	20.7	0.2	13
2018/05/25	11:29:00 AM	20.7	0.2	13
2018/05/25	11:30:00 AM	20.7	0.2	21
2018/05/25	11:31:00 AM	20.7	0.2	26
2018/05/25	11:32:00 AM	20.7	0.2	210
2018/05/25	11:33:00 AM	20.7	0.2	112
2018/05/25	11:34:00 AM	20.7	0.2	103
2018/05/25	11:35:00 AM	20.7	0.2	33
2018/05/25	11:36:00 AM	20.7	0.2	20
2018/05/25	11:37:00 AM	20.7	0.2	17
2018/05/25	11:38:00 AM	20.7	0.2	14
2018/05/25	11:39:00 AM	20.7	0.2	12
2018/05/25	11:40:00 AM	20.7	0.2	11
2018/05/25	11:41:00 AM	20.7	0.2	11
2018/05/25	11:42:00 AM	20.7	0.2	11
2018/05/25	11:43:00 AM	20.7	0.2	10
2018/05/25	11:44:00 AM	20.7	0.2	12
2018/05/25	11:45:00 AM	20.7	0.2	39
2018/05/25	11:46:00 AM	20.7	0.2	138
2018/05/25	11:47:00 AM	20.7	0.2	2752
2018/05/25	11:48:00 AM	20.7	0.2	525
2018/05/25	11:49:00 AM	20.7	0.2	234
2018/05/25	11:50:00 AM	20.7	0.2	233
2018/05/25	11:51:00 AM	20.7	0.2	181
2018/05/25	11:52:00 AM	20.7	0.2	224
2018/05/25	11:53:00 AM	20.7	0.2	108
2018/05/25	11:54:00 AM	20.7	0.2	118
2018/05/25	11:55:00 AM	20.7	0.2	400
2018/05/25	11:56:00 AM	20.7	0.2	343
2018/05/25	11:57:00 AM	20.7	0.2	90
2018/05/25	11:58:00 AM	20.7	0.2	216
2018/05/25	11:59:00 AM	20.7	0.2	159
2018/05/25	12:00:00 PM	20.7	0.2	143
2018/05/25	12:01:00 PM	20.7	0.2	171
2018/05/25	12:02:00 PM	20.7	0.2	254
2018/05/25	12:03:00 PM	20.7	0.2	277
2018/05/25	12:04:00 PM	20.7	0.2	698
2018/05/25	12:05:00 PM	20.7	0.2	375
2018/05/25	12:06:00 PM	20.7	0.2	224
2018/05/25	12:07:00 PM	20.7	0.2	142
2018/05/25	12:08:00 PM	20.7	0.2	281
2018/05/25	12:09:00 PM	20.7	0.2	241
2018/05/25	12:10:00 PM	20.7	0.2	149
2018/05/25	12:11:00 PM	20.7	0.2	228
2018/05/25	12:12:00 PM	20.7	0.2	323
2018/05/25	12:13:00 PM	20.7	0.2	647
2018/05/25	12:14:00 PM	20.7	0.2	223
2018/05/25	12:15:00 PM	20.7	0.2	86
2018/05/25	12:16:00 PM	20.7	0.2	199
2018/05/25	12:17:00 PM	20.7	0.2	158
2018/05/25	12:18:00 PM	20.7	0.2	206
2018/05/25	12:19:00 PM	20.7	0.2	157
2018/05/25	12:20:00 PM	20.7	0.2	274
2018/05/25	12:21:00 PM	20.7	0.2	300
2018/05/25	12:22:00 PM	20.7	0.2	514
2018/05/25	12:23:00 PM	20.7	0.2	338
2018/05/25	12:24:00 PM	20.7	0.2	121
2018/05/25	12:25:00 PM	20.7	0.2	77
	Avg.	20.7	0.2	270.3

*Shredder was down during this period. These numbers are not included in the average.



APPENDIX F
CALIBRATION GAS CERTIFICATION SHEETS



CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
Airgas USA, LLC
 12722 South Wentworth Ave.
 Chicago, IL 60628
 773-785-3000 Fax: 773-785-1928
 Airgas.com

Part Number:	E03NI76E15A0295	Reference Number:	54-124572685-1
Cylinder Number:	SG9133821BAL	Cylinder Volume:	152.5 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12016	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Aug 22, 2016

Expiration Date: Aug 22, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which effect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	12.00 %	12.15 %	G1	+/- 1.0% NIST Traceable	08/22/2016
OXYGEN	12.00 %	11.91 %	G1	+/- 1.0% NIST Traceable	08/22/2016
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060817	CC416652	24.04 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 16, 2019
NTRM	12062016	CC367570	22.88 % OXYGEN/NITROGEN	+/- 0.2%	Apr 24, 2018

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Aug 13, 2016
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Aug 22, 2016

Triad Data Available Upon Request



Approved for Release

Airgas
an Air Liquide company

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases

Airgas USA, LLC

12722 South Wentworth Ave.

Chicago, IL 60629

773-785-3000 Fax: 773-785-1928

Airgas.com

Part Number: E03NI52E15A38Q7
Cylinder Number: CC183526
Laboratory: ASG - Chicago - IL
PGVP Number: B12016
Gas Code: CO2,O2,BALN

Reference Number: 54-124572686-1
Cylinder Volume: 163.9 CF
Cylinder Pressure: 2015 PSIG
Valve Outlet: 296
Certification Date: Aug 26, 2016

Expiration Date: Aug 26, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	24.00 %	24.01 %	G1	+/- 1.0% NIST Traceable	08/26/2016
OXYGEN	24.00 %	23.18 %	G2	+/- 1.1% NIST Traceable	08/26/2016
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060817	CC416652	24.04 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 16, 2019
NTRM	06120112	CC195607	9.898 % OXYGEN/NITROGEN	+/- 0.7%	Jun 26, 2018

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
GO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Aug 13, 2016
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Aug 22, 2016

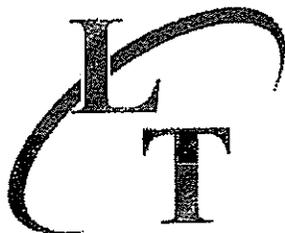
Triad Data Available Upon Request



Abdour H. Sani

Approved for Release

Page 1 of 54-124572686-1



LIQUID TECHNOLOGY CORPORATION
 "INDUSTRY LEADER IN SPECIALTY GASES"

Certificate of Analysis
- EPA PROTOCOL GAS -

<u>Customer</u>	<u>Stack Test Group (Ottawa, IL)</u>
<u>Date</u>	<u>April 30, 2014</u>
<u>Delivery Receipt</u>	<u>DR-51311</u>
<u>Gas Standard</u>	<u>900 ppm Propane/Nitrogen - EPA PROTOCOL</u>
<u>Final Analysis Date</u>	<u>April 28, 2014</u>
<u>Expiration Date</u>	<u>April 28, 2022</u>

<u>Component</u>	<u>Propane</u>
<u>Balance Gas</u>	<u>Air</u>

DO NOT USE BELOW 100 psig

Analytical Data:
 EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations
Propane: 916 ppm +/- 3.0 ppm
Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-125618	CC-165614
Concentration:	497.23 ppm Propane/Nitrogen	1011.92 ppm Propane/Nitrogen
Expiration Date:	04/09/20	04/09/20

Certification Instrumentation

Component:	Propane
Make/Model:	Agilent 7890A
Serial Number:	CN10736166
Principal of Measurement:	GC-FID
Last Calibration:	April 09, 2014

Cylinder Data

Cylinder Serial Number:	CC-185323	Cylinder Outlet:	CGA 350
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by:

Cole Dylewski

Cole Dylewski

PGVP Vendor ID: E12014

"UNMATCHED EXCELLENCE"
 2048 APEX COURT APOPKA, FLORIDA 32703 ~ PHONE (407)-292-2990 FAX (407)-292-3313
 WWW.LIQUIDTECHCORP.COM
 APOPKA, FL • HOUSTON, TX

Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0932	Reference Number:	54-124545729-1
Cylinder Number:	CC349203	Cylinder Volume:	144.4 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12016	Valve Outlet:	350
Gas Code:	PPN,BALN	Certification Date:	Mar 21, 2016

Expiration Date: Mar 21, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
PROPANE	500.0 PPM	506.3 PPM	G1	+/- 1.1% NIST Traceable	03/21/2016
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	10060532	CC281503	495.3 PPM PROPANE/AIR	+/- 0.5%	Jan 08, 2022

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801332	FTIR	Feb 28, 2016

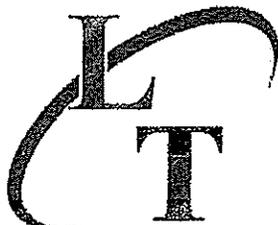
Triad Data Available Upon Request



Abbas Hussain

Approved for Release

Page 1 of 54-124545729-1



LIQUID TECHNOLOGY CORPORATION

"INDUSTRY LEADER IN SPECIALTY GASES"

Certificate of Analysis - EPA PROTOCOL GAS -

<u>Customer</u>	<u>Stack Test Group (Ottawa, IL)</u>
<u>Date</u>	<u>April 30, 2014</u>
<u>Delivery Receipt</u>	<u>DR-51311</u>
<u>Gas Standard</u>	<u>300 ppm Propane/Nitrogen - EPA PROTOCOL</u>
<u>Final Analysis Date</u>	<u>April 28, 2014</u>
<u>Expiration Date</u>	<u>April 28, 2022</u>

<u>Component</u>	<u>Propane</u>
<u>Balance Gas</u>	<u>Air</u>

Analytical Data:
EPA Protocol, Section No. 2.2, Procedure G-1

DO NOT USE BELOW 100 psig

Reported Concentrations
Propane: 305 ppm +/- 1.0 ppm
Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-231424	CC-125618
Concentration:	106.42 ppm Propane/Nitrogen	497.23 ppm Propane/Nitrogen
Expiration Date:	04/09/20	04/09/20

Certification Instrumentation

Component:	Propane
Make/Model:	Agilent 7890A
Serial Number:	CN10736166
Principal of Measurement:	GC-FID
Last Calibration:	April 09, 2014

Cylinder Data

Cylinder Serial Number:	EB-0050476	Cylinder Outlet:	CGA 350
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-12/531.

Certified by:

Cole Dylewski

PGVP Vendor ID: E12014

"UNMATCHED EXCELLENCE"
2048 APEX COURT APOPKA, FLORIDA 32703 ~ PHONE (407)-292-2990 FAX (407)-292-3313
WWW.LIQUIDTECHCORP.COM
APOPKA, FL • HOUSTON, TX



PurityPlus®
Specialty Gases

Certificate of Analysis

Certificate Number: 3034A-07T5-C01
 Certification Date: 4 November 2014
 Mixture Grade: EPA Protocol Standard Gas Mixture

Cylinder Number: CC454471

Mixture Components	Requested Composition	Certified Composition	U (Expanded Uncertainty, k=2)
Propane	8500 PPM	8497 PPM	+/- 55 PPM (absolute)
Nitrogen	Balance	Balance	

Cylinder Pressure: 1900 psi – Do not use below 100 psi (0.7 megapascals)
 Lot Number: 3034A-07T5
 CGA Outlet Conn.: 350
 UN Number: UN 1958
 Classification: Compressed Gas, n. o. s.
 Certification Expiration Date: 4 November 2022
 Procedure Used: EPA Traceability Protocol for Gaseous Calibration Standards
 Procedure G1, EPA/600/R-12/531 May 2012
 Analytical Method: FTIR
 Multipoint Calibration Date: 17 October 2014
 Production Lab: Tier 5 Labs, LLC, Naperville, IL, PGVP Vendor ID R12014

Reference Standards:
 NIST SRM Number 2647a
 NIST Sample Number 104-C-44
 Cylinder Identification Number XF002995B
 Certified Concentration 2467 µmol/mol
 Expanded Uncertainty +/- 13 µmol/mol
 Certification Expiration 8-May-17

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI). The expanded uncertainties, if included on this certificate, use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. If uncertainties are not included on this certificate, they are available upon request. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. Calibration certificates without signatures are not valid. This calibration meets the requirements of ISO/IEC 17025-2005.

Steve Tarrant

Weldstar Aurora
 1750 Mitchell Road, PO Box 1150
 Aurora, IL 60505
 Phone 630.859.3100
 Fax 630.859.3199

Weldstar Logansport
 1000 E. Main Street
 Logansport, IN 46947
 Phone 574.722.1177
 Fax 574.753.3113

Weldstar University Park
 1100 Hamilton Avenue
 University Park, IL 60484
 Phone 708.534.8561
 Fax 708.534.7819



Airgas Specialty Gases
Airgas USA, LLC
12722 S. Wentworth Ave.
Chicago, IL 60628
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0561	Reference Number:	54-401002568-1
Cylinder Number:	CC175226	Cylinder Volume:	144.7 CF
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12017	Valve Outlet:	350
Gas Code:	PPN,BALN	Certification Date:	Sep 20, 2017

Expiration Date: **Sep 20, 2025**

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 85%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psia, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
PROPANE	5000 PPM	4988 PPM	G1	+/- 0.6% NIST Traceable	09/20/2017
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12061208	CC357634	5028 PPM PROPANE/NITROGEN	+/- 0.6%	Jan 20, 2018

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AJR0801332	FTIR	Aug 21, 2017

Triad Data Available Upon Request



Alan Conway

Approved for Release

Page 1 of 54-401002568-1



PurityPlus®
Specialty Gases

Certificate of Analysis

Certificate Number: 3034A-06T5-C01
 Certification Date: 4 November 2014
 Mixture Grade: EPA Protocol Standard Gas Mixture

Cylinder Number: CC451707

Mixture Components	Requested Composition	Certified Composition	U (Expanded Uncertainty, k=2)
Propane	3000 PPM	2976 PPM	+/- 35 PPM (absolute)
Nitrogen	Balance	Balance	

Cylinder Pressure: 1900 psi – Do not use below 100 psi (0.7 megapascals)
 Lot Number: 3034A-06T5
 CGA Outlet Conn.: 350
 UN Number: UN 1956
 Classification: Compressed Gas, n. o. s.
 Certification Expiration Date: 4 November 2022
 Procedure Used: EPA Traceability Protocol for Gaseous Calibration Standards Procedure G1, EPA/600/R-12/531 May 2012
 Analytical Method: FTIR
 Multipoint Calibration Date: 17 October 2014
 Production Lab: Tier 5 Labs, LLC, Naperville, IL, PGVP Vendor ID R12014

Reference Standards:
 NIST SRM Number: 2647a
 NIST Sample Number: 104-C-44
 Cylinder Identification Number: XF002895B
 Certified Concentration: 2467 µmol/mol
 Expanded Uncertainty: +/- 13 µmol/mol
 Certification Expiration: 6-May-17

The calibration results published in this certificate were obtained using equipment and standards capable of producing results that are traceable to National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI). The expanded uncertainties, if included on this certificate, use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. If uncertainties are not included on this certificate, they are available upon request. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from the calibration facility. Calibration certificates without signatures are not valid. This calibration meets the requirements of ISO/IEC 17025-2005.

Steve Tarrant

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Weldstar University Park
 1100 Hamilton Avenue
 University Park, IL 60484
 Phone 708.534.8561
 Fax 708.534.7819

APPENDIX G

RESPONSE FACTOR DETERMINATION FOR VOC EXEMPT COMPOUNDS

General Iron
Chicago, IL
VOM Testing
Response Factor Testing
6/13/2018

Compound	Bag Concentration	FID Response
Chloromethane		
Trial #1	100 PPM	67.1
Trial #2	100 PPM	67.0
Trial #3	100 PPM	67.0
Avg.		67.0
Freon 22		
Trial #1	100 PPM	47.5
Trial #2	100 PPM	47.7
Trial #3	100 PPM	47.8
Avg.		47.7
Freon 12		
Trial #1	100 PPM	117.6
Trial #2	100 PPM	117.4
Trial #3	100 PPM	117.8
Avg.		117.6
Freon 152A		
Trial #1	100 PPM	114.9
Trial #2	100 PPM	115.0
Trial #3	100 PPM	115.0
Avg.		115.0
Carbon Disulfide		
Trial #1	120 PPM	0.2
Trial #2	120 PPM	0.1
Trial #3	120 PPM	0.3
Avg.		0.2
Freon 134A		
Trial #1	100 PPM	114.8
Trial #2	100 PPM	115.1
Trial #3	100 PPM	115.2
Avg.		115.0
Octamethylcyclotetrasiloxane		
Trial #1	100 PPM	114.8

Trial #2	100 PPM	114.9
Trial #3	100 PPM	114.9
Avg.		114.9

APPENDIX H
LABORATORY REPORT FOR VOC EXEMPT COMPOUNDS

DAT Reports®

Data Summary
GPA 2286

Client: Stack Test Group
Client Project:
DAT Project: 0518042
Date Sampled: 5/25/2018
Date Analyzed: 6/25/2018
Analyst: SM

Client Sample ID	DAT Sample ID	Analyte	Detector	ppm (vol)	ppm as Propane	Q
Run 1	0518042- 1	Methane	FID	3.29	1.10	
		Ethane	FID	0.63	0.42	

ND = Not detected in the sample.
D = Value measured from a dilution.
J=Below the lowest calibration point

DAT Reports®

Data Summary
GPA 2286

Client: Stack Test Group
Client Project:
DAT Project: 0518042
Date Sampled: 5/26/2018
Date Analyzed: 6/25/2018
Analyst: SM

Client Sample ID	DAT Sample ID	Analyte	Detector	ppm (vol)	ppm as Propane	Q
Run 2	0518042- 2	Methane	FID	3.10	1.03	
		Ethane	FID	0.45	0.30	

ND = Not detected in the sample.
D = Value measured from a dilution.
J = Below the lowest calibration point

DAT Reports®

Data Summary
GPA 2286

Client: Stack Test Group
Client Project:
DAT Project: 0518042
Date Sampled: 5/27/2018
Date Analyzed: 6/25/2018
Analyst: SM

Client Sample ID	DAT Sample ID	Analyte	Detector	ppm (vol)	ppm as Propane	Q
Run 3	0518042- 3	Methane	FID	3.40	1.13	
		Ethane	FID	0.46	0.30	

ND = Not detected in the sample.
D = Value measured from a dilution.
J = Below the lowest calibration point

DAT Reports®

TO-15 Data Summary

Client ID	Test 1
Sample Name :	0518042-1 1.0mL
Date Acquired :	05/31/18 16:40
Method File :	TO151805
Data File Path :	C:\HPCHEM\1\DATA\0518042\
Data File Name :	05318R01.D
Sample Multiplier :	200
Dilution factor :	1

Name	Amount (ppb)	PQL (ppb)	MDL (ppb)	Q
Dichlorodifluoromethane	882.72	250.00	22.80	
Chloromethane	ND	250.00	19.80	
1,2-dichlorotetrafluoroethane	ND	250.00	19.20	
Acetone	2714.54	250.00	22.00	
Trichlorofluoromethane	2003.48	250.00	23.40	
Methylene Chloride	221.01	250.00	177.40	
1,1,2-Trichlorotrifluoroethane	ND	250.00	20.80	
1,1,1-Trichloroethane	ND	250.00	21.60	
Tetrachloroethylene	ND	250.00	25.40	
Surrogate %R	%R			
4-bromofluorobenzene	83.26			

ND= Not Detected at the Method Detection Limit.
 PQL=Practical Quantitation Limit
 MDL= Method Detection Limit

DAT Reports[®]**Tentatively Identified Compound (LSC) summary**

Operator ID: CSM Date Acquired: 31 May 18 4:40 pm

Data File: C:\HPCHEM\1\DATA\0518042\05318R01.D

Name: 0518042-1 1.0mL

Misc: Test 1

Method: C:\HPCHEM\1\METHODS\TO151812.M (Chemstation Integrator)

Title: TO-15

Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc	Units
Methane, chlorodifluoro-	4.53	8336.8	ppb
Cyclotetrasiloxane, octamethyl-	20.34	2142.2	ppb

RT=Retention time (minutes)

DAT ReportsSM

Tentatively Identified Compound (LSC) summary

Operator ID: Date Acquired: 8 Jun 18 3:57 pm
Data File: C:\HPCHEM\1\DATA\0518042F\06088R03.D
Name: 0518042-2 1.0 mL

Misc: Test #2

Method: C:\HPCHEM\1\METHODS\TO151812.M (Chemstation Integrator)
Title: TO-15
Library Searched: C:\DATABASE\NBS75K.L

TIC Top Hit name	RT	EstConc Units
Methane, chlorodifluoro-	4.47	2831.2 ppb
Ethane, 1,1-difluoro-	4.89	3844.5 ppb

DAT Reports[®]

TO-15 Data Summary

Client ID Test #3
 Sample Name : 0518042-3 1.0 mL
 Date Acquired : 06/ 8/18 15:14
 Method File : TO151805
 Data File Path : C:\HPCHEM\1\DATA\0518042F\
 Data File Name : 06088R02.D
 Sample Multiplier : 200
 Dilution factor : 1

Name	Amount (ppb)	PQL (ppb)	MDL (ppb)	Q
Dichlorodifluoromethane	890.44	250.00	22.80	
Chloromethane	ND	250.00	19.80	
1,2-dichlorotetrafluoroethane	ND	250.00	19.20	
Acetone	29905.85	250.00	22.00	
Trichlorofluoromethane	5978.77	250.00	23.40	
Methylene Chloride	ND	250.00	177.40	
1,1,2-Trichlorotrifluoroethane	ND	250.00	20.80	
1,1,1-Trichloroethane	ND	250.00	21.60	
Tetrachloroethylene	42.35	250.00	25.40	
Surrogate %R	%R			
4-bromofluorobenzene	106.4			

ND= Not Detected at the Method Detection Limit.

PQL=Practical Quantitation Limit

MDL= Method Detection Limit

DAT ReportsSM

Tentatively Identified Compound (LSC) summary

Operator ID: Date Acquired: 8 Jun 18 3:14 pm
Data File: C:\HPCHEM\1\DATA\0518042F\06088R02.D
Name: 0518042-3 1.0 mL

Misc: Test #3

Method: C:\HPCHEM\1\METHODS\TO151812.M (Chemstation Integrator)
Title: TO-15
Library Searched: C:\DATABASE\NBS75K.L

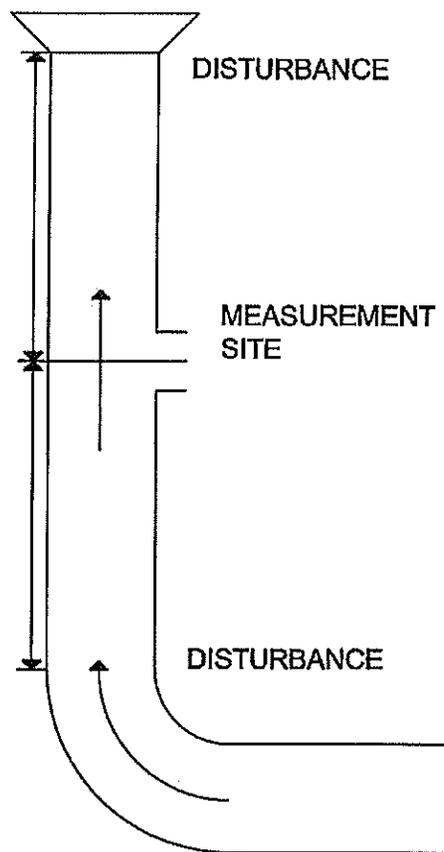
TIC Top Hit name	RT	EstConc	Units
Ethane, 1,1-difluoro-	4.89	1560.6	ppb

APPENDIX I
LOCATION OF SAMPLING PORTS & POINTS

Stack Test Group, Inc.
Air Compliance & Emissions Solutions

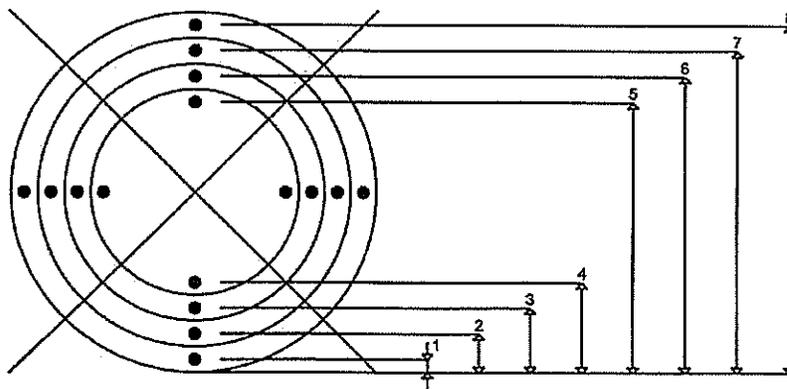
General Iron
Shredder Exhaust

Diameter of Stack = 50 in



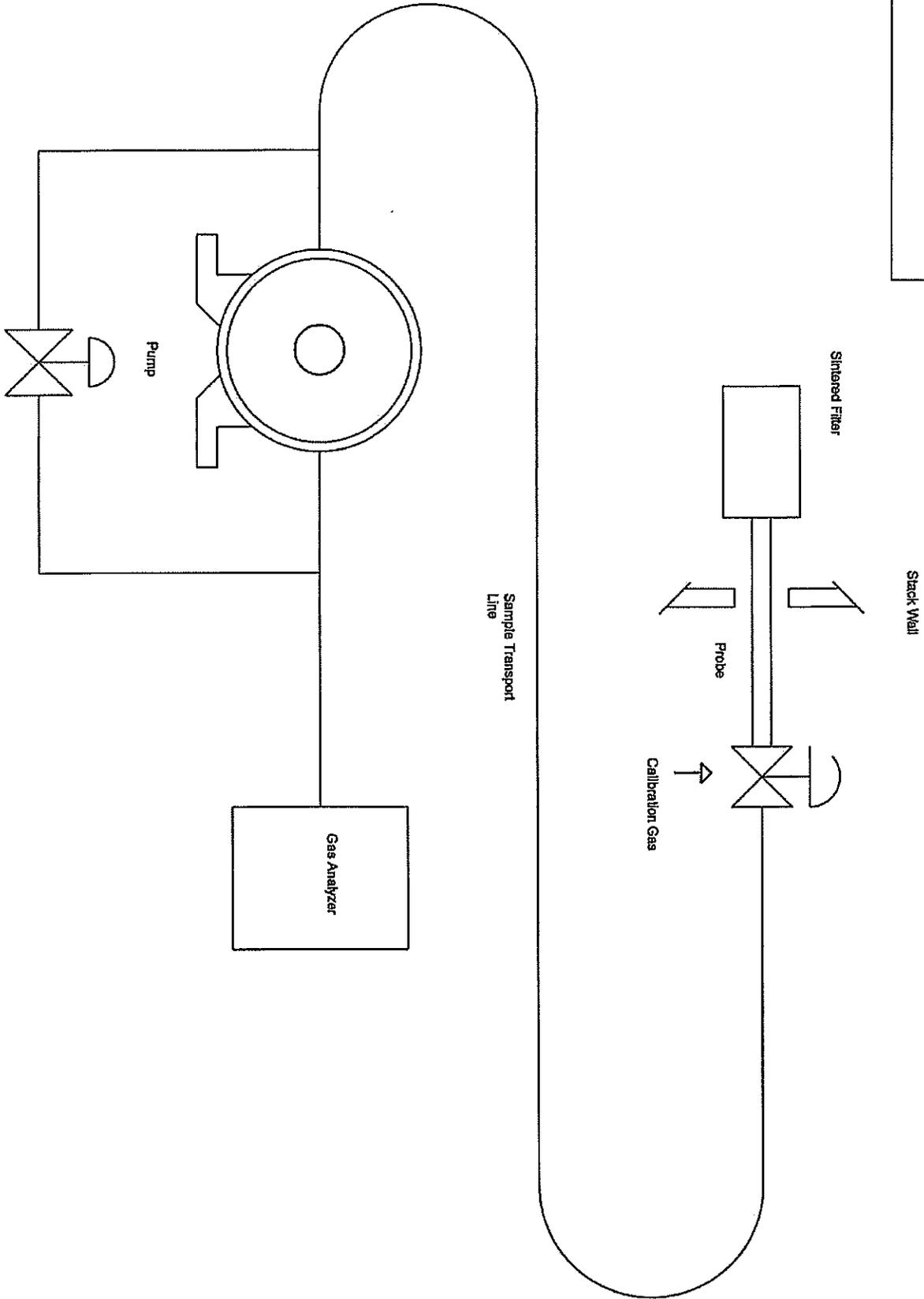
Location of Sample Ports

Traverse Point	% of diameter Distance	Distance form Stack Wall (in)
1	.032	1.6
2	.105	5.25
3	.194	9.7
4	.323	16.15
5	.677	33.85
6	.806	40.3
7	.895	44.75
8	.968	48.4



Location of Sample Points

Method 25A





**Shredder Emissions Test Report for
Total Hydrocarbons, Particulate, and Metals
General Iron Industries, Inc. – Chicago, Illinois
IEPA Bureau of Air Site ID No.: 031600BTB**

JUNE 25, 2018

APPENDIX B –

**Test Report Particulate Matter and Total Select Metals
Hammermill Shredder**

General Iron Industries, Inc. – Chicago, Illinois

**Prepared by Montrose Air Quality Services and
Dated June 21, 2018**

**TEST REPORT
PARTICULATE MATTER AND
TOTAL SELECT METALS
HAMMERMILL SHREDDER
GENERAL IRON INDUSTRIES, INC.
IEPA BUREAU OF AIR SITE ID NO.: 031600BTB
CHICAGO, ILLINOIS**

Prepared For:

Freeborn & Peters, LLP
311 South Wacker Drive
Chicago, Illinois 60606

Prepared By:

Montrose Air Quality Services, LLC
1371 Brummel Avenue
Elk Grove Village, Illinois

Document Number: 023AS-451738-RT-144
Test Dates: June 13 and 14, 2018
Document Date: June 25, 2018



General Iron Industries: Chicago, Illinois
 Hammermill Shredder PM and TSM

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General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

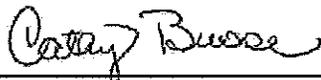
REPORT CERTIFICATION

STATEMENT OF CONFORMANCE AND TEST REPORT CERTIFICATION

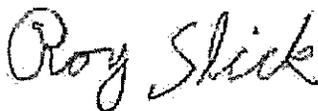
I certify, to the best of my knowledge, that this test program was conducted in a manner conforming to the criteria set forth in ASTM D7036-04: Standard Practice for Competence of Air Emission Testing Bodies, and that project management and supervision of all project related activities were performed by qualified individuals as defined by this practice.

I further certify that this test report and all attachments were prepared under my direction or supervision in accordance with the Montrose Air Quality Services, LLC quality management system designed to ensure that qualified personnel gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed the sampling and analysis relating to this performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate and complete.

Performance data is available upon request.



Cathy Busse
Technical Writer
Montrose Air Quality Services, LLC



Roy Slick, Technical Writer
Quality Assurance Manager
Montrose Air Quality Services, LLC

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

1.0 PROJECT OVERVIEW

1.1 GENERAL

Montrose Air Quality Services, LLC (Montrose) located at 1371 Brummel Avenue, Elk Grove Village, Illinois was contracted by Freeborn & Peters, LLP to conduct an air emissions test program at the General Iron Industries, Inc. (General Iron) facility located at 1909 N Clifton Ave, Chicago, Illinois. This test program was conducted in accordance with the United States Environmental Protection Agency (USEPA) Request to Provide Information Pursuant to the Clean Air Act (information request) dated November 16, 2017. The specific objectives of this test program were to determine the concentration of particulate matter (PM), and total selected metals (TSM¹) from the exhaust duct of the Hammermill Shredder.

Testing was performed at the direction of Freeborn & Peters, LLP.

Testing was performed on June 13 and June 14, 2018. Coordinating the field portion of the test program were:

John Pinion – RK & Associates, Inc. (630) 393-9000
Jim Kallas – General Iron Industries, Inc. (847) 508-9710
Michael Hess – Montrose Air Quality Services, LLC (630) 670-4740

Testing was witnessed on site by the following regulatory officials:

Kevin Mattison – Illinois Environmental Protection Agency (IEPA)
Scott Connolly – United States Environmental Protection Agency (USEPA)

1.2 METHODOLOGY

EPA Methods 5 and Method 29 were used in a combined sample train to determine the PM and TSM at the test location. In Method 5/29, a sample of the gas stream was withdrawn isokinetically from the exhaust duct and the PM collected in a glass lined sample probe and on a quartz fiber filter. TSM were collected in the glass lined probe, on the quartz fiber filter and in a series of chilled impingers charged with metals absorbing solutions. The mass of filterable and gaseous TSM, collected within the sample train, combined with the volume of dry gas withdrawn from the test location was used to calculate the TSM concentration. Analysis of samples for PM and TSM was conducted by ElementOne, Inc. at their laboratory located in Wilmington, North Carolina. PM results are expressed in units of grains per dry standard cubic foot (gr/dscf) and pounds per hour (lb/hr). Results for TSM are reported in units of microgram per dry standard cubic meter (ug/dscm) and lb/hr.

In order to convert the concentration of each constituent to a mass emissions rate, the volumetric flow rate through the test location was determined concurrently with each test run using EPA Methods 1, 2, 3A and 4.

¹ For this test program, TSM will include the following constituents: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, phosphorus, selenium, silver, thallium and zinc.

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

1.3 PARAMETERS

The following parameters were determined at the test location during each test run:

- gas temperature
- gas velocity
- carbon dioxide concentration
- oxygen concentration
- moisture concentration
- particulate matter concentration
- TSM concentrations

1.4 RESULTS

TABLE 1-1 EXECUTIVE SUMMARY

Pollutant	Method	Results (lb/hr)
PM	EPA Method 5	1.90
TSM	EPA Method 29	0.0973

A complete summary of test results is presented in Tables 2 - 1 and 2 - 2².

A TSM audit sample was submitted to ERA and analysis was conducted. The results of all audits may be found in the Laboratory section of the Appendix.

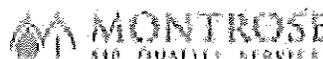
Due to the location of the test ports, a heated flexible ambilocal was used to connect the sampling probe to the impinger box. This is a modification from the Methods 5/29 procedures.

Run 3 did not meet the post leak check requirements. The results obtained with this sampling train were not analyzed and an additional run was performed to replace Run 3.

The blank correction used for the PM results was adjusted to 0.001% of the weight of the acetone. 222 ml of acetone was used for the field blank. The blank correction was calculated as follows:
Blank sample volume X specific gravity X 0.001/100. The specific calculation was:
(222 X 0.791 X .001)/100 = 0.0018

² MEASUREMENT UNCERTAINTY STATEMENT

Both qualitative and quantitative factors contribute to field measurement uncertainty and should be taken into consideration when interpreting the results contained within this report. Whenever possible, Montrose personnel reduce the impact of these uncertainty factors through the use of approved and validated test methods. In addition, Montrose personnel perform routine instrument and equipment calibrations and ensure that the calibration standards, instruments, and equipment used during test events meet, at a minimum, test method specifications as well as the specifications of the Montrose Quality Manual and ASTM D7036-04. The limitations of the various methods, instruments, equipment, and materials utilized during this test have been reasonably considered, but the ultimate impact of the cumulative uncertainty of this project is not fully identified within the results of this report.



General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

2.0 SUMMARY OF RESULTS

TABLE 2 – 1
SUMMARY OF PM RESULTS

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Gas Conditions					
Temperature (°F)	120	117	120	117	119
Volume Metered Standard, $V_{m(std)}$ (ft ³)	64.68	69.74	62.11	63.41	64.99
Volumetric Flow Rate (acfm)	66,300	71,200	65,500	66,100	67,300
Volumetric Flow Rate (scfm)	60,400	64,900	59,600	60,300	61,300
Volumetric Flow Rate (dscfm)	57,000	61,500	55,900	56,700	57,800
Carbon Dioxide (% dry)	0.40	0.30	0.39	0.40	0.37
Oxygen (% dry)	20.80	20.90	20.79	20.80	20.82
Moisture (%)	5.59	5.36	6.24	6.04	5.81
Particulate Results					
Concentration (grains/dscf)	0.00318	0.00398	0.00460	0.00361	0.00384
Emission Rate (lb/hr)	1.55	2.10	2.21	1.75	1.90

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

TABLE 2 - 2
SUMMARY OF TSM RESULTS

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Gas Conditions					
Temperature (°F)	120	117	120	117	119
Volumetric Flow Rate (acfm)	66,300	71,200	65,500	66,100	67,300
Volumetric Flow Rate (scfm)	60,400	64,900	59,600	60,300	61,300
Volumetric Flow Rate (dscfm)	57,000	61,500	55,900	56,700	57,800
Carbon Dioxide (% dry)	0.40	0.30	0.39	0.40	0.37
Oxygen (% dry)	20.80	20.90	20.79	20.80	20.82
Moisture (%)	5.59	5.36	6.24	6.04	5.81
Antimony - Sb					
Concentration (µg/dscm)	0.312*	0.379	0.371	0.237*	0.325
Concentration (gr/dscf)	1.36E-07*	1.66E-07	1.62E-07	1.04E-07*	1.42E-07
Emission Rate (lb/hr)	0.0000667*	0.0000874	0.0000778	0.0000504*	0.0000706
Arsenic - As					
Concentration (µg/dscm)	0.140*	0.152*	<0.114	<0.111	0.129
Concentration (gr/dscf)	6.13E-08*	6.66E-08*	<4.97E-08	<4.87E-08	5.66E-08
Emission Rate (lb/hr)	0.0000300*	0.0000351*	<0.0000238	<0.0000237	0.0000281
Barium - Ba					
Concentration (µg/dscm)	2.58	4.73	2.24	1.93	2.87
Concentration (gr/dscf)	1.13E-06	2.07E-06	9.79E-07	8.45E-07	1.25E-06
Emission Rate (lb/hr)	0.000551	0.00109	0.000469	0.000411	0.000630
Beryllium - Be					
Concentration (µg/dscm)	<0.0273	<0.0253	<0.0284	<0.0278	<0.0272
Concentration (gr/dscf)	<1.19E-08	<1.11E-08	<1.24E-08	<1.22E-08	<1.19E-08
Emission Rate (lb/hr)	<0.00000583	<0.00000583	<0.00000595	<0.00000592	<0.00000588

< indicates the results of both fractions were below the detection limit of the Method

* indicates one fraction was below the detection limit of the Method

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

TABLE 2 - 2
SUMMARY OF TSM RESULTS (CONTINUED)

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Cadmium - Cd					
Concentration ($\mu\text{g}/\text{dscm}$)	1.86*	1.00*	1.08	0.886*	1.21
Concentration (gr/dscf)	8.13E-07*	4.38E-07*	4.72E-07	3.87E-07*	5.28E-07
Emission Rate (lb/hr)	0.000398*	0.000231*	0.000226	0.000188*	0.000261
Chromium - Cr					
Concentration ($\mu\text{g}/\text{dscm}$)	1.35	1.59	1.38	1.10	1.35
Concentration (gr/dscf)	5.89E-07	6.93E-07	6.02E-07	4.83E-07	5.92E-07
Emission Rate (lb/hr)	0.000288	0.000365	0.000289	0.000235	0.000294
Cobalt - Co					
Concentration ($\mu\text{g}/\text{dscm}$)	<0.109	0.138*	<0.114	<0.111	<0.118
Concentration (gr/dscf)	<4.77E-08	6.04E-08*	<4.97E-08	<4.87E-08	<5.16E-08
Emission Rate (lb/hr)	<0.0000233	0.0000318*	<0.0000238	<0.0000237	<0.0000257
Copper - Cu					
Concentration ($\mu\text{g}/\text{dscm}$)	1.47	3.10	1.76	5.14	2.87
Concentration (gr/dscf)	6.44E-07	1.36E-06	7.70E-07	2.24E-06	1.25E-06
Emission Rate (lb/hr)	0.000315	0.000714	0.000369	0.00109	0.000622
Lead - Pb					
Concentration ($\mu\text{g}/\text{dscm}$)	4.93	7.43	5.44	3.42	5.30
Concentration (gr/dscf)	2.15E-06	3.25E-06	2.38E-06	1.49E-06	2.32E-06
Emission Rate (lb/hr)	0.00105	0.00171	0.00114	0.000727	0.001158
Manganese - Mn					
Concentration ($\mu\text{g}/\text{dscm}$)	4.01	4.82	5.42	3.48	4.43
Concentration (gr/dscf)	1.75E-06	2.11E-06	2.37E-06	1.52E-06	1.94E-06
Emission Rate (lb/hr)	0.000857	0.00111	0.00114	0.000738	0.000960

< indicates the results of both fractions were below the detection limit of the Method

* indicates one fraction was below the detection limit of the Method



General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

TABLE 2 – 2
SUMMARY OF TSM RESULTS (CONTINUED)

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Nickel - Ni					
Concentration ($\mu\text{g}/\text{dscm}$)	1.63	2.55	1.36	0.930	1.62
Concentration (gr/dscf)	7.14E-07	1.12E-06	5.92E-07	4.06E-07	7.07E-07
Emission Rate (lb/hr)	0.000349	0.000588	0.000284	0.000198	0.000355
Phosphorous - P					
Concentration ($\mu\text{g}/\text{dscm}$)	18.2	19.6	15.2	13.7	16.7
Concentration (gr/dscf)	7.93E-06	8.56E-06	6.66E-06	6.00E-06	7.29E-06
Emission Rate (lb/hr)	0.00388	0.00451	0.00319	0.00292	0.00363
Selenium - Se					
Concentration ($\mu\text{g}/\text{dscm}$)	0.698	1.17	<0.114	0.160	0.535
Concentration (gr/dscf)	3.05E-07	5.10E-07	<4.97E-08	6.98E-08	2.34E-07
Emission Rate (lb/hr)	0.000149	0.000269	<0.0000238	0.0000340	0.0001189
Silver - Ag					
Concentration ($\mu\text{g}/\text{dscm}$)	<0.109	<0.101	1.61*	<0.111	<0.482
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	7.02E-07*	<4.87E-08	<2.11E-07
Emission Rate (lb/hr)	<0.0000233	<0.0000233	0.000337*	<0.0000237	<0.000102
Thallium - Tl					
Concentration ($\mu\text{g}/\text{dscm}$)	<0.109	<0.101	<0.114	<0.111	<0.109
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	<4.97E-08	<4.87E-08	<4.76E-08
Emission Rate (lb/hr)	<0.0000233	<0.0000233	<0.0000238	<0.0000237	<0.0000235
Zinc - Zn					
Concentration ($\mu\text{g}/\text{dscm}$)	351	345	312	265	318
Concentration (gr/dscf)	1.53E-04	1.51E-04	1.36E-04	1.16E-04	1.39E-04
Emission Rate (lb/hr)	0.0750	0.0795	0.0654	0.0563	0.0690

< Indicates the results of both fractions were below the detection limit of the Method

* Indicates one fraction was below the detection limit of the Method

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

TABLE 2 – 2
SUMMARY OF TSM RESULTS (CONTINUED)

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Mercury - Hg					
Concentration ($\mu\text{g}/\text{dscm}$)	136*	50.6*	176*	11.0*	93.5
Concentration (gr/dscf)	5.96E-05*	2.21E-05*	7.68E-05*	4.82E-06*	4.08E-05
Emission Rate (lb/hr)	0.0291*	0.0117*	0.0368*	0.00234*	0.0200
Total Select Metals					
Emission Rate (lb/hr)	0.112	0.102	0.110	0.0654	0.0973

< indicates the results of both fractions were below the detection limit of the Method

* indicates at least one fraction was below the detection limit of the Method

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3.0 TEST PROCEDURES

3.1 METHOD LISTING

The test methods found in 40 CFR Part 60, Appendix A were referenced for the test program. The following individual methods were referenced:

Method 1	Sample and velocity traverse for stationary sources
Method 2	Determination of stack gas velocity and volumetric flow rate (type S pitot tube)
Method 3A	Determination of oxygen and carbon dioxide concentrations in emissions from stationary sources (Instrumental analyzer procedure)
Method 4	Determination of moisture content in stack gases
Method 5	Determination of particulate emissions from stationary sources
Method 29	Determination of Metals Emissions from Stationary Sources

3.2 METHOD DESCRIPTIONS

3.2.1 Method 1

Method 1 was used to determine the suitability of the test location and to determine the sample points used for the volumetric flow rate determinations. The test location conformed to the minimum requirements of being located at least 2.0 diameters downstream and at least 0.5 diameters upstream from the nearest flow disturbance.

The Hammermill Shredder test location was a round, vertical duct with a diameter of 50.0 inches. Eight points were sampled at each of the two test ports. The test location was approximately 6.0 diameters downstream and approximately 12.0 diameters upstream from the nearest flow disturbances. A cross section of the sampling location, showing the sample points, can be found in Figure 1 of the Appendix.

3.2.2 Method 2

EPA Method 2 was used to determine the gas velocity at the test location using an "S" type pitot tube and incline oil manometer. The manometer was leveled and "zeroed" prior to each test run. The sample trains were leak checked before and after each run by pressurizing the positive or "high" side, of each pitot tube and creating a 3 in. H₂O deflection on the manometer. The leak check was considered valid if the manometer remained stable for 15 seconds. This procedure was repeated on the negative side by generating a vacuum of at least 3 in. H₂O. The velocity head pressure and gas temperature were then determined at each point specified in Method 1. The static pressure of the duct was measured using water filled U-tube manometer. In addition, the barometric pressure was measured and recorded. A diagram of the Method 2 apparatus is shown in Figure 2 as part of the Method 5/29 sampling train.

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3.2.3 Method 3A

The carbon dioxide and oxygen contents were determined at the test location using EPA Method 3A. A gas sample was collected into a Tedlar bag from the back of each sample train for the duration of each test run. Analysis was performed using a Servomex 1440 infrared carbon dioxide analyzer/paramagnetic oxygen analyzer. The analyzers were calibrated immediately prior to analysis of the bag samples using the procedures outlined in Method 3A using EPA Protocol calibration gases.

The carbon dioxide content and oxygen content were used to calculate the dry molecular weight of the gas stream. The molecular weight was then used, along with the moisture content determined by EPA Method 4, for the calculation of the volumetric flow rate. For these calculations, the balance of the gas stream was assumed to be nitrogen since the other gas stream components are insignificant for the purposes of calculating molecular weight.

3.2.4 Method 4

The moisture content at the test location was determined using Method 4. A known volume of sample gas was withdrawn from the source and the moisture was condensed and measured. The dry standard volume of the sample gas was then compared to the volume of moisture collected to determine the moisture content of the sample gas. A diagram of the Method 4 apparatus is shown in Figure 2 as part of the Method 5/29 sampling trains.

To condense the water vapor, the gas sample passed through a series of impingers charged as outlined in Methods 29. After exiting the impinger system, the sample train was leak checked prior to the test run by capping the probe tip and pulling a vacuum of at least 15 inches Hg. The sample train was leak checked prior to the test run by capping the probe tip and pulling a vacuum higher than the value expected during the run. A leak check was considered valid if the leak rate was less than 0.02 cubic feet per minute.

The volume of dry gas exiting the gas condenser system was measured with a dry gas meter. After leaving the dry gas meter, the sample stream passed through an orifice used to meter the flow rate through the sample train. The pressure drop across the orifice was measured with an incline plane, oil manometer. The gas meter reading, gas meter inlet and outlet temperatures, gas meter static pressure and pump vacuum were recorded for each sample point.

After the test run, the sample train was leak checked at the highest vacuum encountered during the test run. The tests were considered valid since the leak rate was less than 0.02 cfm. The amount of water collected in the condenser system was measured gravimetrically. The net weight gain of water was converted to a volume of wet gas and then compared to the amount of dry gas sampled to determine the moisture content.

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3.2.5 Method 5/29

Methods 5 and 29 were used to determine the PM and TSM concentration in a combined sample train at the test location. A sample of the gas stream was withdrawn isokinetically from the stack and the PM in the sample gas stream was collected in a glass probe liner and on a quartz filter. The metals were collected in the glass probe liner, on the quartz filter and in a series of chilled impingers. A diagram of the Method 5/29 sampling train is shown in Figure 2 of the Appendix.

To prevent contamination, all components of the sample train were glass or Teflon with no metal connections. Prior to testing all components were washed with hot tap water then hot soapy water, rinsed three times with tap water and then rinsed three times with de-ionized, ultra filtered (DIUF) water. All glassware was then soaked for a minimum of four hours in a 10% nitric acid solution. After soaking, the glassware was rinsed three times with DIUF water and then rinsed with acetone. After drying, all components were sealed with parafilm.

The sample probe used consisted of a glass liner and glass nozzle. The liner was housed in a heated sheath maintained at a temperature of 248°F (+/- 25°F). Sample gas passed through the nozzle and probe assembly and then through a quartz fiber filter heated to 248°F (+/- 25°F). After exiting the filter, the sample gas passed through a series of six glass impingers. The first and second impingers contained 100ml of a 5 percent nitric acid (HNO₃)/10 percent hydrogen peroxide (H₂O₂) solution to collect all the metals except mercury. The third impinger remained empty to prevent cross contamination of the separate solutions. The fourth and fifth impingers contained 100ml of a 4 percent potassium permanganate (KMnO₄)/10 percent sulfuric acid (H₂SO₄) solution to absorb mercury. The sixth impinger contained a known quantity of silica gel. The dry gas exiting the moisture condenser system then passed through a sample pump and a dry gas meter to measure the gas volume. After leaving the dry gas meter, the sample stream passed through an orifice, which was used to meter the flow rate through the sample train. The pressure drop across the orifice was measured with an incline plane oil manometer.

Prior to the test run the filter was weighed to the nearest 0.0001g until a constant weight was achieved. The weight of the filter was considered constant only when two consecutive weights taken at least six hours apart were within 0.0005g of each other. The filter was then loaded into a glass filter holder with a Teflon support screen that was prepared in the same manner as the other components of the sample train. The probe was thoroughly cleaned with acetone and the probe wash saved as a quality assurance check. The condenser system was then loaded as outlined above. After assembly, the sample train was leak checked prior to the test run by capping the probe tip and pulling a vacuum of at least 15 in.Hg. A leak check was considered valid if the leak rate was below 0.02 cubic feet per minute.

The probe tip was placed at the first of the sample points determined in Method 1. The velocity at the sample point was determined using Method 2 by reading the velocity pressure from the oil manometer. Sample was withdrawn from the source at a rate such that the velocity at the opening of the nozzle matched the velocity of the stack gas at the sample point (isokinetically). During the test run the train was moved to each of the Method 1 sample points. The sample time at each point was calculated based on the number of sample points and the total run time. The run time and sample rate was

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determined such that a minimum sample volume of 60 dry standard cubic feet (dscf) was collected. The gas velocity pressure (ΔP), stack temperature, gas meter reading, gas meter inlet and outlet temperatures, gas meter orifice pressure (ΔH), probe and filter temperatures, and pump vacuum was recorded for each sample point.

After the test run, the train was leak checked at the highest vacuum encountered during the test run. The sample train was then transferred to the on-site laboratory for recovery. The filter was removed from the holder and placed in a glass petri dish. The front half of the sample train, consisting of the nozzle, probe liner and filter holder, was brushed with a non-metallic brush and rinsed with 0.1 N nitric acid. The rinse was saved in a 250ml trace clean amber glass sample jar. The contents of the first two impingers were recovered and saved in two 500ml sample jars. The impingers were then rinsed with 0.1N nitric acid, and the rinses added to the sample jars. The contents of the third impinger, which was originally empty, was recovered and saved separately in a 500ml sample jar. The impinger was rinsed with nitric acid and the rinse added to the sample jar. The contents of the fourth and fifth impingers was recovered and saved in two 500ml sample jars. The impingers were rinsed with fresh potassium permanganate and the rinse added to the sample jars. If deposits remained on the potassium permanganate impinger surface, the impingers were rinsed with 25 ml of 8 N hydrochloric acid (HCl) and the rinse saved in a separate 250ml sample jar.

Analysis of the samples for particulate and metals followed procedures outlined in EPA Method 29. The front half rinse and filter were digested with HNO_3 . This fraction and the sample fraction acquired from the first three impingers were analyzed separately for all the metals listed using ICP and GFAA. These two fractions were also analyzed for mercury using CVAA. The KMnO_4 impinger sample, the HCl rinse and the empty impinger sample were then analyzed separately for mercury using CVAA.

Analysis of the samples for PM and TSM was performed by ElementOne located in Wilmington, North Carolina.

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4.0 DESCRIPTION OF INSTALLATION

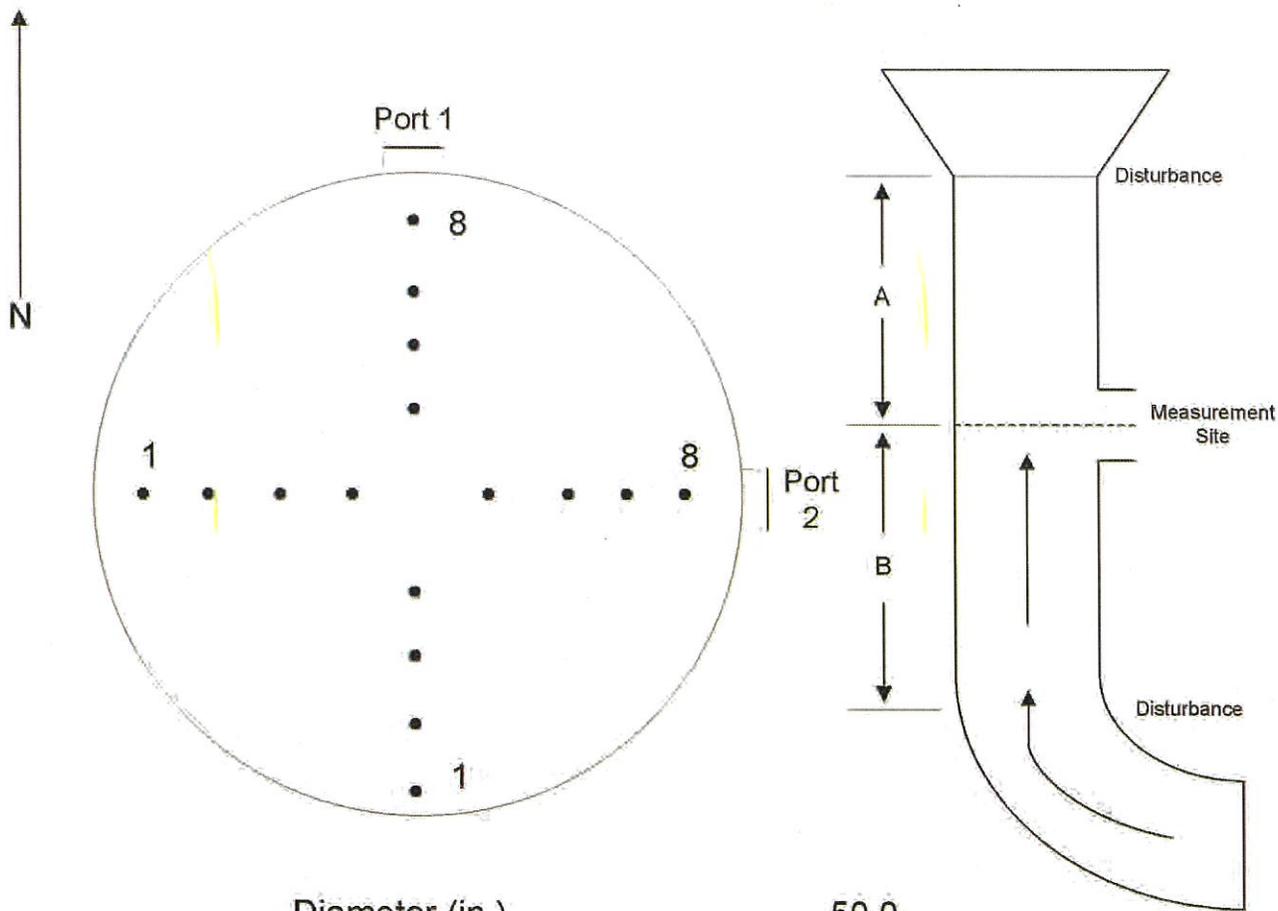
General Iron Industries, Inc. (General Iron) is an existing scrap metal recycling facility located at 1909 N. Clifton Avenue, Chicago, Illinois (see Figure 1). General Iron receives and shreds mixed scrap metal in various forms to produce uniform grades of ferrous and non-ferrous metals. Existing scrap handling and processing activities include receiving, sorting, shredding, metal separation and recovery of ferrous and nonferrous metals.

Testing was performed in the exhaust duct of the hammermill shredder air handling system, downstream of a cyclone separator, a roll media filter, and the induced draft fan.



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APPENDIX A FIGURES



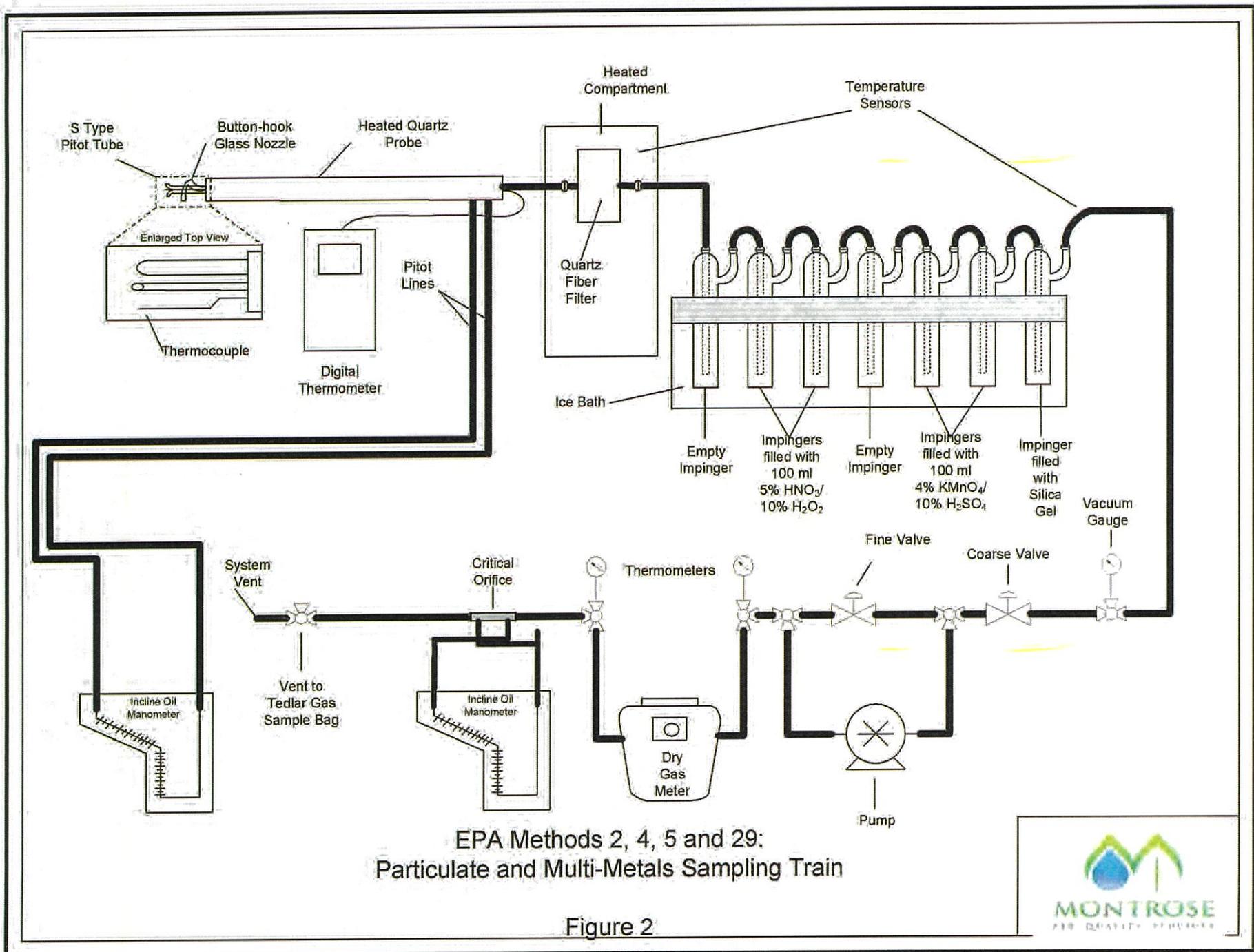
Diameter (in.)	50.0
Port Length (in.)	14.5
Distance A (Duct Diameters)	12.0
Distance B (Duct Diameters)	6.0

Point	Distance From Wall (in.)
1	1.6
2	5.3
3	9.7
4	16.2
5	33.8
6	40.3
7	44.8
8	48.4

Cross Section of the Hammermill Shredder
 Test Location
 General Iron Industries Corporation

Figure 1





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APPENDIX B SAMPLE CALCULATIONS

Sample Calculations for Method 5/29, Run 1**Area of Sample Location**

$$A_s = (\pi) \left(\frac{d_s}{2 \times 12} \right)^2$$

$$A_s = (\pi) \left(\frac{50.0}{2 \times 12} \right)^2$$

$$A_s = 13.6 \text{ ft}^2$$

where:

- A_s = area of stack (ft²)
- D_s = diameter of stack (in)
- 12 = conversion factor (in/ft)
- 2 = conversion factor (diameter to radius)

Stack Pressure Absolute

$$P_a = P_b + \frac{P_s}{13.6}$$

$$P_a = 29.85 + \frac{1.3}{13.6}$$

$$P_a = 29.95 \text{ in. Hg}$$

where:

- P_a = stack pressure absolute (in. Hg)
- P_b = barometric pressure (in. Hg)
- P_s = static pressure (in. H₂O)
- 13.6 = conversion factor (in. H₂O/in. Hg)

Volume of Dry Gas Collected Corrected to Standard Conditions

$$V_{m(std)} = \frac{17.64(V_m)(Y_d)\left(P_b + \frac{\Delta H}{13.6}\right)}{(T_m + 460)}$$

$$V_{m(std)} = \frac{17.64(69.19)(0.9987)\left(29.85 + \frac{1.62}{13.6}\right)}{(105 + 460)}$$

$$V_{m(std)} = 64.68 \text{ scf}$$

where:

$V_{m(std)}$	= volume of gas collected at standard conditions (scf)
V_m	= volume of gas sampled at meter conditions (ft ³)
Y_d	= gas meter correction factor (dimensionless)
P_b	= barometric pressure (in. Hg)
ΔH	= average sample pressure (in. H ₂ O)
T_m	= average gas meter temperature (°F)
13.6	= conversion factor (in. H ₂ O/in. Hg)
17.64	= ratio of standard temperature over standard pressure (°R/in. Hg)
460	= conversion (°F to °R)

Volume of Water Vapor Collected Corrected to Standard Conditions

$$V_{w(std)} = 0.04715 \times V_{wc} + 0.04715 \times V_{wsg}$$

$$V_{w(std)} = 0.04715 \times 68.5 + 0.04715 \times 12.8$$

$$V_{w(std)} = 3.83 \text{ scf}$$

where:

$V_{w(std)}$	= volume of water vapor at standard conditions (scf)
V_{wc}	= weight of liquid collected (g)
V_{wsg}	= weight gain of silica gel (g)
0.04715	= volume occupied by one gram water at standard conditions (ft ³ /g)

Percent Moisture

$$B_{ws} = 100 \times \left[\frac{V_{w(std)}}{(V_{m(std)} + V_{w(std)})} \right]$$

$$B_{ws} = 100 \times \left[\frac{3.83}{(64.68 + 3.83)} \right]$$

$$B_{ws} = 5.59\%$$

where:

- B_{ws} = moisture content of the gas stream (%)
- $V_{m(std)}$ = volume of gas collected at standard conditions (scf)
- $V_{w(std)}$ = volume of water vapor at standard conditions (scf)
- 100 = conversion factor

Molecular Weight of Dry Gas Stream³

$$M_d = \left(44 \times \frac{\%CO_2}{100} \right) + \left(32 \times \frac{\%O_2}{100} \right) + \left(28 \times \frac{(\%N_2)}{100} \right)$$

$$M_d = \left(44 \times \frac{0.4}{100} \right) + \left(32 \times \frac{20.8}{100} \right) + \left(28 \times \frac{78.8}{100} \right)$$

$$M_d = 28.90 \text{ lbs / lb - mole}$$

where:

- M_d = molecular weight of the dry gas stream (lb/lb-mole)
- $\%CO_2$ = carbon dioxide content of the dry gas stream (%)
- 44 = molecular weight of carbon dioxide (lb/lb-mole)
- $\%O_2$ = oxygen content of the dry gas stream (%)
- 32 = molecular weight of oxygen (lb/lb-mole)
- $\%CO$ = carbon monoxide content of the dry gas stream (%)
- $\%N_2$ = nitrogen content of the dry gas stream (%)
- 28 = molecular weight of nitrogen (lb/lb-mole)
- 100 = conversion factor

³ The remainder of the gas stream after subtracting carbon dioxide and oxygen is assumed to be nitrogen.

Molecular Weight of Wet Gas Stream

$$M_s = \left(M_d \times \left(1 - \frac{B_{ws}}{100} \right) \right) + \left(18 \times \frac{B_{ws}}{100} \right)$$

$$M_s = \left(28.90 \times \left(1 - \frac{5.59}{100} \right) \right) + \left(18 \times \frac{5.59}{100} \right)$$

$$M_s = 28.29 \text{ lbs / lb - mole}$$

where:

M_s	= molecular weight of the wet gas stream (lb/lb-mole)
M_d	= molecular weight of the dry gas stream (lb/lb-mole)
B_{ws}	= moisture content of the gas stream (%)
18	= molecular weight of water (lb/lb-mole)
100	= conversion factor

Velocity of Gas Stream

$$V_s = 85.49 (C_p) (\sqrt{\Delta P}) \sqrt{\frac{(T_s + 460)}{(M_s) \left(P_b + \frac{P_s}{13.6} \right)}}$$

$$V_s = 85.49 (0.84) (1.36) \sqrt{\frac{(120 + 460)}{(28.29) \left(29.85 + \frac{1.3}{13.6} \right)}}$$

$$V_s = 81.0 \text{ ft / sec}$$

where:

V_s	= average velocity of the gas stream (ft/sec)
C_p	= pitot tube coefficient dimensionless
$\sqrt{\Delta P}$	= average square root of velocity pressures (in. H ₂ O) ^{1/2}
T_s	= average stack temperature (°F)
M_s	= molecular weight of the wet gas stream (lb/lbmole)
P_b	= barometric pressure (in. Hg)
P_s	= static pressure of gas stream (in. H ₂ O)
85.49	= pitot tube constant (ft/sec)/[(lb/lbmole)(in. Hg)]/[°R)(in. H ₂ O)] ^{1/2}
460	= conversion (°F to °R)
13.6	= conversion factor (in. H ₂ O/in Hg)

Volumetric Flow of Gas Stream - Actual Conditions

$$Q_a = 60(V_s)(A_s)$$

$$Q_a = 60(81.0)(13.6)$$

$$Q_a = 66,269 \text{ acfm}$$

where:

Q_a = volumetric flow rate of the gas stream at actual conditions (acfm)

V_s = average velocity of the gas stream (ft/sec)

A_s = area of duct or stack (ft²)

60 = conversion factor (sec/min)

Volumetric Flow of Gas Stream - Standard Conditions

$$Q_{\text{std}} = \frac{17.64(Q_a)(P_a)}{(T_s + 460)}$$

$$Q_{\text{std}} = \frac{17.64(66,269)(29.95)}{(120 + 460)}$$

$$Q_{\text{std}} = 60,368 \text{ scfm}$$

where:

Q_{std} = volumetric flow rate of the gas stream at standard conditions (scfm)

Q_a = volumetric flow rate of the gas stream at actual conditions (acfm)

T_s = average stack temperature (°F)

P_a = stack pressure absolute (in. Hg)

17.64 = ratio of standard temperature over standard pressure (°R/in. Hg)

460 = conversion (°F to °R)

Volumetric Flow of Gas Stream - Standard Conditions - Dry Basis

$$Q_{\text{dstd}} = Q_{\text{std}} \left(1 - \frac{B_{\text{ws}}}{100} \right)$$

$$Q_{\text{dstd}} = 60,368 \left(1 - \frac{5.59}{100} \right)$$

$$Q_{\text{dstd}} = 57,013 \text{ dscfm}$$

where:

Q_{dstd} = volumetric flow rate of the dry gas stream at standard conditions (dscfm)

Q_{std} = volumetric flow rate of the gas stream at standard conditions (scfm)

B_{ws} = moisture content of the gas stream (%)

100 = conversion factor

Area of Nozzle

$$A_n = \pi \times \left(\frac{d_n}{2 \times 12} \right)^2$$

$$A_n = \pi \times \left(\frac{0.170}{2 \times 12} \right)^2$$

$$A_n = 0.000158 \text{ ft}^2$$

where:

A_n = area of nozzle (ft²)

d_n = diameter of nozzle (in)

12 = conversion factor (in/ft)

2 = conversion factor (diameter to radius)

Percent Isokinetic

$$I = \frac{0.0945(T_s + 460)(V_{m(std)})}{\left(P_b + \frac{P_s}{13.6}\right)(v_s)(A_n)(\Theta)\left(1 - \frac{B_{ws}}{100}\right)}$$

$$I = \frac{0.0945(120 + 460)(64.68)}{\left(29.85 + \frac{1.3}{13.6}\right)(81.0)(0.000158)(96)\left(1 - \frac{5.59}{100}\right)}$$

$$I = 102.3\%$$

where:

I	= percent isokinetic (%)
T _s	= average stack temperature (°F)
V _{m(std)}	= volume of gas collected at standard temperature and pressure (scf)
P _b	= barometric pressure (in. Hg)
P _s	= static pressure of gas stream (in. H ₂ O)
V _s	= average velocity of the gas stream (ft/sec)
A _n	= cross sectional area of nozzle (ft ²)
Θ	= sample time (min)
B _{wsat}	= moisture saturation point of the gas stream (%)
0.0945	= constant (°R/in. Hg)
460	= conversion (°F to °R)
13.6	= conversion factor (in. H ₂ O/in Hg)
100	= conversion factor

Acetone Wash Blank Correction

$$W_a = \frac{(m_{ab})(v_{aw})}{v_{awb}}$$

$$W_a = \frac{(0.0018)(134)}{222}$$

$$W_a = 0.0011g$$

where:

W _a	= maximum allowable particulate mass in acetone wash blank (g)
m _{ab}	= mass collected, acetone wash blank (g)
v _{aw}	= mass of acetone wash (g)
v _{awb}	= mass of acetone wash blank (g)

Particulate Catch

$$M_n = m_f + (m_a - W_a)$$

$$M_n = 0.0052 + (0.0092 - 0.0011)$$

$$M_n = 0.0133g$$

where:

- M_n = particulate catch (g)
- m_f = particulate on filter (g)
- m_a = particulate in wash (g)
- W_a = particulate mass in acetone wash blank (g)

Particulate Concentration, grains/dscf

$$C = \frac{(M_n)(15.43)}{V_{m(std)}}$$

$$C = \frac{(0.0133)(15.43)}{64.68}$$

$$C = 0.00318gr / dscf$$

where:

- C = particulate concentration (grains/dscf)
- M_n = particulate catch (g)
- $V_{m(std)}$ = volume of gas collected at standard temperature and pressure (scf)
- 15.43 = conversion factor (grains/g)

Particulate Emission Rate (lb/hr)

$$E_{lb/hr} = \frac{(M_n)(Q_{dstd})(60)}{(V_{m(std)})(453.6)}$$

$$E_{lb/hr} = \frac{(0.0133)(57,013)(60)}{(64.68)(453.6)}$$

$$E_{lb/hr} = 1.55 lb/hr$$

where:

- $E_{lb/hr}$ = particulate emission rate (lb/hr)
- M_n = particulate catch (g)
- $V_{m(std)}$ = volume of dry gas collected at standard temperature and pressure (scf)
- Q_{dstd} = volumetric flow rate of the gas stream at standard conditions, on a dry basis (dscfm)
- 60 = conversion factor (min/hr)
- 453.6 = conversion factor (g/lb)

Concentration of Lead in Flue Gas, ug/dscm⁴

$$C_{ug/dscm} = \frac{(M_c)}{(V_{m(std)})} (35.31)$$

$$C_{ug/dscm} = \frac{(9.03)}{(64.68)} (35.31)$$

$$C_{ug/dscm} = 4.93 ug/dscm$$

where:

- $C_{ug/dscm}$ = concentration of lead in flue gas (ug/dscm)
- M_c = mass of lead in sample (ug)
- $V_{m(std)}$ = volume of gas collected at standard temperature and pressure (scf)
- 35.31 = conversion factor (ft³/m³)

⁴ The concentrations of all TSM are calculated in a similar manner.

Concentration of Lead in Flue Gas, gr/dscf⁵

$$C_{gr/dscf} = \frac{(C_{ug/dscm})(15.43)}{(35.32)(10^6)}$$

$$C_{gr/dscf} = \frac{(4.93)(15.43)}{(35.32)(10^6)}$$

$$C_{gr/dscf} = 2.15E^{-6} \text{ gr / dscf}$$

where:

$C_{gr/dscf}$	= concentration of lead in flue gas (gr/dscf)
$C_{ug/dscm}$	= concentration of lead in flue gas (ug/dscm)
15.43	= conversion factor (grains/g)
35.32	= conversion factor (ft ³ /m ³)
10 ⁶	= conversion factor (ug/g)

Lead Emission Rate, lb/hr⁶

$$E_{lb/hr} = \frac{(C_{ug/dscm})(Q_{dstd})(60)}{(35.315)(10^6)(453.6)}$$

$$E_{lb/hr} = \frac{(4.93)(57,013)(60)}{(35.315)(10^6)(453.6)}$$

$$E_{lb/hr} = 0.00105 \text{ lb / hr}$$

where:

$E_{lb/hr}$	= lead emission rate (lb/hr)
$C_{ug/dscm}$	= lead concentration (ug/dscm)
Q_{dstd}	= volumetric flow rate of dry gas stream at standard conditions (dscfm)
10 ³	= conversion factor (ug/mg)
35.315	= conversion factor (ft ³ /m ³)
60.0	= conversion factor (min/hr)

⁵ The concentrations of all TSM are calculated in a similar manner.

⁶ The emission rates of all TSM are calculated in a similar manner.

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APPENDIX C PARAMETERS

General Iron Industries, Inc.
Hammermill Shredder

Method 5 and 29 Parameters

Project No. 023AS-451738

EPA Methods 1-4 Parameters	Run 1	Run 2	Run 4	Run 5
Date	6/13/2018	6/13/2018	6/14/2018	6/14/2018
Start Time	11:49	15:15	10:56	13:45
Stop Time	13:40	17:09	12:45	15:33
Dimensions of Sample Location, D_s (in)	50.0	50.0	50.0	50.0
Velocity Pressure, $\Delta P^{1/2}$ avg (in. $H_2O^{1/2}$)	1.36	1.47	1.35	1.36
Barometric Pressure, P_b (Inches Hg)	29.85	29.79	29.85	29.80
Static Pressure, P_s (Inches H_2O)	1.3	1.0	1.0	1.0
Pitot Coefficient, C_p	0.84	0.84	0.84	0.84
Sample Location Temperature, T_s ($^{\circ}F$)	120	117	120	117
Volume Metered, V_m (ft^3)	69.19	75.29	65.49	66.40
Meter Temperature, T_m ($^{\circ}F$)	105	109	96.5	91.8
Average Sample Pressure, ΔH_{avg} (in. H_2O)	1.62	1.86	1.51	1.54
Gas Meter Correction Factor, Y_d	0.9987	0.9987	0.9987	0.9987
Carbon Dioxide (% dry)	0.40	0.30	0.39	0.40
Oxygen (% dry)	20.8	20.9	20.8	20.8
Weight of Water Collected, V_{wc} (g)	68.5	64.7	72.6	74.6
Silica Gel Net Weight, V_{wsg} (g)	12.8	19.1	15.1	11.8
Diameter of Nozzle, D_n (in)	0.170	0.170	0.170	0.170
Run Time, θ (minutes)	96	96	96	96
EPA METHODS 1-4 RESULTS				
Area of Sample Location, A_s (ft^2)	13.6	13.6	13.6	13.6
Stack Pressure Absolute (inches Hg)	29.95	29.86	29.92	29.87
Volume Metered Standard, $V_{m(std)}$ (ft^3)	64.68	69.74	62.11	63.41
Volume of Water Vapor, $V_{v(std)}$ (ft^3)	3.83	3.95	4.14	4.07
Percent Moisture, B_{ws} (%)	5.59	5.36	6.24	6.04
Moisture Saturation Point, B_{wsat} (%)	11.5	10.7	11.6	10.7
Dry Molecular Weight, M_d (lbs/lb mole)	28.90	28.88	28.89	28.90
Wet Molecular Weight, M_s (lbs/lb mole)	28.29	28.30	28.21	28.24
Gas Velocity, V_s (ft/sec)	81.0	87.0	80.1	80.8
Average Flowrate, Q_a (acfm)	66,269	71,167	65,533	66,101
Standard Flowrate, Q_{std} (scfm)	60,368	64,946	59,615	60,350
Dry Standard Flowrate, Q_{dstd} (dscfm)	57,013	61,489	55,916	56,729
Area of Nozzle, A_n (ft^2)	0.000158	0.000158	0.000158	0.000158
Isokinetics (%)	102.3	102.3	100.2	100.8
F1/2 Particulate Matter (mg)	14.4	18.7	19.4	15.5
F1/2 Particulate Matter, blank corrected (g)	0.0133	0.0180	0.0185	0.0148
Concentration (gr/dscf)	0.00318	0.00398	0.00460	0.00361
Emission Rate (lb/hr)	1.55	2.10	2.21	1.75

General Iron Industries, Inc.
Hammermill Shredder

Method 5 Parameters

Project No. 023AS-451738

EPA Method 5 Parameters		Blank	Run 1	Run 2	Run 4	Run 5
<u>Filter</u>			31347	31346	31457	31460
Filter tare weight (g)		0.4022	0.4015	0.4031	0.3679	0.3551
Filter final weight (g)		0.4035	0.4067	0.4118	0.3759	0.3618
Filter net weight, m_f (g)		0.0013	0.0052	0.0087	0.0080	0.0067
<u>Front Half Wash</u>	<i>Beaker ID</i>	895	758	737	597	x23
Beaker tare weight (g)		10.2526	10.8814	11.0158	10.1119	9.9149
Beaker final weight (g)	Average	10.2550	10.8906	11.0258	10.1233	9.9237
Volume of Wash, V_{aw} (ml)		222	134	88	108	84
Beaker net weight, m_a (g)		0.0018	0.0092	0.0100	0.0114	0.0088

General Iron Industries, Inc.
Hammermill Shredder

Method 29 Parameters

Project No. 023AS-451738

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
Front Half (ug)	0.472	0.6225	0.388	0.326
Back Half (ug)	<0.1	0.127	0.265	<0.1
Antimony - Sb, (μg)	0.572	0.749	0.653	0.426
Front Half (ug)	0.157	0.201	<0.1	<0.1
Back Half (ug)	<0.1	<0.1	<0.1	<0.1
Arsenic - As, (μg)	0.257	0.301	<0.2	<0.2
Front Half (ug)	3.95	3.96	2.80	2.73
Back Half (ug)	0.774	5.38	1.14	0.741
Barium - Ba, (μg)	4.724	9.34	3.94	3.47
Front Half (ug)	<0.025	<0.025	<0.025	<0.025
Back Half (ug)	<0.025	<0.025	<0.025	<0.025
Beryllium - Be, (μg)	<0.050	<0.050	<0.050	<0.050
Front Half (ug)	3.31	1.88	1.74	1.49
Back Half (ug)	<0.1	<0.1	0.159	<0.1
Cadmium - Cd, (μg)	3.41	1.98	1.90	1.59
Front Half (ug)	2.01	2.14	1.76	1.58
Back Half (ug)	0.460	0.997	0.664	0.404
Chromium - Cr, (μg)	2.47	3.13	2.42	1.98
Front Half (ug)	<0.1	<0.1	<0.1	<0.1
Back Half (ug)	<0.1	0.173	<0.1	<0.1
Cobalt - Co, (μg)	<0.2	0.273	<0.2	<0.2
Front Half (ug)	1.63	1.79	1.55	1.35
Back Half (ug)	1.07	4.34	1.55	7.87
Copper - Cu, (μg)	2.70	6.13	3.100	9.22
Front Half (ug)	7.70	10.7	8.68	5.67
Back Half (ug)	1.33	3.98	0.884	0.471
Lead - Pb, (μg)	9.03	14.7	9.56	6.14
Front Half (ug)	4.04	4.52	3.97	4.02
Back Half (ug)	3.31	5.00	5.57	2.22
Manganese - Mn, (μg)	7.35	9.52	9.54	6.24
Front Half (ug)	2.54	2.64	0.974	0.864
Back Half (ug)	0.452	2.41	1.41	0.805
Nickel - Ni, (μg)	2.99	5.05	2.38	1.67
Front Half (ug)	5.96	8.86	5.22	4.46
Back Half (ug)	27.3	29.9	21.6	20.2
Phosphorous - P, (μg)	33.3	38.7	26.8	24.7

General Iron Industries, Inc.
Hammermill Shredder

Method 29 Parameters

Project No. 023AS-451738

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
Front Half (ug)	0.943	1.74	<0.1	0.186
Back Half (ug)	0.336	0.569	<0.1	0.101
Selenium - Se, (µg)	1.28	2.30	<0.2	0.287
Front Half (ug)	<0.1	<0.1	<0.1	<0.1
Back Half (ug)	<0.1	<0.1	2.726	<0.1
Silver - Ag, (µg)	<0.2	<0.2	2.83	<0.2
Front Half (ug)	<0.1	<0.1	<0.1	<0.1
Back Half (ug)	<0.1	<0.1	<0.1	<0.1
Thallium - Tl, (µg)	<0.2	<0.2	<0.2	<0.2
Front Half (ug)	612	629	524	455
Back Half (ug)	30.9	52.6	25.1	21.0
Zinc - Zn, (µg)	643	682	549	476
Mercury - Hg				
Front-Half Trial 1	<0.1	<0.1	<0.1	<0.1
Front-Half Trial 2	<0.1	<0.1	<0.1	<0.1
Front-Half (µg)	<0.1	<0.1	<0.1	<0.1
H ₂ O ₂ /HNO ₃ Impingers Trial 1	<0.5	<0.3	<0.3	<0.4
H ₂ O ₂ /HNO ₃ Impingers Trial 2	<0.5	<0.3	<0.3	<0.4
H ₂ O ₂ /HNO ₃ Impingers (µg)	<0.5	<0.3	<0.3	<0.4
Empty Impinger Trial 1	<0.2	<0.2	<0.2	<0.2
Empty Impinger Trial 2	<0.2	<0.2	<0.2	<0.2
Empty Impinger (µg)	<0.2	<0.2	<0.2	<0.2
H ₂ SO ₄ /KMnO ₄ Impingers Trial 1	232	80.3	205	9.65
H ₂ SO ₄ /KMnO ₄ Impingers Trial 2	233	80.2	211	9.66
H ₂ SO ₄ /KMnO ₄ (µg)	233	80.3	208	9.66
8N HCl Rinse Trial 1	17.5	19.8	101	10.2
8N HCl Rinse Trial 2	17.5	19.6	101	10.2
8N HCl Rinse (µg)	17.5	19.7	101	10.2
Total Mercury - Hg (µg)	250	100	309	19.8

General Iron Industries, Inc.
Hammermill Shredder

Method 29 Parameters

Project No. 023AS-451738

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
<i>Antimony - Sb</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	0.312	0.379	0.371	0.237
Concentration (gr/dscf)	1.36E-07	1.66E-07	1.62E-07	1.04E-07
Emission Rate (lb/hr)	0.0000667	0.0000874	0.0000778	0.0000504
<i>Arsenic - As</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	0.140	0.152	<0.114	<0.111
Concentration (gr/dscf)	6.13E-08	6.66E-08	<4.97E-08	<4.87E-08
Emission Rate (lb/hr)	0.0000300	0.0000351	<0.0000238	<0.0000237
<i>Barium - Ba</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	2.58	4.73	2.24	1.93
Concentration (gr/dscf)	1.13E-06	2.07E-06	9.79E-07	8.45E-07
Emission Rate (lb/hr)	0.000551	0.00109	0.000469	0.000411
<i>Beryllium - Be</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	<0.0273	<0.0253	<0.0284	<0.0278
Concentration (gr/dscf)	<1.19E-08	<1.11E-08	<1.24E-08	<1.22E-08
Emission Rate (lb/hr)	<0.00000583	<0.00000583	<0.00000595	<0.00000592
<i>Cadmium - Cd</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	1.86	1.00	1.08	0.886
Concentration (gr/dscf)	8.13E-07	4.38E-07	4.72E-07	3.87E-07
Emission Rate (lb/hr)	0.000398	0.000231	0.000226	0.000188
<i>Chromium - Cr</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	1.35	1.59	1.38	1.10
Concentration (gr/dscf)	5.89E-07	6.93E-07	6.02E-07	4.83E-07
Emission Rate (lb/hr)	0.000288	0.000365	0.000289	0.000235
<i>Cobalt - Co</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	<0.109	0.138	<0.114	<0.111
Concentration (gr/dscf)	<4.77E-08	6.04E-08	<4.97E-08	<4.87E-08
Emission Rate (lb/hr)	<0.0000233	0.0000318	<0.0000238	<0.0000237
<i>Copper - Cu</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	1.47	3.10	1.76	5.14
Concentration (gr/dscf)	6.44E-07	1.36E-06	7.70E-07	2.24E-06
Emission Rate (lb/hr)	0.000315	0.000714	0.000369	0.00109

General Iron Industries, Inc.
Hammermill Shredder

Method 29 Parameters

Project No. 023AS-451738

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
<i>Lead - Pb</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	4.93	7.43	5.44	3.42
Concentration (gr/dscf)	2.15E-06	3.25E-06	2.38E-06	1.49E-06
Emission Rate (lb/hr)	0.00105	0.00171	0.00114	0.000727
<i>Manganese - Mn</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	4.01	4.82	5.42	3.48
Concentration (gr/dscf)	1.75E-06	2.11E-06	2.37E-06	1.52E-06
Emission Rate (lb/hr)	0.000857	0.001110	0.001136	0.000738
<i>Nickel - Ni</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	1.63	2.55	1.36	0.930
Concentration (gr/dscf)	7.14E-07	1.12E-06	5.92E-07	4.06E-07
Emission Rate (lb/hr)	0.000349	0.000588	0.000284	0.000198
<i>Phosphorous - P</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	18.2	19.6	15.2	13.7
Concentration (gr/dscf)	7.93E-06	8.56E-06	6.66E-06	6.00E-06
Emission Rate (lb/hr)	0.00388	0.00451	0.00319	0.00292
<i>Selenium - Se</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	0.70	1.17	<0.114	0.160
Concentration (gr/dscf)	3.05E-07	5.10E-07	<4.97E-08	6.98E-08
Emission Rate (lb/hr)	0.000149	0.000269	<0.0000238	0.0000340
<i>Silver - Ag</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	<0.109	<0.101	1.61	<0.111
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	7.02E-07	<4.87E-08
Emission Rate (lb/hr)	<0.0000233	<0.0000233	0.000337	<0.0000237
<i>Thallium - Tl</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	<0.109	<0.101	<0.114	<0.111
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	<4.97E-08	<4.87E-08
Emission Rate (lb/hr)	<0.0000233	<0.0000233	<0.0000238	<0.0000237
<i>Zinc - Zn</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	351	345	312	265
Concentration (gr/dscf)	1.53E-04	1.51E-04	1.36E-04	1.16E-04
Emission Rate (lb/hr)	0.0750	0.0795	0.0654	0.0563
<i>Mercury - Hg</i>				
Concentration ($\mu\text{g}/\text{dscm}$)	136	50.6	176	11.0
Concentration (gr/dscf)	5.96E-05	2.21E-05	7.68E-05	4.82E-06
Emission Rate (lb/hr)	0.0291	0.0117	0.0368	0.00234

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM
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APPENDIX D FIELD DATA PRINTOUTS

General Iron Industries, Inc.
Hammermill Shredder

Method 29 Field Data Entry

Project No. 023AS-451738

Project Number	451738
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/13/2018
Meter ID	M-39
Y _d	0.9987
Pilot C ₂	0.84

Place an "x" in the appropriate Box

Nozzle Diameter (in)	0.170
Filter ID	31347
Train Type	IMP
Train ID	IB-18
P _b (Inches Hg)	29.85
P _s (Inches H ₂ O)	1.3
Start Time	11:49
Stop Time	13:40

Circular?	x
Rectangular?	
Diameter	50
Length	
Width	

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	642.4	681.4	39.0
Impinger 2	713.4	733.9	20.5
Impinger 3	752.7	758.0	5.3
Impinger 4	605.6	607.9	2.3
Impinger 5	630.7	632.1	1.4
Impinger 6	737.2	737.2	0.0
Silica Gel	911.1	923.9	12.8
Weight of Water Collected, V _{wc} (g)			68.5
Silica Gel Net Weight, V _{wsg} (g)			12.8

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.40	NA	20.8
Trial 2	0.40	NA	20.8
Trial 3	0.40	NA	20.8
Average	0.40	NA	20.8

Run 1

Traverse Point	Min/PT	Velocity Pressure Δ P (in. H ₂ O)	Orifice Setting Δ H (in. H ₂ O)	Gas Sample Volume Initial (ft ³)	Stack Temp (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root Δ P	Stack Gas Velocity Vs (ft/sec)	Volume Metered Vmstd (ft ³)	Isokinetics (%)
	6										
1-1	6	1.60	1.40	811.55	114	93	89	1.265	74.8	4.013	108.9
1-2	12	1.90	1.60	815.92	119	96	91	1.378	81.8	4.168	104.2
1-3	18	1.80	1.50	820.20	119	101	91	1.342	79.7	4.063	104.4
1-4	24	1.70	1.50	824.50	120	103	93	1.304	77.5	4.067	107.6
1-5	30	1.60	1.40	828.90	121	105	95	1.265	75.2	4.146	113.2
1-6	36	2.20	1.90	832.84	120	107	98	1.483	88.1	3.701	86.1
1-7	42	2.40	2.10	837.60	120	109	100	1.549	92.1	4.457	99.3
1-8	48	2.00	1.70	842.10	121	110	102	1.414	84.1	4.198	102.5
2-1	54	1.50	1.30	846.14	121	107	104	1.225	72.8	3.769	106.3
2-2	60	1.60	1.40	850.25	120	110	104	1.265	75.2	3.825	104.3
2-3	66	1.70	1.50	854.30	120	112	106	1.304	77.5	3.767	99.4
2-4	72	1.60	1.40	858.35	121	115	108	1.265	75.2	3.739	102.1
2-5	78	1.70	1.50	862.45	120	115	109	1.304	77.5	3.783	100.1
2-6	84	2.20	1.90	867.22	123	116	110	1.483	88.4	4.398	102.6
2-7	90	2.20	1.90	871.82	118	116	111	1.483	88.0	4.238	98.4
2-8	96	2.20	1.90	876.55	121	116	111	1.483	88.2	4.357	101.4

Totals and Averages

96	1.62	69.19	120	105	1.36	81.0	64.68	102.3
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Project Number	451738
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/13/2018
Meter ID	M-39
Y _d	0.9987
Pilot C _o	0.84

Place an "x" in the appropriate Box

Circular?	x
Rectangular?	
Diameter	50
Length	
Width	

Nozzle Diameter (in)	0.170
Filter ID	31346
Train Type	JMP
Train ID	IB-16
P ₁ (inches Hg)	29.79
P ₂ (inches H ₂ O)	1.0
Start Time	15:15
Stop Time	17:09

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	736.9	769.0	32.1
Impinger 2	736.0	763.1	17.1
Impinger 3	661.4	667.8	6.4
Impinger 4	733.7	741.5	7.8
Impinger 5	735.8	737.1	1.3
Silica Gel	946.1	965.2	19.1
Weight of Water Collected, V _{wc} (g)			64.7
Silica Gel Net Weight, V _{wsg} (g)			19.1

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.30	NA	20.9
Trial 2	0.30	NA	20.9
Trial 3	0.30	NA	20.9
Average	0.30	NA	20.9

Run 2

Traverse Point	Min/Pl	Velocity Pressure Δ P (in. H ₂ O)	Orifice Setting Δ H (in. H ₂ O)	Gas Sample Volume Initial (ft ³)	Stack Temp. (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root Δ P	Stack Gas Velocity Vs (ft/sec)	Volume Metered V _{mstd} (ft ³)	Isokinetics (%)
	6										
1-1	6	2.90	2.60	883.75	113	107	106	1.703	100.7	4.886	98.3
1-2	12	2.70	2.30	888.90	115	109	106	1.643	97.3	4.790	100.0
1-3	18	2.50	2.20	893.95	116	111	106	1.581	93.7	4.687	101.8
1-4	24	2.10	1.80	899.08	117	113	107	1.449	86.0	4.744	112.6
1-5	30	2.40	2.10	903.60	118	115	108	1.549	92.0	4.172	92.7
1-6	36	2.00	1.70	908.45	118	116	108	1.414	84.0	4.472	108.8
1-7	42	2.10	1.80	913.30	115	117	110	1.449	85.8	4.458	105.6
1-8	48	1.90	1.60	917.70	119	118	111	1.378	81.9	4.035	100.8
2-1	54	2.70	2.30	923.26	120	107	109	1.643	97.8	6.167	108.2
2-2	60	2.10	1.80	928.05	119	108	108	1.449	86.1	4.455	105.9
2-3	66	1.80	1.40	932.16	122	109	107	1.265	75.4	3.811	104.0
2-4	72	2.00	1.70	936.50	118	110	107	1.414	84.0	4.023	97.9
2-5	78	1.90	1.60	940.72	117	109	106	1.378	81.8	3.918	97.7
2-6	84	2.00	1.70	945.15	117	110	106	1.414	83.9	4.110	99.9
2-7	90	1.90	1.60	949.45	116	110	106	1.378	81.7	3.989	99.4
2-8	96	1.80	1.50	953.80	116	109	105	1.342	79.5	4.041	103.6

Totals and Averages

96	1.86	75.29	117	109	1.47	87.0	69.74	102.3
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General Iron Industries, Inc.
Hammermill Shredder

Method 29 Field Data Entry

Project No. 023AS-451738

Project Number	451738
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/14/2018
Meter ID	M-39
Y _s	0.9987
Pilot C _p	0.84

Place an "x" in the appropriate Box

Nozzle Diameter (in)	0.170
Filter ID	31457
Train Type	IMP
Train ID	18-16
P _s (Inches Hg)	29.65
P _s (Inches H ₂ O)	1.0
Start Time	10:56
Stop Time	12:45

Circular?	X
Rectangular?	
Diameter	50
Length	
Width	

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	687.8	741.5	63.7
Impinger 2	765.2	777.6	12.4
Impinger 3	609.1	611.4	2.3
Impinger 4	622.8	624.3	1.5
Impinger 5	732.8	735.5	2.7
Silica Gel	848.0	863.1	15.1
Weight of Water Collected, V _{wc} (g)			72.6
Silica Gel Net Weight, V _{wc} (g)			15.1

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.39	NA	20.79
Trial 2	0.39	NA	20.79
Trial 3	0.39	NA	20.79
Average	0.39	NA	20.79

Run 4

Traverse Point	Min/Pt	Velocity Pressure Δ P (in. H ₂ O)	Orifice Setting Δ H (in. H ₂ O)	Gas Sample Volume Initial (ft ³) 1,058.74	Stack Temp (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root Δ P	Stack Gas Velocity Vs (ft/sec)	Volume Metered Vmstd (ft ³)	Isokinetics (%)
	6 Elapsed Time										
1-1	6	1.90	1.60	1062.82	111	89	86	1.378	81.4	3.934	98.3
1-2	12	2.00	1.70	1067.10	119	95	87	1.414	84.1	4.102	100.6
1-3	18	1.80	1.50	1071.26	120	99	88	1.342	79.9	3.957	102.4
1-4	24	1.90	1.60	1075.42	121	100	89	1.378	82.1	3.970	100.0
1-5	30	1.70	1.40	1079.46	122	100	90	1.304	77.7	3.832	102.2
1-6	36	1.90	1.60	1083.66	121	101	90	1.378	82.1	4.001	100.8
1-7	42	1.70	1.40	1087.90	123	102	92	1.304	77.8	4.017	107.2
1-8	48	2.10	1.70	1092.17	119	102	93	1.449	86.2	4.045	95.8
2-1	54	1.40	1.20	1095.70	120	98	94	1.183	70.4	3.349	98.2
2-2	60	1.50	1.20	1099.30	121	100	94	1.225	73.0	3.409	96.7
2-3	66	1.50	1.20	1103.05	123	102	94	1.225	73.0	3.545	100.7
2-4	72	1.50	1.20	1106.80	122	103	95	1.225	73.0	3.538	100.4
2-5	78	2.00	1.70	1111.11	123	104	96	1.414	84.4	4.064	100.0
2-6	84	1.80	1.50	1115.35	120	105	97	1.342	79.9	3.989	103.2
2-7	90	2.20	1.80	1119.75	120	105	97	1.483	88.3	4.143	95.9
2-8	96	2.20	1.80	1124.23	119	105	97	1.483	88.2	4.218	98.6

Totals and Averages

96	1.51	65.49	120	95.5	1.35	80.1	62.11	100.2
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General Iron Industries, Inc.
Hammermill Shredder

Method 29 Field Data Entry

Project No. 023AS-451739

Project Number	451739
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/14/2018
Meter ID	M-39
Y _s	0.9987
Pitot C _p	0.84

Place an "x" in the appropriate Box

Circular?	x
Rectangular?	
Diameter	50
Length	
Width	

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	743.2	800.3	57.1
Impinger 2	738.0	749.5	11.5
Impinger 3	685.9	688.9	3.0
Impinger 4	746.9	748.7	1.8
Impinger 5	744.2	745.4	1.2
Silica Gel	964.4	976.2	11.8
Weight of Water Collected, V _{wc} (g)			74.6
Silica Gel Net Weight, V _{wsg} (g)			11.8

Nozzle Diameter (in)	0.170
Filter ID	31460
Train Type	IMP
Train ID	IB-18
P ₁ (inches Hg)	29.80
P ₂ (inches H ₂ O)	1.0
Start Time	13:45
Stop Time	15:33

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.40	NA	20.80
Trial 2	0.40	NA	20.80
Trial 3	0.40	NA	20.80
Average	0.40	NA	20.80

Run 5

Traverse Point	Min/Pt	Velocity Pressure Δ P (in. H ₂ O)	Orifice Setting Δ H (in. H ₂ O)	Gas Sample Volume Initial (ft ³)	Stack Temp. (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root Δ P	Stack Gas Velocity Vs (ft/sec)	Volume Metered Vmsd (ft ³)	Isokinetics (%)
	6										
1-1	6	2.00	1.70	124.85	107	88	88	1.414	83.3	4.089	99.1
1-2	12	1.70	1.40	133.10	116	93	88	1.304	77.4	3.828	101.4
1-3	18	1.50	1.20	136.92	120	95	88	1.225	72.9	3.647	103.3
1-4	24	1.50	1.20	140.68	119	95	89	1.225	72.9	3.587	101.5
1-5	30	1.70	1.40	144.66	118	95	89	1.304	77.5	3.798	100.8
1-6	36	1.90	1.60	148.86	119	95	89	1.378	82.0	4.010	100.8
1-7	42	2.00	1.70	153.05	116	95	89	1.414	83.9	4.002	97.8
1-8	48	2.10	1.70	157.50	118	95	89	1.449	86.1	4.260	101.5
2-1	54	1.90	1.60	161.67	117	94	89	1.378	81.9	3.985	100.0
2-2	60	1.90	1.60	165.93	117	95	89	1.378	81.9	4.068	102.1
2-3	66	1.80	1.50	169.40	118	96	89	1.342	79.8	3.309	85.4
2-4	72	1.80	1.50	174.20	117	97	89	1.342	79.7	4.574	117.9
2-5	78	1.60	1.30	178.05	119	96	89	1.265	75.3	3.670	100.5
2-6	84	1.90	1.60	182.20	119	95	90	1.378	82.0	3.959	99.6
2-7	90	2.20	1.80	186.71	119	96	90	1.483	88.2	4.301	100.4
2-8	96	2.20	1.80	191.25	116	96	89	1.483	88.0	4.333	100.9

Totals and Averages

96	1.54	66.40	117	91.8	1.36	80.8	63.41	100.8
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General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM
Protected by the Attorney Client Privilege and Attorney Work Product Doctrine

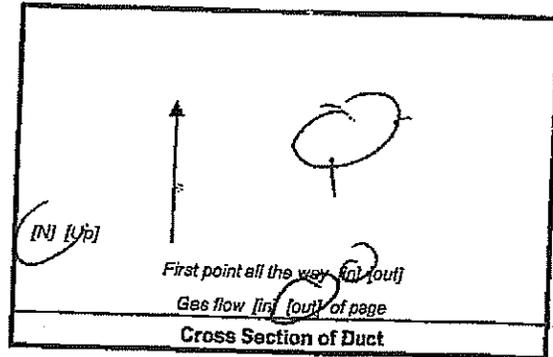
APPENDIX E FIELD DATA

MONTROSE AIR QUALITY SERVICES, LLC

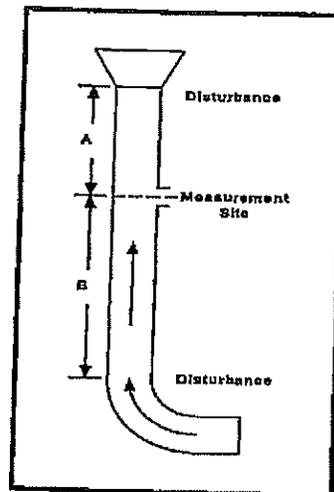
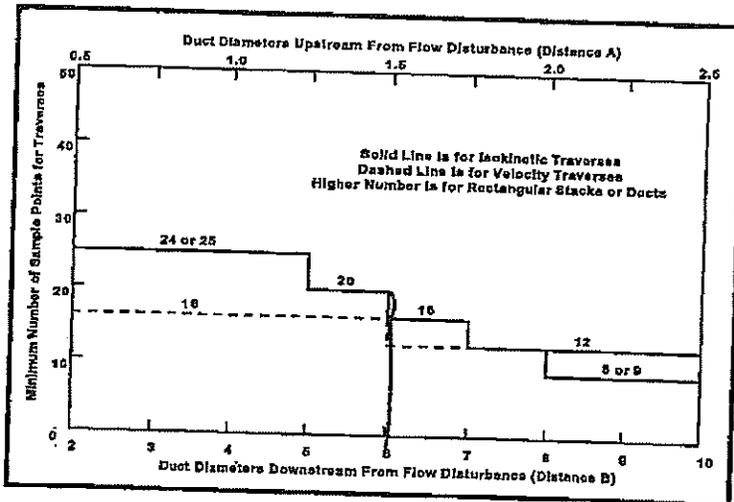
EPA Method 1

LOCATION Hammes, MI Sample and Velocity Traverses Datasheet

Client	<u>Frem Industries Inc</u>
Project No:	<u>451738</u>
Plant	<u>Champ IC</u>
Date	<u>6-13-18</u>
Technician	<u>CS</u>
Duct Diameter (in.)	<u>50</u>
Port Diameter (in.)	<u>4.125</u>
Port Length (in.)	<u>14.5</u>
Port Type	<u>Nipple</u>
Distance A (ft)	<u>50</u>
Distance B (ft)	<u>25</u>
Distance A (Duct Diameters)	<u>12</u>
Distance B (Duct Diameters)	<u>6</u>



For rectangular ducts $ED = \frac{2LW}{L+W}$

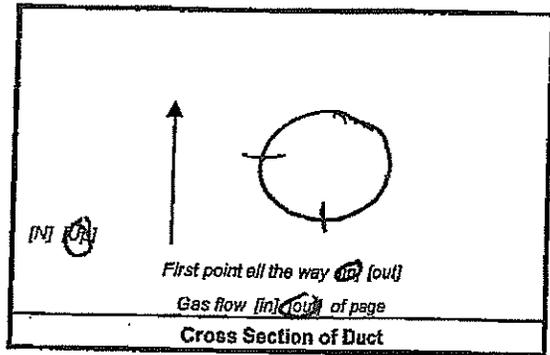


Location Schematic and Notes	Traverse Point	Distance (in.)
<p>Distance B includes 17" of a 12° curve, per EPA guidance document "Guidelines for sampling in tapered stacks" anything less than 15° is considered a non disturbance.</p> <p>Indicate sample ports, height from grade, types of disturbances, access, unistrut configuration, etc.</p> <p>Distance to point must include length of port</p>	1	<u>16.11</u>
	2	<u>19.74</u>
	3	<u>21.19</u>
	4	<u>30.66</u>
	5	<u>48.39</u>
	6	<u>54.81</u>
	7	<u>59.26</u>
	8	<u>62.89</u>
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16	

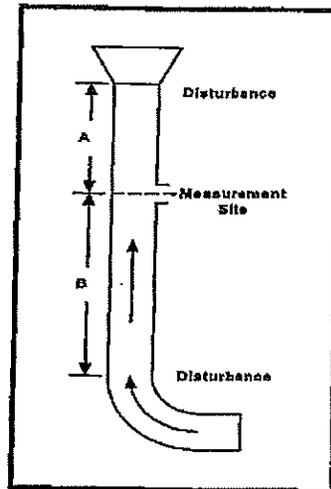
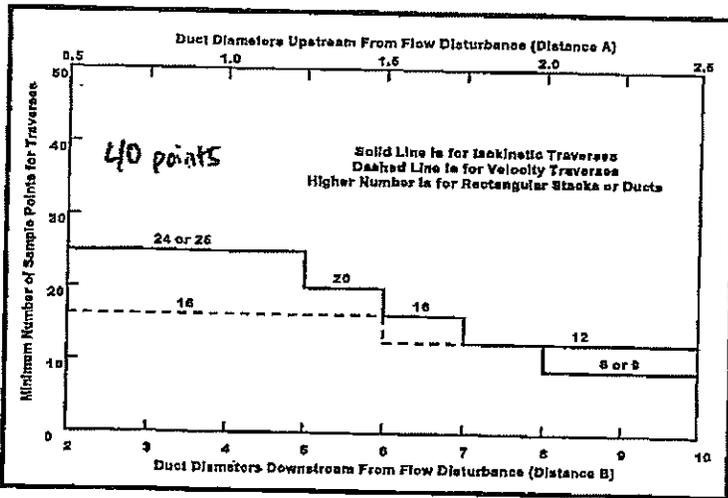
MONTROSE AIR QUALITY SERVICES, LLC
EPA Method 1

LOCATION Hammer Mill Shredder Sample and Velocity Traverses Datasheet

Client	Iron Industries
Project No:	451738
Plant	Chicago, IL
Date	6/14/16
Technician	BJ
Duct Diameter (in.)	50
Port Diameter (in.)	4
Port Length (in.)	8
Port Type	M - Nipple
Distance A (ft)	250
Distance B (ft)	25
Distance A (Duct Diameters)	12
Distance B (Duct Diameters)	6



For rectangular ducts $ED = \frac{2LW}{L+W}$

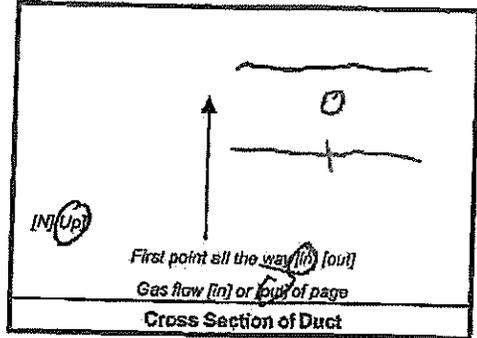


3DFLOW POINTS

Location Schematic and Notes	Traverse Point	Distance (in.)
Dist Indicate sample ports, height from grade, types of disturbances, access, unistrut configuration, etc. Distance to point must include length of port	$A = 13.6354$	
	1	8.63
	2	9.95
	3	11.35
	4	12.84
	5	14.46
	6	16.23
	7	18.21
	8	20.50
	9	23.32
	10	27.41
	11	38.99
	12	42.68
	13	45.50
	14	47.79
	15	49.77
	16	51.54
	17	53.16
	18	54.65
	19	56.05
20	57.37	

MONTROSE AIR QUALITY SERVICES, LLC
 EPA Method 2
 Cyclonic Flow Traverse Datasheet

Client	Iron Industries Inc.		
Project No.	451738		
Plant	Chicago, IL		
Location	Hammer Mill	Duct size (in)	50
Date	6/13/18	Port Length (in)	8
Probe ID	AE2-G-G	PKot Cp	.84



Run Number	Start Time	Stop Time	Barometric (InHg)	Static (inH ₂ O)	Probe Operator	Data Recorder	Pre Leak Check	Post Leak Check	Run Number	Start Time	Stop Time	Barometric (InHg)	Static (InH ₂ O)	Probe Operator	Data Recorder	Pre Leak Check	Post Leak Check
1	2:49:30	4:56	29.85	1.3	CS	ZM	✓	✓									
Traverse Point	Pressure ΔP @ 0° (in H ₂ O)	Angle α (< 20°)	Notes	Traverse Point	Pressure ΔP @ 0° (in H ₂ O)	Angle α (< 20°)	Notes	Traverse Point	Pressure ΔP @ 0° (in H ₂ O)	Angle α (< 20°)	Notes						
1-1	.02	2.8															
2	-.02	0.2															
3	-.01	0.3															
4	.01	4.5															
5	.02	6.2															
6	.02	13.5															
7	.02	15.5															
8	.02	17.2															
2-1	-.01	5.0															
2	.01	5.0															
3	-.01	7.0															
4	-.01	10.0															
5	0.0	0.0															
6	-.01	5.0															
7	.01	15.0															
8	.01	0.0															
Total	107.2			Total				Total									
Average	6.7			Average				Average									

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM / Metals

5/29

RUN NO. 1

METHOD NO. _____

Page	of	2
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Client: <u>Iron Industries Inc.</u>								Barometric (in. Hg) <u>29.85</u>		Water (ml) (g) <u>68.5</u>	
Plant: <u>Chicago, IL</u>								Ambient Temp. (°F) <u>80</u>		Silica gel (g) <u>12.8</u>	
Location: <u>Hammer Mill Shredder</u>								Static (in. H ₂ O) <u>2M</u> <u>-1.0</u> <u>1.3</u>		Total Vlc <u>81.3</u>	
Date: <u>6/13/18</u>		Project No. <u>45738</u>						Probe ID <u>5-6-7</u>		Linar Type <u>Glass</u>	
Meter Operator: <u>ZM</u>								Nozzle ID <u>.170</u>		Nozzle Dia (in.) <u>.170</u>	
Probe Operator: <u>CS</u>				Filter ID <u>31347</u>							
Meter ID	<u>M-39</u>	Vol	<u>.9987</u>	Pitot Cp	<u>.84</u>	Train ID <u>18-18</u> <u>CS-3</u>		Train Type <u>Imp</u>			
ΔH@	<u>1.879</u>	Kf	<u>.86</u>	Leak check	<input checked="" type="checkbox"/>	Duct Dim. (in.) <u>50</u>		Port Lgth. (in.) <u>814.5</u>			
Pre Leak Check	<u>0.000</u>	(cfm) [ppm] @	<u>15</u>	(inHg)		Start Time <u>11:49</u>		Stop Time <u>13:40</u>			
Post Leak Check	<u>0.000</u>	(cfm) [ppm] @	<u>15</u>	(inHg)		Cross Section of Duct					

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial [ft ³] [l]	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
1-1	6	1.6	1.4	811.55	114	250	250	63	93	89	6	N/A	Initial Vol = 807.05 .36 ZM
2	12	1.9	1.6	815.92	114	252	250	62	96	91	6		
3	18	1.8	1.5	820.20	119	253	257	62	101	91	6		
4	24	1.9	1.6	824.50	120	250	250	62	103	93	6		
5	30	1.6	1.4	828.90	121	252	250	63	105	95	6		
6	36	2.2	1.9	832.84	120	250	250	63	107	98	6		
7	42	2.4	2.1	837.60	120	251	253	62	109	100	6		
8	48	2.0	1.7	842.10	121	253	252	62	110	102	6		
2-1	54	1.5	1.3	846.14	121	251	250	61	107	104	6		1.7 = ΔP, 1.5 ΔH
2	60	1.6	1.4	850.25	120	252	252	60	110	104	6		
3	66	1.7	1.5	854.30	120	253	253	56	112	106	6		
4	72	1.6	1.4	858.35	121	250	250	54	115	108	6		
Total	96	1.8123	1.7	69.19	119.9				1208	1181			
Average		1.8233	1.6						104.8				

1.619

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

B-133

R 000274

G10000310

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM / Metals

RUN NO. 1 (Cont)

METHOD NO. 5/29

Page 2 of 2

Client: <u>Iron Industries Inc.</u>				<p style="text-align: center;">First point all the way (in) (out) Gas flow (in) (out) of page</p>				Barometric (In. Hg) <u>29.85</u>		Water (ml) (g) <u>68.5</u>	
Plant: <u>Chicago, IL</u>								Ambient Temp. (°F) <u>80</u>		Silica gel (g) <u>17.8</u>	
Location: <u>Hammer Mill Shredder</u>								Static (In. H ₂ O) <u>1.3</u>		Total Vic <u>81.3</u>	
Date: <u>6/13/18</u>		Project No. <u>451738</u>						Probe ID <u>5-6-7</u>		Liner Type <u>Glass</u>	
Meter Operator: <u>ZM</u>								Nozzle ID <u>170</u>		Nozzle Dia (In.) <u>170</u>	
Probe Operator: <u>CS</u>				Filter ID <u>31347</u>		Train ID <u>1B-1C</u>		Train Type <u>Imp</u>			
Meter ID: <u>M-39</u>	Yd: <u>.9987</u>	Pitot Cp: <u>.84</u>	Leak check: <input checked="" type="checkbox"/>	Duct Dim. (in.) <u>50</u>		Port Lgth. (In.) <u>14.8</u>					
ΔH@: <u>1.999</u>	KF: <u>.86</u>			Start Time: <u>11:49</u>		Stop Time: <u>13:40</u>					
Pre Leak Check: <u>0.000</u>	(cfm) (lpm) @: <u>15</u>	(InHg)		* BH							
Post Leak Check: <u>0.000</u>	(cfm) (lpm) @: <u>15</u>	(InHg)									

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial (l) <u>807.36</u>	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (In Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
5	78	2.2	1.9	862.45	120	253	253	57	115	109	6	N/A	Initial Vol = 807.36 AP = 1.7, ΔH = 1.5 AP = 2.2, ΔH = 1.9
6	84	2.2	1.9	867.22	123	251	251	56	116	110	6		
7	90	2.2	1.9	871.82	118	254	255	57	116	117	6		
8	96	2.2	1.9	876.58	121	254	254	58	116	111	6		
				ZM <u>422</u>		253	253	56	116	111	6		
Total	96	21.8123	7.2	69.19	482				463	441			
Average		1.3633	1.6		119.9				109.8				

B-134

R 000275

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

G10000311

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM / Metals

RUN NO. 2

METHOD NO. 5/29

Page of 2

Client: <u>Iron Industries Inc</u>								Barometric (In. Hg): <u>29.79</u>		Water (ml) (g): <u>64.2</u>	
Plant: <u>Chicago, IL</u>								Ambient Temp. (°F): <u>80</u>		Silica gel (g): <u>19.1</u>	
Location: <u>Hammer Mill Shredder</u>								Static (in. H ₂ O): <u>1.0</u>		Total Vic: <u>83.2</u>	
Date: <u>6/13/18</u>		Project No.: <u>451738</u>						Probe ID: <u>5-6-7</u>		Liner Type: <u>Glass</u>	
Meter Operator: <u>ZM</u>								Nozzle ID: <u>170</u>		Nozzle Dia. (In.): <u>170</u>	
Probe Operator: <u>CS</u>								Filter ID: <u>B1346</u>		Train ID: <u>18-16</u>	
Meter ID: <u>M-39</u>		Yd: <u>.9987</u>						Pitot Cp: <u>.84</u>		Train Type: <u>Imp</u>	
ΔH@: <u>1-879</u>		Kf: <u>.87</u>						Leak check: <input checked="" type="checkbox"/>		Duct Dim. (In.): <u>50</u>	
Pre Leak Check: <u>0.000</u>		Leak (lpm) @ <u>18</u> (InHg)						Cross Section of Duct		Start Time: <u>1515</u>	
Post Leak Check: <u>0.000</u>		Leak (lpm) @ <u>15</u> (InHg)								Stop Time: <u>17:39</u>	

Traverse Point	MiniPoint	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial (l) III	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
1	6	2.9	2.58	883.75	113	258	250	62	107	106	11	N/A	ΔH = 2.6
2	12	2.7	2.3	885.90	115	253	250	54	109	104	11		DGM out = 106
3	18	2.5	2.2	893.95	116	253	250	53	111	106	11		
4	24	2.1	1.8	899.08	114	251	250	57	113	107	11		Stack temp = 117
5	30	2.4	2.1	903.60	115	251	251	59	115	108	11		Stack temp = 118
6	36	2.0	1.7	908.45	118	251	250	61	115	108	11		New Kf = .85
7	42	2.1	1.8	913.30	115	251	251	61	117	110	11		
8	48	1.9	1.6	917.20	119	250	251	62	118	111	11		Resume 16:20
2-1	54	2.7	2.3	923.25	120	250	250	60	107	109	11		vacuum = 10
2	60	2.1	1.8	928.05	119	250	250	53	108	108	11		Vacuum = 11
3	66	1.6	1.4	932.16	122	250	250	58	109	107	9		Kf = .86
4	72	2.0	1.7	936.50	118	250	250	59	110	107	9		
Total	96	23.4574	23.3	95.29	1110				1339	1293			
Average		1.4657	1.85625		117.29				109.15				

Circle correct bracketed [] units
Train Type denotes Impingers, knockouts, etc.

B-135

R 000276

GI0000312

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM / Metals

RUN NO. 2 (cont.)

METHOD NO. 5/29

Page 2 of 2

Client: <u>Iron Industries Inc.</u>				<p style="font-size: small;">First point all the way (in) (out) Gas flow (in) (out) of page</p>				Barometric (in. Hg): <u>29.79</u>		Water (ml) (g): <u>64.2</u>	
Plant: <u>Chicago, IL</u>								Ambient Temp. (°F): <u>80</u>		Silica gel (g): <u>19.1</u>	
Location: <u>Hammermill Shredder</u>								Static (in. H ₂ O): <u>1.0</u>		Total Vlc: <u>83.8</u>	
Date: <u>6/13/18</u>		Project No.: <u>45738</u>						Probe ID: <u>5-6-7</u>		Liner Type: <u>Glass</u>	
Meter Operator: <u>ZM</u>								Nozzle ID: <u>170</u>		Nozzle Dia (in.): <u>170</u>	
Probe Operator: <u>CS</u>								Filter ID: <u>31348</u>			
Meter ID: <u>M-39</u>	Yd: <u>9987</u>	Pilot Cp: <u>.84</u>	Leak check: <input checked="" type="checkbox"/>					Train ID: <u>18-16</u>		Train Type: <u>LMP</u>	
ΔH@: <u>1.899</u>	Kf: <u>.86</u>							Duct Dim. (in.): <u>50</u>		Port Lgth. (in.): <u>24</u>	
Pre Leak Check: <u>0.000</u>	(Temp) (ppm) @: <u>18</u>	(inHg)						Start Time: <u>1515</u>		Stop Time: <u>17:09</u>	
Post Leak Check: <u>0.000</u>	(Temp) (ppm) @: <u>15</u>	(inHg)						Cross Section of Duct			

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial [I]	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
2-5	78	1.9	1.5	878.51	117	250	250	61	109	106	9	N/A	
6	84	2.0	1.7	945.15	117	250	250	62	110	106	9		
7	90	1.9	1.6	949.45	116	250	250	63	110	106	9		
8	96	1.8	1.5	953.80	116	250	250	64	109	106	9		
Total	96	1.9514	1.64	75.29	116.4				438	423			
Average		1.9577	1.85625		117.28				109.15				

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

B-136

R 000277

G10000313

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM/ Metals

RUN NO. 4

METHOD NO. 5/29

Page of 2

Client: <u>Iron Industries Inc.</u>								Barometric (in. Hg) <u>30.85</u>		Water (ml) (g) <u>72.6</u>	
Plant: <u>Chicago IL</u>								Ambient Temp. (°F) <u>85</u>		Silica gel (g) <u>15.1</u>	
Location: <u>Hamper Hill Shredder</u>								Static (in. H ₂ O) <u>1.0</u>		Total Vic <u>87.7</u>	
Date: <u>6/14/18</u>		Project No. <u>451738</u>						Proba ID <u>5-6-7</u>		Liner Type <u>Class</u>	
Meter Operator: <u>ZM</u>								Nozzle ID <u>.170</u>		Nozzle Dia (in.) <u>.170</u>	
Probe Operator: <u>CS</u>				Filter ID <u>31457</u>		Train ID <u>ZM</u>		Train Type <u>Imp</u>			
Meter ID	<u>M-39</u>	Yd	<u>.9987</u>	Pilot Cp	<u>.87</u>	Duct Dim. (in.) <u>50</u>		Port Lgth. (in.) <u>14.5</u>			
AH@	<u>1.899</u>	KF	<u>.83</u>	Leak check	<u>Y</u>	Start Time <u>1053</u>		Stop Time <u>1245</u>			
Pre Leak Check <u>0.000</u>		<u>(cfm)</u> (lpm) @ <u>20</u> (inHg)		Cross Section of Duct							
Post Leak Check <u>0.000</u>		<u>(cfm)</u> (lpm) @ <u>15</u> (inHg)									

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial (l) (l)	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
1-1	6	1.9	1.6	1062.82	11	250	250	65	89	86	7	N/A	
2	12	2.0	1.7	1066.2M	19	250	250	65	95	87	9		1067.10 2 vol.
3	18	1.8	1.5	1071.25	20	250	250	65	99	88	8		
4	24	1.9	1.6	1075.42	21	250	250	65	100	89	8		
5	30	1.7	1.4	1079.45	22	250	250	65	100	90	8		
6	36	1.9	1.6	1083.66	21	250	250	65	101	90	8		
7	42	1.7	1.4	1087.90	23	250	250	60	102	92	8		
8	48	2.1	1.7	1092.17	19	251	256	54	102	93	9		
2-1	54	1.4	1.2	1095.70	20	252	253	65	98	94	6		Reserve 1149 pause
2	60	1.5	1.2	1099.30	21	250	250	57	100	94	6		port change
3	66	1.5	1.2	1103.05	23	250	250	58	102	94	6		
4	72	1.5	1.2	1106.80	22	251	250	61	103	95	6		
Total	96	21.527	17.3	65.49	1942				1191	1092			
Average		1.3455	1.50625		120.25				96.5				

Circle correct bracketed [] units.
Train Type denotes Impingers, knockouts, etc.

B-137

R 000278

G10000314

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM / Metals

RUN NO. 4

METHOD NO. 5/29

Page 2 of 2

Client <u>Iron Industries Inc.</u>								Barometric (in. Hg) <u>29.85</u>		Water (ml) (g) <u>72.6</u>	
Plant <u>Chicago, IL</u>								Ambient Temp. (°F) <u>85</u>		Silica gel (g) <u>15.3</u>	
Location <u>Humboldt Mill Shredder</u>								Static (in. H ₂ O) <u>1.0</u>		Total Vic <u>87.7</u>	
Date <u>6/14/18</u>		Project No. <u>451738</u>						Probe ID <u>5-6-7</u>		Liner Type <u>Glass</u>	
Meter Operator <u>ZWA</u>								Nozzle ID <u>170</u>		Nozzle Dia (in.) <u>170</u>	
Probe Operator <u>CS</u>				Filter ID <u>31457</u>		Train ID <u>IB16</u>		Train Type <u>Imp</u>			
Meter ID	<u>M-39</u>	Yd	<u>.9987</u>	Pitot Cp	<u>.84</u>	Duct Dim. (in.) <u>50</u>		Port Lgth. (in.) <u>14.5</u>			
ΔH@	<u>1.899</u>	Kf	<u>.83</u>	Leak check	<input checked="" type="checkbox"/>	Start Time <u>1056</u>		Stop Time <u>1245</u>			
Pre Leak Check	<u>0.000</u>	(cfm) [ppm] @	<u>20</u>	(inHg)							
Post Leak Check	<u>0.000</u>	(cfm) [ppm] @	<u>15</u>	(inHg)	Cross Section of Duct						

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial (g) [l]	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
2-5	78	2.0	1.7	111.11	123	250	250	63	104	96	10	N/A	
6	84	1.7	1.5	115.35	120	250	250	63	105	97	10		
7	90	2.2	1.8	119.75	120	251	251	65	105	97	10		
8	96	2.2	1.8	124.23	116.2	250	250	65	105	97	10		Stack @ 119
Total	96	2.1527	1.68	65.49	482				419	387			
Average		1.3455	1.5062		120.28				96.5				

Circle correct bracketed [] units
Train Type denotes Impingers, knockouts, etc.

B-138

R 000279

G10000315

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM/Metals

RUN NO. 5

METHOD NO. 5/29

Page 1 of 2

Client <u>Ston Industries Inc.</u>				<p>First point all the way <u>(In)</u> <u>(Out)</u> Gas flow <u>(In)</u> <u>(Out)</u> of page</p>	Barometric (in. Hg) <u>29.80</u>		Water (ml) (g) <u>74.6</u>	
Plant <u>Chicago, IL</u>					Ambient Temp. (°F) <u>88</u>		Silica gel (g) <u>11.8</u>	
Location <u>Hammer Mill Shredder</u>					Static (in. H ₂ O) <u>1.0</u>		Total Vic <u>86.4</u>	
Date <u>6/14/18</u>		Project No. <u>451738</u>			Probe ID <u>5-6-7</u>		Liner Type <u>Glass</u>	
Meter Operator <u>ZM</u>					Nozzle ID <u>.170</u>		Nozzle Dia. (in.) <u>.170</u>	
Probe Operator <u>CS</u>					Filter ID <u>31460</u>			
Meter ID <u>M-39</u>		Yd <u>.9987</u>			Pitot Cp <u>.84</u>		Train ID <u>38-18</u>	
ΔH@ <u>1.819</u>		Kf <u>.83</u>			Leak check <input checked="" type="checkbox"/>		Train Type <u>Imp</u>	
Pre Leak Check <u>0.080</u>		<u>(cm) (rpm) @</u> <u>92</u> (InHg)			Duct Dim. (in.) <u>50</u>		Port Lgth. (in.) <u>3' 14.5"</u>	
Post Leak Check <u>0.000</u>		<u>(cm) (rpm) @</u> <u>14</u> (InHg)			Cross Section of Duct		Start Time <u>1345</u> Stop Time <u>1533</u>	

Traverse Point	Min/Point	Velocity	Orifice	Gas Sample	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time	Pressure ΔP (in H ₂ O)	Setting ΔH (in H ₂ O)	Volume Initial <u>121.67</u> []									
1-1	6	2.0	1.7	129.10	107	250	250	55	88	88	7	N/A	124.85
2	12	1.7	1.4	133.10	116	250	251	53	93	88	7		
3	18	1.5	1.2	136.92	120	250	250	52	95	88	7		
4	24	1.5	1.2	140.68	119	250	250	54	95	89	7		
5	30	1.7	1.4	144.66	118	252	252	54	95	89	7		
6	36	1.9	1.6	148.86	119	250	250	55	95	89	7		
7	42	2.0	1.7	153.05	116	254	252	53	95	89	7		
8	48	2.1	1.7	157.50	118	253	252	54	95	89	7		Resume 1445
2-1	54	1.9	1.6	161.67	117	250	250	53	94	89	8		
2	60	1.9	1.6	165.93	117	250	251	52	95	89	9		
3	66	1.8	1.5	169.40	118	251	253	52	96	89	9		169.40 ZM
4	72	1.8	1.5	174.20	117	253	255	52	97	89	9		
Total	96	21763	18.1	191224	1402				1133	1065			
Average		1.3602	0.5375	66.40	117.1875				91.8				

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

B-139

R 000280

GI0000316

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE: PM / Metal

RUN NO. 5

METHOD NO. 5/29

Page 2 of 2

Client <u>Brown Industries Inc</u>				<p style="text-align: center;">First point all the way [in] [out] Gas flow [in] [out] of page</p>				Barometric (in. Hg) <u>29.80</u>		Water (ml) (g) <u>74.6</u>	
Plant <u>Chicago, IL</u>								Ambient Temp. (°F) <u>85</u>		Silica gel (g) <u>11.8</u>	
Location <u>Hammer Mill Shredder</u>								Static (in. H ₂ O) <u>1.0</u>		Total Vic <u>86.4</u>	
Date <u>2/14/18</u>		Project No. <u>451738</u>						Probe ID <u>5-6-7</u>		Liner Type <u>Glass</u>	
Meter Operator <u>ZM</u>								Nozzle ID <u>170</u>		Nozzle Dia. (in.) <u>170</u>	
Probe Operator <u>CS</u>				Filter ID <u>31460</u>		Train ID <u>IB-18</u>					
Meter ID <u>M-39</u>	Yd <u>.9967</u>	Pitot Cp <u>.84</u>	<p style="text-align: center;">Cross Section of Duct</p>					Duct Dim. (in.) <u>50</u>			
ΔH@ <u>1.899</u>	KF <u>483</u>	Leak check <input checked="" type="checkbox"/>						Start Time <u>1345</u>		Stop Time <u>1533</u>	
Pre Leak Check <u>0.000</u> (cfm) [ipm] @ <u>22</u> (inHg)		Post Leak Check <u>0.000</u> (cfm) [ipm] @ <u>14</u> (inHg)									

Traverse Point	Min/Point	Velocity	Orifice	Gas Sample	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time	Pressure ΔP (in H ₂ O)	Setting ΔH (in H ₂ O)	Volume Initial (ft ³)		Temp (°F)	Temp (°F)	Temp (°F)	Temp (°F)				
2-5	78	1.6	1.3	124.85 178.85	119	252	250	52	96	89	10	W/A	Initial Vol. = 124.85
6	84	1.9	4.5	182.20	119	253	250	53	95	90	10		ΔH = 1.6
7	90	2.2	1.8	186.71	119	250	251	53	96	90	10		
8	96	2.2	1.8	196.25	116	250	252	53	96	89	10		
Total	96	2.763	6.5	66.40	473				383	358			
Average		1.3602	1.5375		117.875				91.8				

Circle correct bracketed [] units
Train Type denotes Impingers, knockouts, etc.

B-140

R 000281

G10000317

MONTROSE AIR QUALITY SERVICES, LLC
Impinger Weights Datasheet

PROJECT NO. 451738

Page 1 of 2

Client	Iron Industries Inc.		
Plant	Chicago, IL		
Location	Hammer Mill Shredder		
Date	6/13/14	Unit	
Operator	Bil		

Run No.	1				
Method No.	5/29	Train ID	1B-18	Filter No.	31347
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	Empty	642.4	681.4	39.0	
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	713.4	733.9	20.5	
Impinger No. 3	10% H ₂ O ₂ 5% HNO ₃	752.7	758.0	5.3	
Impinger No. 4	Empty	605.6	607.9	2.3	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	630.7	632.1	1.4	
Impinger No. 6	10% H ₂ SO ₄ 4% KMnO ₄	737.2	737.2	0.0	
Impinger No. 7	Silica	911.1	923.9	12.8	
Additional Rinse					
			Net Weight (g)	81.3	

Run No.	2				
Method No.	5/29	Train ID	1B-16	Filter No.	31346
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O ₂ 5% HNO ₃	736.9	769.0	32.1	Low Moisture... decided to eliminate first "empty imp" at Bil
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	736.0	753.1	17.1	
Impinger No. 3	Empty	661.4	667.8	6.4	
Impinger No. 4	10% H ₂ SO ₄ 4% KMnO ₄	733.7	741.5	7.8	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	735.8	737.1	1.3	
Impinger No. 6	Silica	946.1	965.2	19.1	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	83.8	

Run No.	3				
Method No.	5/29	Train ID	1B-18	Filter No.	31345
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O ₂ 5% HNO ₃	740.4	739.0	22.6	
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	781.0	759.4	3.4	
Impinger No. 3	Empty	608.9	610.0	1.1	
Impinger No. 4	10% H ₂ SO ₄ 4% KMnO ₄	624.3	629.0	4.7	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	734.1	735.3	1.2	
Impinger No. 6	Silica	923.1	940.0	16.9	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	45.9	

MONTROSE AIR QUALITY SERVICES, LLC
Impinger Weights Datasheet

PROJECT NO. 451730

Page 2 of 2

Client	Iron Industries		
Plant	Chicago, IL		
Location	Hammer Mill Shredder		
Date	6/13/18	Unit	
Operator	BH		

Run No.	FB				
Method No.	5/29	Train ID	1B-1C	Filter No.	31344
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O, 5% HNO ₃	743.1	743.2	.10	
Impinger No. 2	10% H ₂ O, 5% HNO ₃	738.0	737.8	-.20	
Impinger No. 3	Empty	665.6	665.6	0.0	
Impinger No. 4	10% H ₂ SO ₄ , 4% KMnO ₄	738.4	738.1	-.30	
Impinger No. 5	10% H ₂ SO ₄ , 4% KMnO ₄	738.6	737.8	-.20	
Impinger No. 6	Silica	964.2	964.2	0.0	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	- .20	

964.8

Run No.	4				
Method No.	5/29	Train ID	1B-1C	Filter No.	31457
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O, 5% HNO ₃	743.1	741.5	53.7	687.8 mH
Impinger No. 2	10% H ₂ O, 5% HNO ₃	738.0	777.6	12.4	765.2
Impinger No. 3	Empty	609.1	611.4	2.3	
Impinger No. 4	10% H ₂ SO ₄ , 4% KMnO ₄	622.8	624.3	1.5	
Impinger No. 5	10% H ₂ SO ₄ , 4% KMnO ₄	737.8	735.5	2.7	
Impinger No. 6	Silica	848.0	863.1	15.1	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	87.7	

Run No.	5				
Method No.	5/29	Train ID	1B-1B	Filter No.	31460
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O, 5% HNO ₃	743.2	800.3	57.1	
Impinger No. 2	10% H ₂ O, 5% HNO ₃	738.0	549.5	11.5	
Impinger No. 3	Empty	665.9	668.9	3.0	
Impinger No. 4	10% H ₂ SO ₄ , 4% KMnO ₄	746.9	748.7	1.8	
Impinger No. 5	10% H ₂ SO ₄ , 4% KMnO ₄	744.2	745.4	1.2	
Impinger No. 6	Silica	964.4	976.2	11.8	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	810.4	

MONTROSE AIR QUALITY SERVICES, LLC

EPAMethod 3B

Orsat Analyzer Datasheet

Client	Iron Industries	Project No.	451738
Plant	Chicago DC	Pre Leak Check	
Location	Hammer Mill	Post Leak Check	

% Difference = $\frac{ABS(Orsat Avg.-Cal Gas)}{Cal Gas} \times 100$

Cal Gas	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
	1	4.82	NA	20.85	BH/ML	6/13/18	9:40
	2	9.86		9.86	%O ₂ Difference	%CO ₂ Difference	
	3	0.00		0.00			
	Average						

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
1	1	.40	NA	20.8	BH	6/13/18	13:50
	2						
	3						
	Average	.46		20.8			

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
2	1	.30	NA	20.9	BH	6/13/18	17:20
	2						
	3						
	Average	.30		20.9			

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
3	1					6/13/18	
	2						
	3						
	Average						

RUN VOIDED, Failed Leak Check

Cal Gas	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
	1	10.1		20.95	MH	6/14/18	13:00
	2	4.9		9.96	%O ₂ Difference	%CO ₂ Difference	
	3	0.00		0.00			
	Average						

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
4	1	.89		20.75	BH	6/14/18	14:15
	2						
	3						
	Average	0.39		20.79			

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
5	1	.80		20.80	BH	6/14/18	1540
	2						
	3						
	Average	.40		20.80			

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
	1						
	2						
	3						
	Average						

Cal Gas	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
	1						
	2				%O ₂ Difference	%CO ₂ Difference	
	3						
	Average						

20.95 - O₂ / 4.885 - CO₂ : XLO25171 B
 9.971 - O₂ / 9.854 - CO₂ : CC167397

Cylinder Numbers

Cylinder Number	
Concentration (%)	%O ₂ %CO ₂

Notes:

- Run an ambient air check to verify Oxsorb.
- Measurements must be made to the nearest 0.2%.
- Three different trials should be performed for each sample.
- The differences between the trials must not be greater than 0.2% overall.

Expected F_o Ranges

Wood Bark	1.000-1.120	Residual Oil	1.210-1.370
Anthracite/Lignite	1.015-1.130	Distillate Oil	1.260-1.413
Municipal Waste	1.043-1.177	Net. Gas	1.600-1.836
Bituminous	1.083-1.230		

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

Protected by the Attorney Client Privilege and Attorney Work Product Doctrine

APPENDIX F LABORATORY DATA

Montrose Air Quality Services, LLC

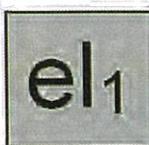
1371 Brummel Avenue
Elk Grove, IL 60007

Project Number: 451738

Particulate Matter, Antimony, Arsenic, Barium,
Beryllium, Cadmium, Chromium, Cobalt, Copper,
Lead, Manganese, Nickel, Phosphorus, Selenium,
Silver, Thallium, Zinc & Mercury

EPA Methods 5 & 29 Analyses

Analytical Report
31368

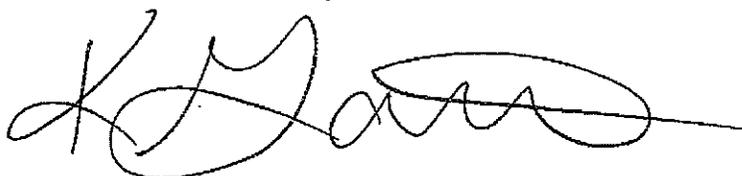


Element One, Inc.

6319-D Carolina Beach Rd., Wilmington, NC 28412
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 31368
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:



Katie Gattis, B.S. Chemist
June 21, 2018

Report Reviewed and Finalized By:



Ken Smith, Laboratory Director
June 21, 2018

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SUMMARY OF RESULTS

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Summary of Analysis

Hammermill Shredder - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, μg	Front Half μg	H_2O_2 / HNO_3 μg	Empty Impinger μg	KMnO_4 μg	HCl μg
M29/5-R1	#1	250	< 0.1	< 0.5	< 0.2	232	17.5
	#2		< 0.1	< 0.5	< 0.2	233	17.5
M29/5-R2	#1	100	< 0.1	< 0.3	< 0.2	80.3	19.8
	#2		< 0.1	< 0.3	< 0.2	80.2	19.6
M29/5-R4	#1	309	< 0.1	< 0.3	< 0.2	205	101
	#2		< 0.1	< 0.3	< 0.2	211	101
M29/5-R5	#1	19.8	< 0.1	< 0.4	< 0.2	9.65	10.2
	#2		< 0.1	< 0.4	< 0.2	9.66	10.2
Field Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
Reagent Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

Hammermill Shredder - Summary of Method 5 Particulate Analysis

Fraction	M29/5-R1 e31368-1 Catch, mg	M29/5-R2 e31368-2 Catch, mg	M29/5-R4 e31368-3 Catch, mg	M29/5-R5 e31368-4 Catch, mg
Filter	5.2	8.7	8.0	6.7
Rinse	9.2	10.0	11.4	8.8
Total PM	14.4	18.7	19.4	15.5

Fraction	Field Blank e31368-5 Catch, mg	Reagent Blank e31368-6 Catch, mg
Filter	1.3	—
Rinse	1.8	2.4
Total PM	3.1	2.4

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Summary of Analysis

Front Half - Hammermill Shredder- Summary of Method 29 Metals Analysis

Element	M29/5-R1 e31368-1 FH Total µg	M29/5-R2 e31368-2 FH Total µg	M29/5-R2 e31368-2 FH dup Total µg	M29/5-R4 e31368-3 FH Total µg	M29/5-R5 e31368-4 FH Total µg
Antimony	0.472	0.621	0.624	0.388	0.326
Arsenic	0.157	0.194	0.208	< 0.1	< 0.1
Barium	3.95	4.04	3.88	2.80	2.73
Beryllium	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Cadmium	3.31	1.97	1.79	1.74	1.49
Chromium	2.01	2.16	2.11	1.76	1.58
Cobalt	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Copper	1.63	1.82	1.76	1.55	1.35
Lead	7.70	10.8	10.6	8.68	5.67
Manganese	4.04	4.64	4.40	3.97	4.02
Nickel	2.54	2.68	2.59	0.974	0.864
Phosphorus	5.96	8.88	8.83	5.22	4.46
Selenium	0.943	1.70	1.77	< 0.1	0.186
Silver	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thallium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zinc	612	630	628	524	455

Back Half - Hammermill Shredder- Summary of Method 29 Metals Analysis

Element	M29/5-R1 e31368-1 BH Total µg	M29/5-R2 e31368-2 BH Total µg	M29/5-R2 e31368-2 BH dup Total µg	M29/5-R4 e31368-3 BH Total µg	M29/5-R5 e31368-4 BH Total µg
Antimony	< 0.1	0.123	0.130	0.265	< 0.1
Arsenic	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Barium	0.774	5.49	5.26	1.14	0.741
Beryllium	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Cadmium	< 0.1	< 0.1	< 0.1	0.159	< 0.1
Chromium	0.460	1.022	0.972	0.664	0.404
Cobalt	< 0.1	0.177	0.169	< 0.1	< 0.1
Copper	1.07	4.44	4.23	1.55	7.87
Lead	1.33	4.01	3.94	0.884	0.471
Manganese	3.31	5.05	4.95	5.57	2.22
Nickel	0.452	2.44	2.38	1.41	0.805
Phosphorus	27.3	30.1	29.6	21.6	20.2
Selenium	0.336	0.593	0.545	< 0.1	0.101
Silver	< 0.1	< 0.1	< 0.1	2.726	< 0.1
Thallium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zinc	30.9	52.5	52.7	25.1	21.0

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Summary of Analysis

Blanks - Summary of Method 29 Metals Analysis

Element	Field Blank	Reagent Blank	Field Blank	Reagent Blank
	Front Half e31368-5 FH	Front Half e31368-6 FH	Back Half e31368-5 BH	Back Half e31368-6 BH
	Total µg	Total µg	Total µg	Total µg
Antimony	< 0.1	< 0.1	< 0.1	0.135
Arsenic	< 0.1	< 0.1	< 0.1	< 0.1
Barium	3.14	3.09	0.567	< 0.1
Beryllium	< 0.025	< 0.025	< 0.025	< 0.025
Cadmium	< 0.1	< 0.1	< 0.1	< 0.1
Chromium	1.21	1.21	0.318	0.371
Cobalt	< 0.1	< 0.1	< 0.1	< 0.1
Copper	0.375	0.220	0.539	0.394
Lead	0.346	0.216	0.348	< 0.1
Manganese	0.714	0.671	5.31	0.354
Nickel	2.00	2.14	0.324	0.257
Phosphorus	< 2	< 2	16.2	19.8
Selenium	1.11	< 0.1	< 0.1	< 0.1
Silver	< 0.1	< 0.1	< 0.1	< 0.1
Thallium	< 0.1	< 0.1	< 0.1	< 0.1
Zinc	6.02	2.70	7.57	3.38

SUMMARY OF AUDITS

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Stationary Source Audit Testing Data Reporting Form

Project #: 061318S

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Metals on Filter Paper (cat# 1425)

Method Description: E.P.A. 29 Rev. Ed: _____
 Analysis Date (mm-dd): 06 - 19 Analyst: DMP Workgroup: _____

TNI Code	Analyte	Units	PTL	Concentration Range	Reported Value
1005	Antimony	µg/Filter	19.0	25.0 to 250	40.7
1010	Arsenic	µg/Filter	15.0	20.0 to 250	38.7
1015	Barium	µg/Filter	15.0	20.0 to 250	39.7
1020	Beryllium	µg/Filter	7.50	10.0 to 250	21.7
1030	Cadmium	µg/Filter	8.00	10.0 to 250	16.0
1040	Chromium	µg/Filter	12.0	15.0 to 250	26.7
1050	Cobalt	µg/Filter	7.50	10.0 to 250	23.1
1055	Copper	µg/Filter	7.50	10.0 to 250	30.2
1075	Lead	µg/Filter	16.0	20.0 to 350	35.9
1090	Manganese	µg/Filter	7.00	10.0 to 250	41.6
1105	Nickel	µg/Filter	14.0	20.0 to 250	38.6
1140	Selenium	µg/Filter	14.0	20.0 to 250	38.7
1140	Silver	µg/Filter	21.0	30.0 to 250	59.5
1165	Thallium	µg/Filter	22.0	30.0 to 250	53.8
1190	Zinc	µg/Filter	14.0	20.0 to 250	45.9

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A Waters Company

Stationary Source Audit Testing Data Reporting Form
Project #: 061318S

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Metals in Impinger Solution (cat# 1426)

Method Description: EPA 29 Rev/Ed:
 Analysis Date (mm-dd): 06-19 Analyst: DMP Workgroup:

TNI Code	Analyte	Units	PTRL	Concentration Range	Reported Value
1005	Antimony	µg/mL	0.100	0.250 to 20.0	0 0.896
1010	Arsenic	µg/mL	0.150	0.200 to 20.0	0 1.13
1015	Barium	µg/mL	0.110	0.150 to 25.0	0 3.28
1020	Beryllium	µg/mL	0.0350	0.0500 to 20.0	0 1.41
1030	Cadmium	µg/mL	0.0800	0.100 to 20.0	0 1.07
1040	Chromium	µg/mL	0.160	0.200 to 20.0	0 4.05
1050	Cobalt	µg/mL	0.0750	0.100 to 25.0	0 2.02
1055	Copper	µg/mL	0.150	0.200 to 20.0	0 3.74
1075	Lead	µg/mL	0.150	0.200 to 20.0	0 2.96
1090	Manganese	µg/mL	0.0750	0.100 to 20.0	0 1.86
1105	Nickel	µg/mL	0.120	0.150 to 30.0	0 2.65
1140	Selenium	µg/mL	0.110	0.150 to 25.0	0 1.90
1150	Silver	µg/mL	0.300	0.500 to 20.0	0 4.71
1165	Thallium	µg/mL	0.110	0.150 to 25.0	0 3.02
1190	Zinc	µg/mL	0.110	0.150 to 25.0	0 2.86

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Stationary Source Audit Testing Data Reporting Form
Project #: 061318S

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Mercury on Filter Paper (cat# 1427)

Method Description	EP A 29	Rev Ed	
Analysis Date (mm-dd)	06 - 20	Analyst	MMP
		Workgroup	

TN Code	Analyte	Units	PTRL	Concentration Range	Reported Value
1095	Mercury	µg/Filter	0.750	1.00 to 75.0	16.2

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A Waters Company

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Stationary Source Audit Testing Data Reporting Form
Project #: 061318S

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Mercury in Impinger Solution (cat# 1428)

Method Description: EPA 129 Rev/Ed: _____
 Analysis Date (mm-dd): 06-19 Analyst: MMP Workgroup: _____

TNI Code	Analyte	Units	PTBL	Concentration Range	Reported Value
1095	Mercury	ng/mL	0.680	0.500 to 200	133

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ANALYTICAL NARRATIVE

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Element One Analytical Narrative

Client:	Montrose Air Quality Services, LLC	Element One #:	31368
Client ID:	451738 General Iron	Analyst:	JGP, MMP, DMR
Method:	Methods 5 & 29	Dates Received:	06/15/18
Analytes:	PM, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, P, Se, Ag, Tl, Zn & Hg	Dates Analyzed:	06/18-21/18

Summary of Analysis

The Method 5 particulate samples were analyzed in accordance with EPA Method 5 guidelines. Particulate samples were weighed to a constant weight of ± 0.5 mg and reported to the nearest 0.1mg. The Method 29 samples were digested, prepared, and analyzed according to Method 29 protocol. Samples were analyzed for mercury on a PerkinElmer FIMS-100 CVAA mercury analyzer. The samples were analyzed for metals on a PerkinElmer Nexlon 350X ICP-MS.

Detection Limits

The FIMS-100 CVAA instrument reporting limit for mercury was 0.004 μ g per aliquot analyzed. The ICP-MS instrument reporting limits were 0.25 μ g/L for beryllium, 20.0 μ g/L for phosphorus and 1.0 μ g/L for the other metals.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD), spike sample recovery, and second source calibration verification data are summarized in the Quality Control Section.

*Ref. page 17; Hammermill Shredder-R4 spike recoveries for arsenic and selenium were outside of laboratory guidelines of 75-125% with 63% and 59%, respectively. Sample was reanalyzed at a five-fold dilution resulting in recoveries of 85% for arsenic and 83% for selenium.

All other QA/QC data was within the criteria of the method.

The audit results for the Stationary Source Audit Program have been reported to ERA for Project #061318S. Copies of the audit reporting forms are included in the Summary of Audits section of this report.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values. The Method 5 blank correction factor has not been implemented. The reported results relate only to the items tested or calibrated.

The ICP analysis of the blank samples revealed detectable traces of metals. The unprepared back half, c9 fraction was analyzed with similar results to the prepared fraction. The unprepared 0.1N HNO₃, c8a fraction was analyzed with detectable traces of selenium and zinc, suggesting the other metals were in the filter portion of the prepared front half sample.

QUALITY CONTROL SUMMARY

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Summary of Quality Control Data

Hammermill Shredder - Mercury Duplicate Analysis RPD

(Method 29 QC limits: < 10% for RPD)

Run Number	Front Half	H ₂ O ₂ /HNO ₃	Empty Imp	KMnO ₄	HCl
M29/5-R1	NA	NA	NA	0.5%	0.3%
M29/5-R2	NA	NA	NA	0.2%	0.9%
M29/5-R4	NA	NA	NA	3.1%	0.0%
M29/5-R5	NA	NA	NA	0.1%	0.2%
Field Blank	NA	NA	NA	NA	NA
Reagent Blank	NA	NA	NA	NA	NA

Hammermill Shredder - Mercury Spike Recoveries

(Method 29 QC limits: 75-125% for Spike Recoveries)

Run Number		Front Half	H ₂ O ₂ /HNO ₃	Empty Imp	KMnO ₄	HCl
M29/5-R4	#1	119%	99%	98%	90%	103%
	#2	118%	98%	97%	92%	101%

Summary of Quality Control Data

Hammermill Shredder - Metals Duplicate Analysis RPD

(Method 29 QC limits: < 20% for RPD)

Element	M29/5-R2	M29/5-R2
	Front Half	Back Half
	RPD	RPD
Antimony	0.5%	6.0%
Arsenic	7.0%	NA
Barium	4.2%	4.3%
Beryllium	NA	NA
Cadmium	9.7%	NA
Chromium	2.4%	5.0%
Cobalt	NA	4.5%
Copper	3.2%	4.8%
Lead	1.8%	1.6%
Manganese	5.4%	2.1%
Nickel	3.2%	2.1%
Phosphorus	0.6%	1.7%
Selenium	3.9%	8.4%
Silver	NA	NA
Thallium	NA	NA
Zinc	0.3%	0.4%

Summary of Quality Control Data

Hammermill Shredder - Metals Analysis Spike Recoveries

(Method 29 QC limits: 75-125% for Spike Recoveries)

Element	M29/5-R4 Front Half Recovery	M29/5-R4 Back Half Recovery
Antimony	106%	111%
Arsenic	79%	63%*
Barium	102%	104%
Beryllium	94%	84%
Cadmium	100%	99%
Chromium	100%	96%
Cobalt	101%	100%
Copper	101%	101%
Lead	100%	103%
Manganese	100%	92%
Nickel	99%	99%
Phosphorus	94%	83%
Selenium	76%	59%*
Silver	108%	107%
Thallium	98%	100%
Zinc	99%	97%

*See Analytical Narrative, page 13.

Summary of Quality Control Data

Second Source Calibration Check Recoveries (Method 29 QC limits: $\pm 10\%$ for Second Source Continuing Check Standard*)

Element	0.25 ppb	1 ppb	50 ppb	100 ppb*	250 ppb
Antimony		102%	107%	101%	101%
Arsenic		118%	98%	100%	99%
Barium		92%	98%	100%	100%
Beryllium	101%	105%	102%	101%	101%
Cadmium		81%	98%	98%	98%
Chromium		101%	98%	101%	101%
Cobalt		97%	98%	100%	100%
Copper		102%	98%	101%	101%
Lead		97%	100%	98%	98%
Manganese		95%	100%	100%	100%
Nickel		110%	96%	99%	99%
Selenium		85%	103%	101%	99%
Silver		103%	100%	102%	102%
Thallium		100%	98%	100%	100%
Zinc		119%	104%	102%	101%

Element	21 ppb	250 ppb	1100 ppb*	2500 ppb
Phosphorus	113%	98%	103%	99%

SAMPLE CUSTODY

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MONTRÖSE AIR QUALITY SERVICES, LLC
Chain of Custody

31368

Project Number	451738		Location	Hammermill Shredder		Analyte Requested	Page	1	of	4
Client	General Iron		Date	6/14/2018						
Plant	Chicago, IL		Completed By	Michael Hess						
FH/BH Separate. Don't combine FH and BH Samples Please. 3DD TAT!!! TSM-Sb, As, Ba, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Ti, Ag, Zn, Be <i>200 6-13-18</i>						Method 29				
ID No.	Run No.	Date	Sample Description							Notes
R1-IMP-1-3	1	6/13/2018	Method 29 Back Half 5% HNO ₃ /10% H ₂ O ₂ Impinger Contents	X						
R2-IMP-1-3	2	6/13/2018	Method 29 Back Half 5% HNO ₃ /10% H ₂ O ₂ Impinger Contents	X						
R4-IMP-1-3	4	6/14/2018	Method 29 Back Half 5% HNO ₃ /10% H ₂ O ₂ Impinger Contents	X						
R5-IMP-1-3	5	6/14/2018	Method 29 Back Half 5% HNO ₃ /10% H ₂ O ₂ Impinger Contents	X						
FB-IMP-1-3	FB	6/14/2018	Method 29 Back Half 5% HNO ₃ /10% H ₂ O ₂ Impinger Contents	X						
RB	RB	6/14/2018	Method 29 Back Half 5% HNO ₃ /10% H ₂ O ₂ Impinger Contents	X						
R1-MTI-29	1	6/13/2018	Method 29 Back Half Empty Impinger	X						
R2-MTI-29	2	6/13/2018	Method 29 Back Half Empty Impinger	X						
R4-MTI-29	4	6/14/2018	Method 29 Back Half Empty Impinger	X						
R5-MTI-29	5	6/14/2018	Method 29 Back Half Empty Impinger	X						
FB-MTI-29	FB	6/14/2018	Method 29 Back Half Empty Impinger	X						
Relinquished By (signature)	<i>Michael Hess</i>		Relinquished By (signature)	<i>Ben Hilgendorf</i>		Carrier				
(printed)	Michael Hess		(printed)	Ben Hilgendorf		Laboratory				
Date/Time	6/14/18		Date/Time	6/14/18 1930		Contact				
Accepted By (signature)	<i>Ben Hilgendorf</i>		Accepted By (signature)	<i>Lisa Newton</i>		Address				
(printed)	Ben Hilgendorf		(printed)	Lisa Newton		Phone				
Date/Time	6/14/18 1720		Date/Time	6-14-18 0955		Fax				
 MONTRÖSE AIR QUALITY SERVICES <i>Samples received in good condition. No empty containers.</i>						Montrose Air Quality Services, LLC 1371 Brunell Ave Elk Grove Village, IL 60007 Phone: (530) 266-4740				

MONTROSE AIR QUALITY SERVICES, LLC
CHAIN OF CUSTODY

31368

Project Number		451738		Location		Haworth Shredder		Analysis Requested		Page	3	of	4
Client		General Iron		Date		6/14/2018							
Plant		Chicago, IL		Completed By		Michael Hess							
FI/DI Separate. Don't combine FI and DI Samples Please. SBD TATU: TSM-Sb, As, Ba, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Tl, Ag, Zn, Bc. <i>LAB 6/15/18</i>													
										Method 29			
ID No.	Run No.	Date	Sample Description							Notes			
R1-WP-S-6	1	6/13/2018	Method 20 Back Half H2SO4/KMnO4 Impinger Contents							X			
R2-WP-S-6	2	6/13/2018	Method 20 Back Half H2SO4/KMnO4 Impinger Contents							X			
R4-WP-S-6	4	6/14/2018	Method 20 Back Half H2SO4/KMnO4 Impinger Contents							X			
R5-WP-S-6	5	6/14/2018	Method 20 Back Half H2SO4/KMnO4 Impinger Contents							X			
RB	RB	6/14/2018	Method 20 Back Half H2SO4/KMnO4 Impinger Contents							X			
FB-WP-S-6	FB	6/14/2018	Method 20 Back Half H2SO4/KMnO4 Impinger Contents							X			
R1-SH-Rinse	1	6/13/2018	Method 29 Back Half HCl Rinse							X			
R2-SH-Rinse	2	6/13/2018	Method 29 Back Half HCl Rinse							X			
R4-SH-Rinse	4	6/14/2018	Method 29 Back Half HCl Rinse							X			
R5-SH-Rinse	5	6/14/2018	Method 29 Back Half HCl Rinse							X			
FB-HCl-29	FB	6/14/2018	Method 29 Back Half HCl Rinse							X			
RD	RD	6/14/2018	Method 29 Back Half HCl Rinse										
Relinquished By (signature)		<i>[Signature]</i>		Relinquished By (signature)		<i>[Signature]</i>		Carrier Laboratory					
(printed)		Michael Hess		(printed)		Ben Higdon		Contact					
Date/Time		6/14/18		Date/Time		6/14/18 1930		Address					
Accepted By (signature)		<i>[Signature]</i>		Accepted By (signature)		<i>[Signature]</i>		Phone					
(printed)		Ben Higdon		(printed)		Lisa Burton		Fax					
Date/Time		6/14/18 1730		Date/Time		6.15.18 0155		Data/Time					

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ANALYTICAL DATA

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Analytical Calculations

Metals-

$$\text{Element Results } (\mu\text{g}) = \text{ICP Results } (\mu\text{g/L}) * \text{Dilution} * \text{Final Volume (L)}$$

Where-

ICP Results= Raw sample concentration (ppb)—*ICP-Data Sheet*

Dilution= $\frac{\text{Diluted Volume}}{\text{Aliquot}}$ —*ICP-MS Run Sheet*

Final Volume= FH=Final Volume (FV)—*Sample Submission*
 BH= $\frac{\text{Received Volume (BV)} * \text{Final Volume (FV)}}{\text{Aliquot (Used)}}$ —*Sample Submission*

Mercury-

$$\text{Mercury Results } (\mu\text{g}) = \frac{\text{CVAA Results } (\mu\text{g}) * \text{Final Volume (ml)}}{\text{Aliquot (ml)}}$$

Where-

CVAA Results= Raw sample reading (μg)—*Hg-Data Sheet*

Aliquot= Sample Aliquot (Alq.)—*Hg-Data Sheet*

Final Volume=Final Volume (FV)*—*Sample Submission*
 * With the exception of the BH fraction where-
 =Received Volume (BV)—*Sample Submission*

Analytical Calculations

Spike Recovery-

$$\text{Spike (\%)} = \frac{(\text{Spiked Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Spike Amount } (\mu\text{g/L})} \times 100$$

Where-

Spike Result = Raw sample concentration (ppb)—*ICP-Data Sheet*

Sample Result = Raw sample concentration (ppb)—*ICP-Data Sheet*

Spike Amount—*ICP-MS Spike Table*

Duplicate Analysis RPD-

$$\text{RPD (\%)} = \frac{(\text{Duplicate Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Average } (\mu\text{g/L})} \times 100$$

Where-

Sample Result and Duplicate Results=Raw sample concentration (ppb)—*ICP-Data Sheet*

$$\text{Average} = \frac{(\text{Duplicate} + \text{Sample Results})}{2}$$

elementOne AIR TESTING SAMPLE SUBMISSION FORM Lab ID 31368

**FH/BH Separate
RUSH--3 DAY TAT**

Analysis Due Date 06.18.18
QA/QC Report Due Date 06.19.18

Client	Montrose Air Quality Services, LLC (Airtech)	Date Rec	06.15.18
Project No	451738	Time Rec	0955
HNO ₃ Lot: 1117100	HF Lot: 5114072	HCl Lot: 4117040	Ref. Method: 29 / 5
Volume Marked Y/N	Volume Loss Y/N?	Acetone: 5635	

Sample Identification

1	Hammermill Shredder-M29/5-R1	5	Field Blank	7	061318S-Cat 1426 Fil
2	Hammermill Shredder-M29/5-R2	6	Reagent Blank	8	061318S-Cat 1426 Imp
	Hammermill Shredder-M29/5-R2 Duplicate			9	061318S-Cat 1427 Fil & Imp
3	Hammermill Shredder-M29/5-R4			10	061318S-Cat 1428 Imp
	Hammermill Shredder-M29/5-R4 Spike				
4	Hammermill Shredder-M29/5-R5				

Analyses Requested	Samples 1-3	Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn Ni, P, Se, Ti, Ag, Zn
	Samples 1-6, 9-10	Hg
	Samples 1-6	PM

Runs / FB	Fil / Ace (FH)	HNO ₃ (FH)		5% HNO ₃ /10% H ₂ O ₂ (BH)			HNO ₃ (A)		KMnO ₄ (B)		HCl (C)	
		BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
1	31247 134	90	100	505	253	50	98	300	405	500	210	400
2.D	31346 83	118		310	155		100		400		240	
3.S	31457 103	56		325	163		116		375		270	
4	31460 84	62		350	175		104		390		225	
5	31344 102	60		320	115		110		380		225	

M-29 Reagent Blank

Lab ID	Fraction	BV, ml	FV, ml	Comments
6	C 7 FH Acetone Blank	22	100	
	C 8A FH 0.1N HNO ₃	225	100	used 100 mlis 8A
	C 8A A 0.1N HNO ₃	335		Combined with mlis 8A + 20 mlis 505 335
	C 8B B DI H ₂ O			
	C 9 BH 5% HNO ₃ /10% H ₂ O ₂	305	50	
	C 10 B 4% KMnO ₄ /10% H ₂ SO ₄	305		used 100 ml C10 & 33 ml DI TA
	C 11 C 8N HCl DI H ₂ O	225	400	
	C 12 FH Filter			

Audits See Attached Audit Instructions

Sample ID	Analyses Requested	Prep By / Date
7	061318S-Cat 1426 Fil	Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn Ni, P, Se, Ti, Ag, Zn DWR 6/19/18
8	061318S-Cat 1426 Imp	Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn Ni, P, Se, Ti, Ag, Zn DWR 6/19/18
9	061318S-Cat 1427 Fil & Imp	Hg R.V. 100 MMW 6/19/18
10	061318S-Cat 1428 Imp	Hg MMW 6/19/18

Lab Communications

VB + spiked w/ 0.1 mlis 259 pm Hds A, B, C, F (02/11/18 - 4, 35-F)
Fractions Received: Runs: C1, C2, C3, C4, C5A, C5B, C5C, RB: C12, C7, C8A, C9, C10, C11, 4 Audits - 06.15.18 LLB Hg + Spiked w/ 0.2 mlis 259 pm

SS Page 1 of 1
6/16/2018 11:04:42 AM
SS Form By: [Signature]
Labeled By/Date: [Signature] 6/15/18
FH Prep By/Date: MMW 6/19/18 A Prep By/Date: [Signature] 6/15/18
BH Prep By/Date: MMW 6/19/18 B Prep By/Date: [Signature] 6/15/18
BH/FH Prep By/Date: MMW 6/19/18 C Prep By/Date: [Signature] 6/15/18
PM Prep By/Date: [Signature] 6/15/18 ID Verification By / Date: [Signature] 6/15/18
Hg prep DE4 6/15/18



A Waters Company

31368



**Instructions for Catalog # 1425
Stationary Source Audit Program
Air and Emissions Metals on Filter Paper**

Revision 051517

Description:

- This standard is packaged in a 50mm polystyrene petri dish containing a single 47mm glass fiber filter.
- This standard is designed for use with EPA Method 29.
- This standard is not preserved.
- This standard can be stored at room temperature.
- This standard will contain the following analytes in the concentration ranges shown;

Antimony.....	25 - 250 µg/filter	Lead.....	20 - 350 µg/filter
Arsenic.....	20 - 250 µg/filter	Manganese.....	10 - 250 µg/filter
Barium.....	20 - 250 µg/filter	Nickel.....	20 - 250 µg/filter
Beryllium.....	10 - 250 µg/filter	Selenium.....	20 - 250 µg/filter
Cadmium.....	10 - 250 µg/filter	Silver.....	30 - 250 µg/filter
Chromium.....	15 - 250 µg/filter	Thallium.....	30 - 250 µg/filter
Cobalt.....	10 - 250 µg/filter	Zinc.....	20 - 250 µg/filter
Copper.....	10 - 250 µg/filter		

- This standard is stable, unopened, for 1 year from receipt of the standard.
- **NOTE:** This standard **MUST** be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Before you begin:

- This standard must be prepared and analyzed following the procedure specified in EPA Method 29.
- This standard should be analyzed as soon as possible after it is prepared.

Instructions:

1. Carefully open the Metals on Filter Paper standard and using tweezers or a gloved hand place the filter into your digestion vessel.
2. Digest & analyze the standard following the procedure specified in EPA Method 29.
3. Report your results as µg/filter for each of the metals.
4. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. Material Safety Data Sheets (MSDS) for all ERA products are available by calling 1-800-372-0122.



31368



Instructions for Catalog # 1426
Stationary Source Audit Program
Air and Emissions Metals in Impinger Solution
 Revision 051517

Description:

- This standard is packaged in a 15 mL screw top vial containing approximately 14 mL of standard concentrate.
- This standard is designed for use with EPA Method 29.
- This standard is preserved with approximately 2% (v/v) nitric acid and 1% (w/v) tartaric acid.
- This standard can be stored at room temperature.
- This standard will contain the following analytes in the concentration ranges shown:

Antimony.....	0.25 – 20 µg/mL	Lead.....	0.2 – 20 µg/mL
Arsenic.....	0.2 – 20 µg/mL	Manganese.....	0.1 – 20 µg/mL
Barium.....	0.15 – 25 µg/mL	Nickel.....	0.15 – 30 µg/mL
Beryllium.....	0.05 – 20 µg/mL	Selenium.....	0.15 – 25 µg/mL
Cadmium.....	0.1 – 20 µg/mL	Silver.....	0.5 – 20 µg/mL
Chromium.....	0.2 – 20 µg/mL	Thallium.....	0.15 – 25 µg/mL
Cobalt.....	0.1 – 25 µg/mL	Zinc.....	0.15 – 25 µg/mL
Copper.....	0.2 – 20 µg/mL		

- This standard is stable, unopened, for 1 year from receipt of the standard.
- **NOTE:** This standard **MUST** be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Before you begin:

- The sample resulting from the dilution described below will have a nitric acid concentration of approximately 0.02% before any acid is added. You may add a volume of acid different from the 4 to 10 mL of HNO₃ suggested in order to matrix match your calibration standards or meet any other method criteria.
- This standard must be prepared and analyzed following the procedure specified in EPA Method 29.
- This standard should be analyzed as soon as possible after the concentrate is diluted.

Instructions:

1. Add 100-200 mL of deionized water and approximately 4 to 10 mL of nitric acid to a clean 1000 mL class A volumetric flask.
2. Shake the Metals in Impinger Solution vial prior to opening.
3. Using a clean, dry, class A pipet, volumetrically pipet 5.0 mL of the concentrate into the 1000 mL volumetric flask.
4. Dilute the flask to final volume with deionized water.
5. Cap the flask and mix well.
6. Immediately analyze the diluted sample by the procedures specified in EPA Method 29.
7. Report your results as µg/mL for the diluted sample.
8. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the



A Waters Company

31368



**Instructions for Catalog # 1427
Stationary Source Audit Program
Mercury on Filter Paper**

Revision 051517

Description:

- This standard is packaged in a 2 mL flame-sealed ampule containing approximately 2 mL of standard concentrate and a 50 mm polystyrene petri dish containing a single 47 mm glass fiber filter.
- This standard is designed for use with EPA Method 29.
- The standard concentrate is preserved with 2% (v/v) HNO₃.
- This standard can be stored at room temperature.
- This standard will contain Mercury in the range of 1-75 µg/filter.
- This standard is stable, unopened, for 1 year from receipt of the standard.
- NOTE: This standard MUST be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Helpful Hints:

- This standard has been prepared as a concentrate intended for spiking onto the supplied glass fiber filter and must be prepared prior to use.
- This standard must be prepared and analyzed following the procedure specified in EPA Method 29.
- This standard should be digested and analyzed as soon as possible after it is prepared using these instructions.

Instructions:

1. Open the container and using tweezers or a gloved hand, place the glass fiber filter onto a clean surface for spiking.
2. Carefully snap the top off the Mercury on Filter ampule.
3. Using a clean, dry, class A pipet or syringe, transfer 100 µL of concentrate onto the glass fiber filter.
4. Place the spiked filter into your digestion vessel.
5. Digest & analyze the standard following the procedure specified in EPA Method 29.
6. Report your results as µg/filter.
7. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. Material Safety Data Sheets (MSDS) for all ERA products are available by calling 1-800-372-0122.



31568



**Instructions for Catalog # 1428
Stationary Source Audit Program
Mercury in Impinger Solution**
Revision 051517

Description:

- This standard is packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate.
- This standard is designed for use with EPA Method 29 and EPA Method 101A.
- This standard is preserved with approximately 2% (v/v) nitric acid.
- This standard can be stored at room temperature.
- The diluted standard will contain Mercury in the range of 0.9-200 ng/mL.
- This standard is stable, unopened, for 1 year from receipt of the standard.
- **NOTE:** This standard **MUST** be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Before you begin:

- This standard has been prepared as a concentrate and must be diluted prior to analysis.
- Mercury is present as a mixture of organic and inorganic forms and must, therefore, be analyzed as Total Mercury.
- This standard must be prepared and analyzed following the procedure specified in EPA Method 29 or EPA Method 101A.
- This standard should be analyzed as soon as possible after the concentrate is diluted.

Instructions:

1. Add 100-200 mL of deionized water and approximately 4 to 10 mL of nitric acid to a clean 1000 mL class A volumetric flask.
2. Shake the Mercury in Impinger Solution vial prior to opening.
3. Using a clean, dry, class A pipet, volumetrically pipet 5.0 mL of the concentrate into the 1000 mL volumetric flask.
4. Dilute the flask to final volume with deionized water.
5. Cap the flask and mix well.
6. Immediately analyze the diluted sample by the procedure specified in EPA Method 29 or EPA Method 101A.
7. Report your results as ng/mL for the diluted sample.
8. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. Material Safety Data Sheets (MSDS) for all ERA products are available by calling 1-800-372-0122.

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Method 5 Particulate

Lab # 31368

Client Air Tech

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Balance checks Date: 09.18.18 2g = 2.0000
 Date: 2g =
 Date: 2g =

Acetone Concentration
 1.37E-05 mg/mg

Filters											
Sample ID #	Filter ID	Tin ID	A		B		B		B		Catch Description and Loading
			Filter Tare, g	Date - 09.18.18 Intake - JGP		Date - 09.18.18 Intake - JGP		Date Intake			
				Time	Filter Weight, g	Time	Filter Weight, g	Time	Filter Weight, g		
31368-1	31347	1	0.4015	820	0.4067	1420	0.4069				
31368-2	31346	2	0.4031	820	0.4118	1420	0.4121				
31368-3	31457	3	0.3679	820	0.3759	1420	0.3761				
31368-4	31450	4	0.3551	820	0.3618	1420	0.3619				
31368-5	31344	5	0.4022	820	0.4035	1420	0.4037				
Client Bk											
E1 Blank											

Acetone Rinses											
Sample ID #	Sample Volume, ml	Bag ID	C		D		D		D		Catch Description and Loading
			Bag Tare, g	Date - 09.18.18 Intake - JGP		Date - 09.18.18 Intake - JGP		Date Intake			
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g		
31368-1	134	758	10.8814	820	10.8907	1420	10.8906			Oily Residue	
31368-2	88	737	11.0158	820	11.0258	1420	11.0250			Oily Residue	
31368-3	108	597	10.1119	820	10.1235	1420	10.1233			Oily Residue	
31368-4	84	x23	9.9149	820	9.9237	1420	9.9238			Oily Residue	
31368-5	102	528	9.8710	820	9.8728	1420	9.8728			Oily Residue	
Client Ace Bk	222	895	10.2528	820	10.2553	1420	10.2550			Oily Residue	
E1 Acetone Blank	100	987	9.9053	820	9.9057	1420	9.9054				

Total Catches										
Sample ID #	Filter ID	Filter Tare, g	Final Filter + Catch, g	Filter Catch, mg	Acetone Bag ID	Bag Tare, g	Final Bag + Ace Catch, g	Acetone Catch, mg	Total Catch, mg	
31368-1	31347	0.4015	0.4097	5.2	758	10.8814	10.8906	9.2	14.4	
31368-2	31346	0.4031	0.4118	8.7	737	11.0158	11.0258	10.0	18.7	
31368-3	31457	0.3679	0.3759	8.0	597	10.1119	10.1233	11.4	19.4	
31368-4	31450	0.3551	0.3618	6.7	x23	9.9149	9.9237	8.8	15.5	
31368-5	31344	0.4022	0.4035	1.3	528	9.871	9.8728	1.8	3.1	
Client Bk					895	10.2528	10.2550	2.4	2.4	
E1 Blank					987	9.9053	9.9054	0.1	0.1	

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Method 29 Microwave Worksheet

Lab ID # e 31368

Client: MONTROSE

Date Digested: 6/19/18 Initials: JCO Worksheet Prepared by: MMP

Auto Sample Loc.	Sample Lab ID	# of filters digested	Spike	Prep Volume (ml)	Comments
1	URB+		0.1 mL A, B, C, F	100	
2	URB				
3	31368-1	↓			
5	-2				
6	-3				
7	-4				
9	-5				
10	-6				
11	-9 audit				
13	M29 clean				
14	↓				
15					
/					
HNO ₃ Lot #: 1117100		mLs Used: 6			
HF Lot #: 5116072		mLs Used: 2			

URB+ spiked w/ 0.1 mLs 25ppm stds A, B, C + F (021418-A, B, C, F) MMP

Sample/Batch Report

Handwritten signature
6/20/18

User Name: r2d2

Computer Name: PESERVICE-PC

Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Sample\c2.sam

Report Date/Time: Wednesday, June 20, 2018 10:49:07

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
	5	QC Std 2		Sample					
	1	QC Std 1		Sample					
	401	LRB FH		Sample					
	402 s	LRB FH		Spike - 1 of 3					
	403	31368-1 FH		Sample					
	404	31368-2 FH		Sample					
	405 d	31368-2 FH		Duplicate of 6					
	406	31368-3 FH		Sample					
	407 s	31368-3 FH		Spike - 1 of 8					
	408	31368-4 FH		Sample					
	409	31368-5 FH		Sample					
	410	31368-6 FH		Sample					
	411	LRB BH		Sample					
	412 s	LRB BH		Spike - 1 of 13					
	413	31368-1 BH		Sample					
	414	31368-2 BH		Sample					
	415 d	31368-2 BH		Duplicate of 16					
	416	31368-3 BH		Sample					
	417 s	31368-3 BH		Spike - 1 of 18					
	418	31368-4 BH		Sample					
	419	31368-5 BH		Sample					
	420	31368-6 BH		Sample					
	421 x10	31368-7		Sample					
	422 x10s	31368-7		Spike - 1 of 23					
	423 x500	31368-8		Sample					
	424 x500s	31368-8		Spike - 1 of 25					
	425 x50x50	31368-8		Sample					
	426 x50x50s	31368-8		Spike - 1 of 27					
	1	QC Std 1		Sample					
	5	QC Std 2		Sample					
	3	QC Std 3		Spike - 3 of 28					
	5	QC Std 2		Sample					

Dataset Report

David J. [Signature]
6/20/18

User Name: r2d2
 Computer Name: PESERVICE-PC
 Dataset File Path: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\061918-5a1
 Report Date/Time: Wednesday, June 20, 2018 10:11:41

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Asquod Vol.	Diluted Vol.
16:45:11 Tue 19-Jun-18	Blank		Blank					
16:48:17 Tue 19-Jun-18	Standard 1		Standard #1					
16:51:24 Tue 19-Jun-18	Standard 2		Standard #2					
16:54:30 Tue 19-Jun-18	Standard 3		Standard #3					
16:57:37 Tue 19-Jun-18	QC Std 1		QC Std #1					
17:00:44 Tue 19-Jun-18	QC Std 2		QC Std #2					
17:03:50 Tue 19-Jun-18	QC Std 3		QC Std #3					
17:06:57 Tue 19-Jun-18	QC Std 4		QC Std #4					
17:10:05 Tue 19-Jun-18	QC Std 5		QC Std #5					
17:13:12 Tue 19-Jun-18	QC Std 6		QC Std #6					
17:16:19 Tue 19-Jun-18	QC Std 7		QC Std #7					
17:19:25 Tue 19-Jun-18	QC Std 8		QC Std #8					
17:22:32 Tue 19-Jun-18	QC Std 2		Sample					
17:25:20 Tue 19-Jun-18	QC Std 1		Sample					
17:28:27 Tue 19-Jun-18	LRB FH		Sample					
17:31:34 Tue 19-Jun-18	LRB FH	a	Spike - 1 of 15					
17:34:40 Tue 19-Jun-18	31368-1 FH		Sample					
17:37:46 Tue 19-Jun-18	31368-2 FH		Sample					
17:40:53 Tue 19-Jun-18	31368-2 FH	d	Duplicate of 18					
17:43:59 Tue 19-Jun-18	31368-3 FH		Sample					
17:47:05 Tue 19-Jun-18	31368-3 FH	a	Spike - 1 of 20					
17:50:12 Tue 19-Jun-18	31368-4 FH		Sample					
17:53:20 Tue 19-Jun-18	QC Std 1		QC Std #1					
17:56:26 Tue 19-Jun-18	QC Std 4		QC Std #4					
17:59:33 Tue 19-Jun-18	31368-5 FH		Sample					
18:02:41 Tue 19-Jun-18	31368-5 FH		Sample					
18:05:48 Tue 19-Jun-18	LRB BH		Sample					
18:08:55 Tue 19-Jun-18	LRB BH	e	Spike - 1 of 27					
18:12:02 Tue 19-Jun-18	31368-1 BH		Sample					
18:15:09 Tue 19-Jun-18	31368-2 BH		Sample					
18:18:15 Tue 19-Jun-18	31368-2 BH	d	Duplicate of 30					
18:21:22 Tue 19-Jun-18	31368-3 BH		Sample					
18:24:28 Tue 19-Jun-18	31368-3 BH	a	Spike - 1 of 32					
18:27:34 Tue 19-Jun-18	31368-4 BH		Sample					
18:30:43 Tue 19-Jun-18	QC Std 1		QC Std #1					
18:33:49 Tue 19-Jun-18	QC Std 4		QC Std #4					
18:36:57 Tue 19-Jun-18	31368-5 BH		Sample					
18:40:04 Tue 19-Jun-18	31368-5 BH		Sample					
18:43:10 Tue 19-Jun-18	31368-7	x10	Sample					
18:46:17 Tue 19-Jun-18	31368-7	x10a	Spike - 1 of 39					
18:49:23 Tue 19-Jun-18	31368-8	x50	Sample					
18:52:30 Tue 19-Jun-18	31368-8	x50a	Spike - 1 of 41					
18:55:37 Tue 19-Jun-18	31368-8	x50x50	Sample					
18:58:43 Tue 19-Jun-18	31368-8	x50x50a	Spike - 1 of 43					
19:01:51 Tue 19-Jun-18	QC Std 1		Sample					
19:04:58 Tue 19-Jun-18	QC Std 2		Sample					
19:08:05 Tue 19-Jun-18	QC Std 2 <i>PAR 6098</i>		Spike - 3 of 45					
19:11:12 Tue 19-Jun-18	QC Std 1		QC Std #1					
19:14:19 Tue 19-Jun-18	QC Std 4		QC Std #4					

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date/Time: Tuesday, June 19, 2018 16:54:30

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\061918-5a\Standard 3.004

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Li	Linear Thru Zero			
Be	Linear Thru Zero	0.004	0.999911	0.00
P	Linear Thru Zero	0.002	0.999991	0.00
Sc	Linear Thru Zero			
Cr	Linear Thru Zero	0.032	0.999987	0.00
Cr	Linear Thru Zero	0.004	0.999982	0.00
Mn	Linear Thru Zero	0.054	0.999996	0.00
Co	Linear Thru Zero	0.036	0.999986	0.00
Ni	Linear Thru Zero	0.008	0.999986	0.00
Cu	Linear Thru Zero	0.019	0.999986	0.00
Cu	Linear Thru Zero	0.006	0.999984	0.00
Zn	Linear Thru Zero	0.004	0.999994	0.00
Zn	Linear Thru Zero	0.001	0.999995	0.00
Zn	Linear Thru Zero	0.003	0.999997	0.00
As	Linear Thru Zero	0.004	0.999988	0.00
Se	Linear Thru Zero	0.000	0.999447	0.00
Se	Linear Thru Zero	0.000	0.999775	0.00
Rh	Linear Thru Zero			
Ag	Linear Thru Zero	0.019	0.999998	0.00
Ag	Linear Thru Zero			
Cd	Linear Thru Zero	0.007	0.999993	0.00
Cd	Linear Thru Zero	0.026	0.999998	0.00
Sb	Linear Thru Zero			
Sb	Linear Thru Zero	0.004	0.999995	0.00
Ba	Linear Thru Zero			
Ba	Linear Thru Zero	0.004	1.000000	0.00
Hg	Linear Thru Zero			
Tl	Linear Thru Zero	0.028	0.999999	0.00
Pb	Linear Thru Zero	0.037	1.000000	0.00
Kr	Linear Thru Zero			

elementOne
Analyst:--DMR--

ICP-MS RUN SHEET
6/20/2018

Job Number:
14

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
5		QC Std 2		Sample		
401		LRB FH		Sample		100
402	s	LRB FH		Spike - 1 of 3		100
403		31368-1 FH		Sample		100
404		31368-2 FH		Sample		100
405	d	31368-2 FH		Duplicate of 6		100
406		31368-3 FH		Sample		100
407	s	31368-3 FH		Spike - 1 of 8		100
408		31368-4 FH		Sample		100
409		31368-5 FH		Sample		100
410		31368-6 FH		Sample		100
411		LRB BH		Sample		50x2
412	s	LRB BH		Spike - 1 of 13		50x2
413		31368-1 BH		Sample		50x2
414		31368-2 BH		Sample		50x2
415	d	31368-2 BH		Duplicate of 16		50x2
416		31368-3 BH		Sample		50x2
417	s	31368-3 BH		Spike - 1 of 18		50x2
418		31368-4 BH		Sample		50x2
419		31368-5 BH		Sample		50x2
420		31368-6 BH		Sample		50x2
421	x10	31368-7		Sample		50
422	x10s	31368-7		Spike - 1 of 23		50
423	x500	31368-8		Sample		5/1000/1000
424	x500s	31368-8		Spike - 1 of 25		5/1000/1000
425	x50x50	31368-8		Sample		5/1000/1000
426	x50x50s	31368-8		Spike - 1 of 27		5/1000/1000
Spikes are post at 0.02mL of 25ppm spiking solutions lot 021418-ABC&F in a final volume of 10mL						
Submitted for QC by:		Date/Time:		QC Review By:		Date/Time:
DMR		6/20/18 10:50		KLG		6/20/18 01:40
Re-Test Required:		No:	Yes:	Comments:		
			<input checked="" type="checkbox"/>			
Resubmitted for QC by:		Date/Time:		QC Review:		By: Date/Time:

S:\Forms\Blank Forms\F208 R2 ICP-MS Run Sheet

Sample/Batch Report

Handwritten signature
6/20/18

User Name: r2d2
Computer Name: PESERVICE-PC
Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Sample\c3.sam
Report Date/Time: Wednesday, June 20, 2018 16:38:31

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
	5	QC Std 2		Sample					
421	x10	31368-7		Sample					
422	x10s	31368-7		Spike - 1 of 2					
423	x50	31368-7		Sample					
424	x50s	31368-7		Spike - 1 of 4					
425	x50x50	31368-8		Sample					
426	x50x50s	31368-8		Spike - 1 of 6					
427	x50x100	31368-8		Sample					
428	x50x100s	31368-8		Spike - 1 of 8					
429		31368-5 FH		Sample					
430		31368-6 FH		Sample					
431		31368-6 CBA		Sample					
432		31368-5 BH		Sample					
433		31368-5 BH Unprep		Sample					
434		31368-6 BH		Sample					
435		31368-6 CBA-C9		Sample					

Dataset Report

Daniel Deak
6/20/18

User Name: r2d2
 Computer Name: PESERVICE-PC
 Dataset File Path: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\062018-1a\
 Report Date/Time: Wednesday, June 20, 2018 16:37:53

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Allocast Vol.	Diluted Vol.
12:11:56 Wed 20-Jun-18	Blank		Blank					
12:14:57 Wed 20-Jun-18	Standard 1		Standard #1					
12:17:57 Wed 20-Jun-18	Standard 2		Standard #2					
12:20:58 Wed 20-Jun-18	Standard 3		Standard #3					
12:23:59 Wed 20-Jun-18	QC Std 1		QC Std #1					
12:27:00 Wed 20-Jun-18	QC Std 2		QC Std #2					
12:30:01 Wed 20-Jun-18	QC Std 3		QC Std #3					
12:33:01 Wed 20-Jun-18	QC Std 4		QC Std #4					
12:36:03 Wed 20-Jun-18	QC Std 5		QC Std #5					
12:39:03 Wed 20-Jun-18	QC Std 6		QC Std #6					
12:42:04 Wed 20-Jun-18	QC Std 7		QC Std #7					
12:45:04 Wed 20-Jun-18	QC Std 8		QC Std #8					
12:48:05 Wed 20-Jun-18	QC Std 2		Sample					
12:50:44 Wed 20-Jun-18	31368-7	x1D	Sample					
12:53:44 Wed 20-Jun-18	31368-7	x1De	Sample					
12:56:45 Wed 20-Jun-18	31368-7	x5D	Sample					
12:59:45 Wed 20-Jun-18	31368-7	x50s	Sample					
13:02:46 Wed 20-Jun-18	31368-5	x50x50	Sample					
13:05:47 Wed 20-Jun-18	31368-8	x50x50s	Sample					
13:08:47 Wed 20-Jun-18	31368-8	x50x100	Sample					
13:11:48 Wed 20-Jun-18	31368-6	x50x100s	Sample					
13:14:49 Wed 20-Jun-18	31368-5 FH		Sample					
13:17:51 Wed 20-Jun-18	QC Std 1		QC Std #1					
13:20:51 Wed 20-Jun-18	QC Std 4		QC Std #4					
13:23:53 Wed 20-Jun-18	31368-6 FH		Sample					
13:26:54 Wed 20-Jun-18	31368-6 CBA		Sample					
13:29:54 Wed 20-Jun-18	31368-5 BH		Sample					
13:32:55 Wed 20-Jun-18	31368-5 BH Unprep		Sample					
13:35:55 Wed 20-Jun-18	31368-6 BH		Sample					
13:38:56 Wed 20-Jun-18	31368-6 CBA-CB		Sample					
13:41:58 Wed 20-Jun-18	Blank		Sample					
13:44:58 Wed 20-Jun-18	Standard 1		Sample					
13:47:59 Wed 20-Jun-18	Standard 2		Sample					
13:51:00 Wed 20-Jun-18	QC Std 1		QC Std #1					
13:54:00 Wed 20-Jun-18	QC Std 2		QC Std #2					
13:57:01 Wed 20-Jun-18	QC Std 4		QC Std #4					
14:00:44 Wed 20-Jun-18	Blank		Blank					

No P, Cr, As, Se, Zn, Cd
DWR 6/20/18

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date/Time: Wednesday, June 20, 2018 12:20:58

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\ParkInElmer Syngistix\CFMS\DataSet\062018-1a\Standard 3.004

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Ll	Linear Thru Zero			
Be	Linear Thru Zero	0.005	0.999959	0.00
P	Linear Thru Zero	0.002	0.999600	0.00
Sc	Linear Thru Zero			
Cr	Linear Thru Zero	0.030	0.999881	0.00
Cr	Linear Thru Zero	0.003	0.999946	0.00
Mn	Linear Thru Zero	0.048	0.999991	0.00
Ni	Linear Thru Zero	0.008	0.999994	0.00
Cu	Linear Thru Zero	0.018	0.999994	0.00
Cu	Linear Thru Zero	0.008	0.999967	0.00
Zn	Linear Thru Zero	0.004	0.999861	0.00
Zn	Linear Thru Zero	0.001	0.999855	0.00
Zn	Linear Thru Zero	0.003	0.999781	0.00
As	Linear Thru Zero	0.005	0.999994	0.00
Se	Linear Thru Zero	0.000	0.997326	0.00
Se	Linear Thru Zero	0.000	0.999923	0.00
Rh	Linear Thru Zero			
Ag	Linear Thru Zero	0.020	0.999995	0.00
Ag	Linear Thru Zero			
Cd	Linear Thru Zero	0.007	0.999996	0.00
Cd	Linear Thru Zero	0.026	1.000000	0.00
Sb	Linear Thru Zero			
Sb	Linear Thru Zero	0.004	0.999990	0.00
Sa	Linear Thru Zero			
Sa	Linear Thru Zero	0.004	0.999988	0.00
Ho	Linear Thru Zero			
Pb	Linear Thru Zero	0.038	1.000000	0.00
Kr	Linear Thru Zero			

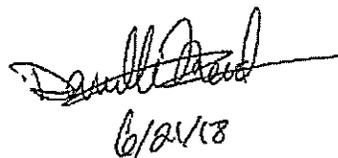
Sample/Batch Report

User Name: r2d2
 Computer Name: PESERVICE-PC
 Sample File: C:\Users\Public\Documents\PerkinElmer\Syngistix\CPMS\Sample\c4.sam
 Report Date/Time: Thursday, June 21, 2018 14:08:50

David A. [Signature]
 6/20/18

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
	5		QC Std 2	Sample					
	1		QC Std 1	Sample					
	401		LRB FH	Sample					
	402	s	LRB FH	Spike - 1 of 3					
	411		LRB BH	Sample					
	412	s	LRB BH	Spike - 1 of 5					
	436	x50	31368-1 FH	Sample					
	437	x50	31368-2 FH	Sample					
	438	x50d	31368-2 FH	Duplicate of 8					
	439	x50	31368-3 FH	Sample					
	440	x50s	31368-3 FH	Spike - 1 of 10					
	441	x50	31368-4 FH	Sample					
	442	x10	31368-2 BH	Sample					
	443	x10d	31368-2 BH	Duplicate of 13					
	444	x5	31368-3 BH	Sample					
	445	x5s	31368-3 BH	Spike - 1 of 15					
	421	x10	31368-7	Sample					
	422	x10s	31368-7	Spike - 1 of 17					
	423	x50	31368-7	Sample					
	424	x50s	31368-7	Spike - 1 of 19					
	425	x50x50	31368-8	Sample					
	426	x50x50s	31368-8	Spike - 1 of 21					
	403		31368-1 FH	Sample					
	404		31368-2 FH	Sample					
	405	d	31368-2 FH	Duplicate of 24					
	406		31368-3 FH	Sample					
	407	s	31368-3 FH	Spike - 1 of 28					
	408		31368-4 FH	Sample					
	413		31368-1 BH	Sample					
	414		31368-2 BH	Sample					
	415	d	31368-2 BH	Duplicate of 30					
	416		31368-3 BH	Sample					
	417	s	31368-3 BH	Spike - 1 of 32					
	418		31368-4 BH	Sample					
	449	x5	31368-1 BH	Sample					
	418		31368-4 BH	Sample					
	450	x5	31368-2 BH	Sample					
	451	x5d	31368-2 BH	Duplicate of 37					
	421	x10	31368-7	Sample					
	422	x10s	31368-7	Spike - 1 of 39					
	425	x50x50	31368-8	Sample					
	426	x50x50s	31368-8	Spike - 1 of 41					
	452		31368-6 BH	Sample					
	427	x50x100	31368-8	Sample					
	428	x50x100s	31368-8	Sample					

Sample/Batch Report



User Name: r2d2
Computer Name: PESERVICE-PC
Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Sample\c9.sam
Report Date/Time: Thursday, June 21, 2018 15:02:45

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
1		QC Std 1		Sample					
3		QC Std 4		Spike - 3 of 1					
201		31369-5 FH		Sample					
202		31369-6 FH		Sample					
203		31369-5 BH		Sample					
204		31369-8 FH		Sample					

Dataset Report

User Name: r2d2
 Computer Name: PESERVICE-PC
 Dataset File Path: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\062118-1a\
 Report Date/Time: Thursday, June 21, 2018 14:22:11

David M. [Signature]
6/21/18

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Aliquot Vol.	Diluted Vol.
11:05:25 Thu 21-Jun-18	Blank		Blank					
11:07:22 Thu 21-Jun-18	Standard 1		Standard #1					
11:09:20 Thu 21-Jun-18	Standard 2		Standard #2					
11:11:17 Thu 21-Jun-18	Standard 3		Standard #3					
11:13:15 Thu 21-Jun-18	QC Std 1		QC Std #1					
11:15:12 Thu 21-Jun-18	QC Std 2		QC Std #2					
11:17:09 Thu 21-Jun-18	QC Std 3		QC Std #3					
11:19:07 Thu 21-Jun-18	QC Std 4		QC Std #4					
11:21:04 Thu 21-Jun-18	QC Std 5		QC Std #5					
11:23:01 Thu 21-Jun-18	QC Std 6		QC Std #6					
11:24:58 Thu 21-Jun-18	QC Std 7		QC Std #7					
11:26:55 Thu 21-Jun-18	QC Std 8		QC Std #8					
11:28:53 Thu 21-Jun-18	QC Std 2		Sample					
11:30:30 Thu 21-Jun-18	QC Std 1		Sample					
11:33:00 Thu 21-Jun-18	Blank		Blank					
11:34:57 Thu 21-Jun-18	Standard 1		Standard #1					
11:36:55 Thu 21-Jun-18	Standard 2		Standard #2					
11:38:52 Thu 21-Jun-18	Standard 3		Standard #3					
11:40:50 Thu 21-Jun-18	QC Std 1		QC Std #1					
11:42:48 Thu 21-Jun-18	QC Std 2		QC Std #2					
11:44:45 Thu 21-Jun-18	QC Std 3		QC Std #3					
11:46:43 Thu 21-Jun-18	QC Std 4		QC Std #4					
11:48:41 Thu 21-Jun-18	QC Std 5		QC Std #5					
11:50:38 Thu 21-Jun-18	QC Std 6		QC Std #6					
11:52:36 Thu 21-Jun-18	QC Std 7		QC Std #7					
11:54:33 Thu 21-Jun-18	QC Std 8		QC Std #8					
11:56:31 Thu 21-Jun-18	QC Std 2		Sample					
11:58:08 Thu 21-Jun-18	QC Std 1		Sample					
12:00:05 Thu 21-Jun-18	LRB FH		Sample					
12:02:04 Thu 21-Jun-18	LRB FH	s	Spike - 1 of 29					
12:04:02 Thu 21-Jun-18	LRB BH		Sample					
12:06:59 Thu 21-Jun-18	LRB BH	s	Spike - 1 of 31					
12:07:58 Thu 21-Jun-18	31368-1 FH	x50	Sample					
12:09:55 Thu 21-Jun-18	31368-2 FH	x50	Sample					
12:11:53 Thu 21-Jun-18	31368-2 FH	x50d	Duplicate of 34					
12:13:50 Thu 21-Jun-18	31368-3 FH	x50	Sample					
12:15:48 Thu 21-Jun-18	31368-3 FH	x50s	Spike - 1 of 38					
12:17:47 Thu 21-Jun-18	QC Std 1		QC Std #1					
12:19:44 Thu 21-Jun-18	QC Std 4		QC Std #4					
12:21:43 Thu 21-Jun-18	31368-4 FH	x50	Sample					
12:23:40 Thu 21-Jun-18	31368-2 BH	x10	Sample					
12:25:38 Thu 21-Jun-18	31368-2 BH	x10d	Duplicate of 41					
12:27:35 Thu 21-Jun-18	31368-3 BH	x5	Sample					
12:29:33 Thu 21-Jun-18	31368-3 BH	x5s	Spike - 1 of 43					
12:31:31 Thu 21-Jun-18	31368-7	x10	Sample					
12:33:28 Thu 21-Jun-18	31368-7	x10s	Spike - 1 of 45					
12:35:26 Thu 21-Jun-18	31368-7	x50	Sample					
12:37:23 Thu 21-Jun-18	31368-7	x50s	Spike - 1 of 47					
12:39:20 Thu 21-Jun-18	31368-8	x50x50	Sample					

Page 1

elementOne

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12:41:18 Thu 21-Jun-18	31368-B	<i>x50x50s</i>	Spike - 1 of 49
12:43:17 Thu 21-Jun-18	QC Std 1		QC Std #1
12:45:14 Thu 21-Jun-18	QC Std 4		QC Std #4
12:47:13 Thu 21-Jun-18	31368-1 FH		Sample
12:49:10 Thu 21-Jun-18	31368-2 FH		Sample
12:51:07 Thu 21-Jun-18	31368-2 FH	d	Duplicate of 54
12:53:05 Thu 21-Jun-18	31368-3 FH		Sample
12:55:02 Thu 21-Jun-18	31368-3 FH	e	Spike - 1 of 56
12:57:00 Thu 21-Jun-18	31368-4 FH		Sample
12:58:58 Thu 21-Jun-18	31368-1 BH		Sample
13:00:55 Thu 21-Jun-18	31368-2 BH		Sample
13:02:53 Thu 21-Jun-18	31368-2 BH	d	Duplicate of 60
13:04:51 Thu 21-Jun-18	31368-3 BH		Sample
13:06:49 Thu 21-Jun-18	31368-3 BH	s	Spike - 1 of 62
13:08:47 Thu 21-Jun-18	QC Std 1		QC Std #1
13:10:45 Thu 21-Jun-18	QC Std 4		QC Std #4
13:13:22 Thu 21-Jun-18	31368-1 BH	x5	Sample
13:15:20 Thu 21-Jun-18	31368-4 BH		Sample
13:17:18 Thu 21-Jun-18	31368-2 BH	x5	Sample
13:19:16 Thu 21-Jun-18	31368-2 BH	x5d	Duplicate of 68
13:21:15 Thu 21-Jun-18	QC Std 1		QC Std #1
13:23:12 Thu 21-Jun-18	QC Std 2		QC Std #2
13:25:10 Thu 21-Jun-18	QC Std 4		QC Std #4
13:27:10 Thu 21-Jun-18	QC Std 4		Sample
13:29:17 Thu 21-Jun-18	Blank		Blank
13:31:05 Thu 21-Jun-18	Standard 1		Standard #1
13:33:59 Thu 21-Jun-18	Standard 2		Standard #2
13:34:50 Thu 21-Jun-18	Standard 3		Standard #3
13:36:42 Thu 21-Jun-18	QC Std 1		QC Std #1
13:38:34 Thu 21-Jun-18	QC Std 2		QC Std #2
13:40:29 Thu 21-Jun-18	QC Std 3		QC Std #3
13:42:17 Thu 21-Jun-18	QC Std 4		QC Std #4
13:44:08 Thu 21-Jun-18	QC Std 5		QC Std #5
13:45:59 Thu 21-Jun-18	QC Std 6		QC Std #6
13:47:50 Thu 21-Jun-18	QC Std 7		QC Std #7
13:49:43 Thu 21-Jun-18	31368-7	x10	Sample
13:51:34 Thu 21-Jun-18	31368-7	x10s	Spike - 1 of 65
13:53:27 Thu 21-Jun-18	31368-8	x50x50	Sample
13:55:18 Thu 21-Jun-18	31368-8	x50x50s	Spike - 1 of 67
13:57:11 Thu 21-Jun-18	31368-6 BH		Sample
13:59:05 Thu 21-Jun-18	31368-8	x50x100	Sample
14:01:37 Thu 21-Jun-18	31368-8	x50x100s	Spike - 1 of 90
14:13:08 Thu 21-Jun-18	31368-8	x50x100	Sample
14:15:00 Thu 21-Jun-18	31368-8	x50x100s	Spike - 1 of 92
14:16:53 Thu 21-Jun-18	QC Std 1		QC Std #1
14:18:44 Thu 21-Jun-18	QC Std 2		QC Std #2
14:20:36 Thu 21-Jun-18	QC Std 4		QC Std #4
14:43:20 Thu 21-Jun-18	QC Std 1		Sample
14:44:45 Thu 21-Jun-18	QC Std 4		Spike - 3 of 97
14:46:31 Thu 21-Jun-18	31368-5 FH		Sample
14:48:17 Thu 21-Jun-18	31368-6 FH		Sample
14:50:02 Thu 21-Jun-18	31368-5 BH		Sample
14:51:45 Thu 21-Jun-18	31368-6 FH		Sample
14:53:35 Thu 21-Jun-18	QC Std 1		QC Std #1
14:55:20 Thu 21-Jun-18	QC Std 2		QC Std #2
14:57:05 Thu 21-Jun-18	QC Std 4		QC Std #4

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date/Time: Thursday, June 21, 2018 11:38:52

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer\Syngistix\CPMS\DataSet\062118-1a\Standard 3_018

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Li	Linear Thru Zero			
Be	Linear Thru Zero	0.004	1.000000	0.00
P	Linear Thru Zero	0.003	0.999962	0.00
Sc	Linear Thru Zero			
Zn	Linear Thru Zero	0.004	0.999959	0.00
Zn	Linear Thru Zero	0.001	0.999959	0.00
Zn	Linear Thru Zero	0.003	0.999959	0.00
As	Linear Thru Zero	0.004	1.000000	0.00
Se	Linear Thru Zero	0.000	0.999930	0.00
Se	Linear Thru Zero	0.000	0.999933	0.00
Rh	Linear Thru Zero			
Ho	Linear Thru Zero			
Kr	Linear Thru Zero			

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample DateTime: Thursday, June 21, 2018 13:34:50

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\CPMS\DataSet\052118-1a\Standard 3.077

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Li	Linear Thru Zero			
Sc	Linear Thru Zero			
Rh	Linear Thru Zero			
Ag	Linear Thru Zero	0.022	0.999965	0.00
Ag	Linear Thru Zero			
Cd	Linear Thru Zero	0.013	0.999881	0.00
Cd	Linear Thru Zero	0.041	0.999881	0.00
Hg	Linear Thru Zero			
Kr	Linear Thru Zero			

elementOne
Analyst:-DMR-

ICP-MS RUN SHEET
6/21/2018

Job Number:
14

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
5		QC Std 2		Sample		
401		LRB FH		Sample		100
402	s	LRB FH		Spike - 1 of 3		100
411		LRB BH		Sample		50x2
412	s	LRB BH		Spike - 1 of 5		50x2
436	x50	31368-1 FH		Sample		100
437	x50	31368-2 FH		Sample		100
438	x50d	31368-2 FH		Duplicate of 8		100
439	x50	31368-3 FH		Sample		100
440	x50s	31368-3 FH		Spike - 1 of 10		100
441	x50	31368-4 FH		Sample		100
442	x10	31368-2 BH		Sample		50x2
443	x10d	31368-2 BH		Duplicate of 13		50x2
444	x5	31368-3 BH		Sample		50x2
445	x5s	31368-3 BH		Spike - 1 of 15		50x2
421	x10	31368-7		Sample		50
422	x10s	31368-7		Spike - 1 of 17		50
423	x50	31368-7		Sample		50
424	x50s	31368-7		Spike - 1 of 19		50
425	x50x50	31368-8		Sample		5/1000/1000
428	x50x50s	31368-8		Spike - 1 of 21		5/1000/1000
403		31368-1 FH		Sample		100
404		31368-2 FH		Sample		100
405	d	31368-2 FH		Duplicate of 24		100
406		31368-3 FH		Sample		100
407	s	31368-3 FH		Spike - 1 of 26		100
408		31368-4 FH		Sample		100
413		31368-1 BH		Sample		50x2
414		31368-2 BH		Sample		50x2
415	d	31368-2 BH		Duplicate of 30		50x2
416		31368-3 BH		Sample		50x2
417	s	31368-3 BH		Spike - 1 of 32		50x2
418		31368-4 BH		Sample		50x2
449	x5	31368-1 BH		Sample		50x2
418		31368-4 BH		Sample		50x2
450	x5	31368-2 BH		Sample		50x2
451	x5d	31368-2 BH		Duplicate of 37		50x2
452		31368-6 BH		Sample		50x2
427	x50x100	31368-8		Sample		5/1000/1000
428	x50x100s	31368-8		Spike - 1 of 44		5/1000/1000

Spikes are post at 0.02mL of 25ppm spiking solutions lot 021418-ABC&F in a final volume of 10mL

Submitted for QC by:	Date/Time:		QC Review By:	Date/Time:	
DMR	6/21/18 13:59		<i>DMR</i>	6/21/18 0:1500	
Re-Test Required:	No:	Yes:	Comments:		
		<input checked="" type="checkbox"/>			
Resubmitted for QC by:	Date/Time:		QC Review:	By:	Date/Time:

S:\Jobs\Jobs - Active\31368 MAQS Airtech General Iron M29-5 4R, FB, RB, Audits--RUSH\062118-1a ICP-MS Run Sheet

ICP-MS QC Values Table

Element or Test	ICP Element Mass	Element symbol	Lowest Reported Value (ug)	Upper Reported Value (ug)	Report Ing Unit	QC #1	QC #2	QC #3	QC #4	QC #5	QC #6	QC #7	QC #8	QC #9	QC #10	QC #11	
						A	AS	2S	LR5	LR5+	LR5+						
Lithium	Lithium	Li	1	500	mg/L	0	1	250	100	50				0	50	100	
Beryllium		Be	1	500	mg/L	0	1	250	100	50				0.25	0	50	100
Boron	Boron	B	5	500	mg/L	0	1	250	100	50					0	50	100
Sodium		Na	20	5500	mg/L	0	21	2500	1100	250	5000	5000			0	716	
Magnesium		Mg	20	5500	mg/L	0	21	2500	1100	250	5000	5000			0	550	
Aluminum		Al	1	500	mg/L	0	1	250	100	50	5000	5000			0	50	100
Phosphorus		P	20	5000	mg/L	0	20	2500	1000	250	5000	5000			0	292	
Potassium		K	20	5500	mg/L	0	20	2500	1000	200	5000	5000			0	500	
Calcium		Ca	50	5500	mg/L	0	21	2500	1100	250	5000	5000			0	550	
Titanium		Ti	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100	
Vanadium		V	1	500	mg/L	0	1	250	100	50	0	2	0.25	0	50	100	
Chromium		Cr	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100	
Iron		Fe	20	5500	mg/L	0	21	2500	1100	250	5000	0		0			
Manganese		Mn	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100	
Cobalt		Co	1	500	mg/L	0	1	250	100	50	0	2	0.25	0	50	100	
Nickel		Ni	1	500	mg/L	0	1	250	100	50	0	2	0.25	0	50	100	
Copper		Cu	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100	
Zinc		Zn	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100	
Germanium	Zinc	Ge	1	500	mg/L	0	1	250	100	50				0.25	0	50	100
Arsenic	Zinc	As	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100	
Selenium		Se	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100	
Selenium		Se	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100	
Strontium		Sr	1	500	mg/L	0	1	250	100	50				0	50	100	
Molybdenum		Mo	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100	
Molybdenum		Mo	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100	
Molybdenum		Mo	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100	
Silver		Ag	1	500	mg/L	0	1	250	100	50	0	1		0	50	100	
Cadmium		Cd	1	500	mg/L	0	1	250	100	50	0	0.5	0.25	0	50	100	
Cadmium		Cd	1	500	mg/L	0	1	250	100	50			0.25	0	50	100	
Tin		Sn	1	500	mg/L	0	1	250	100	50				0	50	100	
Antimony		Sb	1	500	mg/L	0	1	250	100	50			0.25	0	50	100	
Antimony		Sb	1	500	mg/L	0	1	250	100	50			0.25	0	50	100	
Tellurium		Te	1	500	mg/L	0	1	250	100	50				0	50	100	
Barium		Ba	1	500	mg/L	0	1	250	100	50				0	50	100	
Lanthanum		La	1	500	mg/L	0	1	250	100	50				0	50	100	
Tantalum		Ta	1	500	mg/L	0	1	250	100	50				0	50	100	
Platinum		Pt	1	500	mg/L	0	1	250	100	50				0	50	100	
Gold		Au	1	500	mg/L	0	1	250	100	50				0	50	100	
Thallium		Tl	1	500	mg/L	0	1	250	100	50				0	50	100	
Lead		Pb	1	500	mg/L	0	1	250	100	50			0.25	0	50	100	
Bismuth		Bi	1	500	mg/L	0	1	250	100	50				0	50	100	
Thorium		Th	1	500	mg/L	0	1	250	100	50				0	50	100	
Uranium		U	1	500	mg/L	0	1	250	100	50				0	50	100	
Krypton		Kr															

MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 06/18/18 Prep By: MM/TAD SIF File #: 061818-1
 Block #1 Temperature: 98.87 Start Time: 8:52 A.M. Machine ID: 2
 Block #2 Temperature: 94.75 Stop Time: 9:52 A.M. Batch Analyst: MM
 Block #3 Temperature: _____ Typed By: TAD Verified By: MM

A/S	Curve & QC's	0.4ug/ml working std	BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0	40	40	Standard #1 (for working std) Lot #: <u>4105145</u>
2	0.004 ug	0.01ml	40	40	Working Standard
3	0.04 ug	0.10ml	40	40	Lot #: <u>Hg3-012-1</u> by: <u>MM</u>
4	0.08 ug	0.20ml	40	40	Standard #2 (QC #2):
5	0.16 ug	0.40ml	40	40	Lot #: <u>Hg3-012-2</u>
6	0.20ug	0.50ml	40	40	Standard #3 (QC #3): Lot #: <u>Hg3-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std	40	40	
8	QC #3= 0.08ug	0.2ml #3 std	40	40	Curve prepared by: <u>MM</u>

Initial Review By: MM Date: 6/18/18 Time: 12:30
 Final QC Review By: MM Date: 6/18/18 Time: 5:30
 Comments: 31368-10 @ 0.05 31350-12 @ 0.025 31350-11 @ 0.05

A/S	LAB #	Method	Wt (g) FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	30811-31QC	✓ 7470A			0.05	5	TV=9.88
10	416	✓ ↓			1	1	TV=0.008
11	31368-10	✓ m29			0.05	5	
12	-10	↓			0.1	↓	
13	-10	↓			0.2	↓	
14	31368-18H	✓			4	505	
15	-28H	↓				310	
16	-28H	↓				↓	
17	-38H	↓				325	
18	-38H	↓				↓	
19	-48H	↓				350	

NOTES: Lab blanks and spikes must be prepared with each batch digestion

*" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml

H₂SO₄ Lot # 177436 HNO₃ Lot # 117100 HCl Lot #: 4117040

Persulfate Lot # Hg3-002-5 KMnO₄ Lot # Hg3-008-10 Hydrox Lot#: Hg3-002-15

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

elementOne MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 061818-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL, or "1" for conc.	Comments
20	31368-53H	M29			4	230	
21	-6BH					205	
22	-1A					200	
23	-2A						
24	-2AD						
25	-3A						
26	-3AT						
27	-4A						
28	-5A						
29	-6A						
30	31339-1B					500	
31	-2C					400	
32	-2CD						
33	31350-1Z				0.05	5	
34	-1Z				0.1		
35	-1Z				0.2		
36	31350-1K13PH				4	100	
37	-1K13PH				1.6		
38	-1PH				4		
39	-2PH						
40	-2PHD						
41	-3PH						
42	-3PH+						
43	-4PH						
44	-5PH						
45	-5PHD						
46	-6PH						
47	-6PH+						
48	-7PH						
49	-8PH						
50	-11				1		
51	-11				2		
52	-11				4		
53	-11ave				1	100	
54	-11ave				2		

elementOne MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 061818-1

A/S	LAB #	Method	Wt (g)/FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
55	31350-11amp	AM701			4	100	
56	31351-1 PH				0.1		
57	-2 PH						
58	-2 PH D						
59	-3 PH						
60	-3 PH						
61	-4 PH						
62	-9 PH						
63	-10 PH						
64	-10 PH D						
65	-11 PH						
66	-11 PH +						
67	-12 PH						
68	-17 PH						
69	-18 PH						
70	-18 PH D						
71	-19 PH						
72	-19 PH +						
73	-20 PH						
74							
75							
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MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 06/19/18 Prep By: mmp SIF File #: 061918-1
 Block #1 Temperature: 47.84 Start Time: 5:45a Machine ID: 1
 Block #2 Temperature: 42.19 Stop Time: 8:00a Batch Analyst: mmp
 Block #3 Temperature: 295 Typed By: mmp Verified By: DKH

A/S	Curve & QC's	0.4ug/ml working std	BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0	40	40	Standard #1 (for working std) Lot #: <u>4705145</u>
2	0.004 ug	0.01ml	40	40	Working Standard
3	0.04 ug	0.10ml	40	40	Lot #: <u>423-02-1</u> by: <u>mmp</u>
4	0.08 ug	0.20ml	40	40	Standard #2 (QC #2):
5	0.16 ug	0.40ml	40	40	Lot #: <u>423-012-2</u>
6	0.20ug	0.50ml	40	40	Standard #3 (QC #3): Lot #: <u>423-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std	40	40	
8	QC #3= 0.08ug	0.2ml #3 std	40	40	Curve prepared by: <u>DKH</u>

Initial Review By: mmp Date: 6/19/18 Time: 7:55
 Final QC Review By: LAW Date: 06.19.18 Time: 3:57
 Comments: 31364-BK + spike 31364-2 @ 5+10 31368-1B + 3B @ 0.4
31368-4B @ 10ml 31368-2B @ 0.5

A/S	LAB #	Method	Wt (g)/ FV (ml)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	30811-31	QC ✓ 1470A			0.05	5	TV=9.88
10	4L	✓ ↓			1	1	TV=0.008
11	31368-10	✓ M29			0.05	5	
12	-10B	↓			↓	↓	
13	-10T	↓			↓	↓	
14	31368-1B	✓			4	500	
15	-2B	↓			↓	↓	
16	-2B0	↓			↓	↓	
17	-3B	↓			↓	↓	
18	-3B+	↓			↓	↓	
19	-4B	↓ ✓			↓	↓	

NOTES: Lab blanks and spikes must be prepared with each batch digestion
 "*" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.
Digestion chemicals to be added in order at the following rate per 40ml volumes.
 H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml
 H₂SO₄ Lot # 171434 HNO₃ Lot # 1117100 HCl Lot # 4117040
 Persulfate Lot # 423-012-4 KMnO₄ Lot # 423-008-8 Hydrox Lot #: 423-009-2
 Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

elementOne MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 061918-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc. Mass	FV, mL or "1" for conc.	Comments
20	31368-5B	✓ M29			4	500	
21	-4B	↓			↓	↓	
22	31350-17	↓			0.025	5	
23	-17D	↓			↓	↓	
24	-17t	↓			↓	↓	
25	31350-11	✓			0.5	100	
26	-11D	↓			↓	↓	
27	-11t	↓			↓	↓	
28	-1B	↓			4	500	
29	-2B	↓			↓	↓	
30	-2BD	↓			↓	↓	
31	-3B	↓			↓	↓	
32	-3Bt	↓			↓	↓	
33	-4B	↓			↓	↓	
34	-5B	↓			↓	↓	
35	-5BD	↓			↓	↓	
36	-6B	↓			↓	↓	
37	-6Bt	↓			↓	↓	
38	-7B	↓			↓	↓	
39	-8B	↓			↓	↓	
40	-1C	↓			4	400	
41	-2C	↓			↓	↓	
42	-2CD	↓			↓	↓	
43	-3C	↓			↓	↓	
44	-3Ct	↓			↓	↓	
45	-4C	↓			↓	↓	
46	-5C	↓			↓	↓	
47	-5CD	↓			↓	↓	
48	-6C	↓			↓	↓	
49	-6Ct	↓			↓	↓	
50	-7C	↓			↓	↓	
51	-8C	↓			↓	↓	
52	31364/370-4Bt + 7470A	↓			4	1	
53	-4Bt +	↓			0.2	↓	TV=0.100
54	31364-14t	✓ ↓	0.5053/50	4	0.0404	↓	

elementOne MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 061918-1

A/S	LAB #	Method	Wt (g)/FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
55	31364-1D+	✓ 7470A	0.505/50	4	0.0404	1	
56	31370-1D+	✓ ↓	0.505/50	↓	0.0404	↓	
57	-1D+	↓	↓	↓	↓	↓	
58	31360-1	✓ 7470A			0.4	1	
59	-2	↓				↓	
60	-2D	↓				↓	
61	-3	↓				↓	
62	-3+	↓				↓	
63	-4	↓				↓	
64	-5	↓				↓	
65	31364-SRP-BLK	7470A			20	1	
66	-BLK+	↓				↓	
67	31364-1	↓				↓	
68	-1D	↓				↓	
69	31364-BLK	↓				↓	
70	-BLK+	↓				↓	
71	31364-2	↓				↓	
72	-2+	↓				↓	
73							
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MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 06/19/18 Prep By: MMP SIF File #: 06-18 MMP
 Block #1 Temperature: 49.49 Start Time: 5:45a Machine ID: 1
 Block #2 Temperature: ~95 Stop Time: 8:00a Batch Analyst: MMP
 Block #3 Temperature: 93.84 Typed By: MMP Verified By: DHT

A/S	Curve & QC's	0.4ug/ml working std	BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0	40	40	Standard #1 (for working std) Lot #: <u>4705145</u>
2	0.004 ug	0.01ml	40	40	Working Standard
3	0.04 ug	0.10ml	40	40	Lot #: <u>Hg3-012-1</u> by: <u>MMP</u>
4	0.08 ug	0.20ml	40	40	Standard #2 (QC #2):
5	0.16 ug	0.40ml	40	40	Lot #: <u>Hg3-012-2</u>
6	0.20ug	0.50ml	40	40	Standard #3 (QC #3): Lot #: <u>Hg3-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std	40	40	
8	QC #3= 0.08ug	0.2ml #3 std	40	40	Curve prepared by: <u>MMP</u>

Initial Review By: MMP Date: 6/19/18 Time: 1:31

Final QC Review By: KLG Date: 6/20/18 Time: 9:00

Comments: 31368-1B-4B were typed in wrong -> initial volume needs to be changed
31351-2A @ 0.5mls - 31367 - audit

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	31306-17 OC	7470A			0.05	5	TV=11.1
10	L/L	↓			1	1	TV=0.008
11	31368-9	m29			1	100	
12	-9D	↓			2	↓	
13	-9	↓			4	↓	
14	31368-1C	↓				400	
15	-2C	↓				↓	
16	-2CD	↓				↓	
17	-3C	↓				↓	
18	-3C+	↓				↓	
19	-4C	↓				↓	

NOTES: Lab blanks and spikes must be prepared with each batch digestion

*" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml

H₂SO₄ Lot # 177436 HNO₃ Lot # 117100 HCl Lot #: 4117040

Persulfate Lot # Hg3-002-8 KMnO₄ Lot # Hg3-013-6 Hydrox Lot #: Hg3-009-2

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

elementOne MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 062018-1

A/S	LAB #	Method	Wt (g)/FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
✓ 20	31368-5C	m79			4	400	
21	-6C				↓	↓	
22	-1B				0.4	500	
23	-2B				0.5	↓	
24	-2BD				↓	↓	
25	-3B				0.4	↓	
26	-3B+				↓	↓	
27	-4B				↓	↓	
28	-4BPH				4	100	
29	-4BPH+				1.6	↓	
30	-1PH				4	↓	
31	-2PH				↓	↓	
32	-2PHD				↓	↓	
33	-3PH				↓	↓	
34	-3PH+				↓	↓	
35	-4PH				↓	↓	
36	-5PH				↓	↓	
37	-4PH				↓	↓	
✓ 38	31351-29				1	1000	
39	-29D				↓	↓	
40	-29+				↓	↓	
41	-9BH				0.5	570	
42	-17BH				0.5	112	
43	-19BH				0.5	118	
44	-19BH+				↓	↓	
45	31367-6				4	100	
46	-6D				↓	↓	
47	-6+	← missed tube			↓	↓	
48	-1BH				4	900	
49	-2BH				↓	935	
50	-2BH D				↓	↓	
51	-3BH				↓	970	
52	-3BH+				↓	↓	
53	-4BH				↓	330	
54	-5BH				↓	220	

elementOne MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 062018-1

A/S	LAB #	Method	WR (g) FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL, or "1" for conc.	Comments
✓ 55	31367-7	m29			0.05	5	
56	-7	↓			0.1	↓	
57	-7	↓			0.2	↓	
✓ 58	31354-2 BK	7470A			20	1	
59	-BK+	↓			↓	↓	
✓ 60	31354-2	↓			↓	↓	
✓ 61	31364-BK	7470A			20	1	
62	-BK+				↓	↓	
✓ 63	31364-2				10	↓	
64	-2+				10	↓	
65	-2				5	↓	
✓ 66	-2+	↓			5	↓	
✓ 67	31351-13BK	m29			4	715	
✓ 68	313108-9				0.5	100	
69	-9D				↓	↓	
70	-9+				↓	↓	
71	-2C				2	400	2x dil
72	-2CD				2	400	2x dil
73	-3C				0.4	↓	
74	-3C+				0.4	↓	
75							
76							
77							
78							
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MERCURY BATCH DIGESTION - RUN WORKSHEET

ed/Digested: 062018 Prep By: mmp SIF File #: 062118-1
 Block #1 Temperature: 94.4 Start Time: 5:45a Machine ID: 2
 Block #2 Temperature: 92.7 Stop Time: 8:00a Batch Analyst: mmp
 Block #3 Temperature: 95 Typed By: mmp Verified By: DKH

A/S	Curve & QC's	0.4ug/ml working std	BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0	40	40	Standard #1 (for working std) Lot #: <u>4705145</u>
2	0.004 ug	0.01ml	40	40	Working Standard
3	0.04 ug	0.10ml	40	40	Lot #: <u>43-012-1</u> by: <u>mmp</u>
4	0.08 ug	0.20ml	40	40	Standard #2 (QC #2):
5	0.16 ug	0.40ml	40	40	Lot #: <u>43-012-2</u>
6	0.20ug	0.50ml	40	40	Standard #3 (QC #3): Lot #: <u>43-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std	40	40	
8	QC #3= 0.08ug	0.2ml #3 std	40	40	Curve prepared by: <u>DKH</u>

Initial Review By: mmp Date: 6/21/18 Time:
 Final QC Review By: DKH Date: ↓ Time:

Comments:

A/S	LAB #	Method	Wt (g) FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	31306-17 QC	7470A			0.05	5	TV=11.1
10	<u>4L</u>	↓			1	1	TV=0.008
11	31368-69	m29			0.5	100	
12	-9D	↓			↓	↓	
13	-9+	↓			↓	↓	
14	31368-4A	↓			4	200	
15	31367-6	↓			↓	100	
16	-6D	↓			↓	↓	
17	-6+	↓			↓	↓	
18	31367-1A	↓			4	200	
19	-2A	↓			↓	↓	

NOTES: Lab blanks and spikes must be prepared with each batch digestion

*" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml

H₂SO₄ Lot # 177436 HNO₃ Lot # 117100 HCl Lot #: 4117040

Persulfate Lot # 43-002-8 KMnO₄ Lot # 43-013-7 Hydrox Lot #: 43-009-1

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

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MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 062118-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
20	31367-2AD	m79			4	200	
21	-3A	↓			↓	↓	
22	-3A+	↓			↓	↓	
23	-4A	↓			↓	↓	
24	-5A	↓			↓	↓	
25	-1B	↓			↓	500/100	
26	-2B	↓			↓	↓	
27	-2B0	↓			↓	↓	
28	-3B	↓			↓	500	
29	-3B+	↓			↓	↓	
30	-4B	↓			↓	↓	
31	-5B	↓			↓	↓	
32	31367-1C	↓			4	500 400	
33	-2C	↓			↓	↓	
34	-2C0	↓			↓	↓	
35	-3C	↓			↓	↓	
36	-3C+	↓			↓	↓	
37	-4C	↓			↓	↓	
38	-5C	↓			↓	↓	
39	31367-7	↓			0.05	5	
40	-7D	↓			↓	↓	
41	-7+	↓			↓	↓	
42	31351-3A	↓			4	200	
43	-3A+	↓			↓	↓	
44	31351-29	↓			0.5	1000	
45	-29D	↓			↓	↓	
46	-29+	↓			↓	↓	
47	31366/370-BLK	7470A			20	1	
48	-BLK+	↓			↓	↓	
49	31366	↓			↓	↓	
50	31370-1	↓			↓	↓	
51	-2	↓			↓	↓	
52	-2D	↓			↓	↓	
53	-3	↓			↓	↓	
54	-3+	↓			↓	↓	

elementOne MERCURY BATCH DIGESTION - RUN WORKSHEET

SIF File #: 0621181

A/S	LAB #	Method	Wt (g)/FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
55	31370-4	74701A			20	1	
56	-5						
57	-6						
58	-6+						
59	-7						
60	-8						
61	-9						
62	-9+						
63	-10						
64	31371-1						
65	-10						
66	-2						
67	-2+	↓			↓	↓	
68	31368-1B	mag			2	500	
69	-3B (AN)						
70	-3B+	↓			↓	↓	
71							
72							
73							
74							
75							
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PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Date: Tuesday, June 19, 2018 16:45:11

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	3934.1		ppb
Be	9	1.7		ppb
P	31	1596.7		ppb
Sc	45	6083.1		ppb
Cr	52	575		ppb
Cr	53	432.7		ppb
Mn	55	107		ppb
Co	59	17.3		ppb
Ni	60	10.3		ppb
Cu	63	54.3		ppb
Cu	65	24.7		ppb
Zn	66	24.7		ppb
Zn	67	16		ppb
Zn	68	99.7		ppb
As	75	38.1		ppb
Se	77	60.3		ppb
Se	82	0.8		ppb
Rh	103	4735.1		ppb
Ag	107	16		ppb
Ag	109	17		ppb
Cd	111	11.3		ppb
Cd	114	12.1		ppb
Sb	121	43.7		ppb
Sb	123	28.2		ppb
Ba	135	20.7		ppb
Ba	137	31		ppb
Ho	165	45790.2		ppb
Tl	205	87.3		ppb
Pb	208	218.7		ppb
Kr	83	25.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Tuesday, June 19, 2018 16:48:17

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	4121.4		ppb
Be	9	17.3	0.86067	ppb
P	31	1782.1	8.46315	ppb
Sc	45	6380.8		ppb
Cr	52	766	0.78793	ppb
Cr	53	507.3	2.23881	ppb
Mn	55	362.3	0.96919	ppb
Co	59	185.7	0.94774	ppb
Ni	60	42.7	0.83734	ppb
Cu	63	151	1.04471	ppb
Cu	65	64.3	0.96039	ppb
Zn	66	44.3	0.91436	ppb
Zn	67	14.7	-0.54654	ppb
Zn	68	115.7	0.9504	ppb
As	75	62.9	1.13953	ppb
Se	77	59.7	-2.06343	ppb
Se	82	3.1	1.45291	ppb
Rh	103	4853.1		ppb
Ag	107	100.7	0.9166	ppb
Ag	109	91.7		ppb
Cd	111	35.8	0.73273	ppb
Cd	114	135.1	0.98013	ppb
Sb	121	242.7		ppb
Sb	123	198.7	0.97724	ppb
Ba	135	104		ppb
Ba	137	208.7	0.90205	ppb
Ho	165	47377.2		ppb
Tl	205	1413.4	0.9841	ppb
Pb	208	1907.7	0.95205	ppb
Kr	83	27		ppb

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PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Tuesday, June 19, 2018 16:51:24

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	4349.8			ppb
Be	9	1788.4	93.33241		ppb
P	31	15679.9	1017.6585		ppb
Sc	45	6866.6			ppb
Cr	52	22294.3	97.43378		ppb
Cr	53	2985.2	97.28293		ppb
Mn	55	27976	98.55799		ppb
Co	59	19038.2	99.09757		ppb
Ni	60	4104	98.52348		ppb
Cu	63	9804.6	98.54359		ppb
Cu	65	4314.4	97.21147		ppb
Zn	66	2248.1	98.34052		ppb
Zn	67	347	97.72093		ppb
Zn	68	1624.4	98.73451		ppb
As	75	2232.6	97.51044		ppb
Se	77	165	83.64266		ppb
Se	82	152.8	89.39875		ppb
Rh	103	5261.6			ppb
Ag	107	9888.3	99.05469		ppb
Ag	109	9205.4			ppb
Cd	111	3527.9	98.1012		ppb
Cd	114	13725.1	100.94902		ppb
Sb	121	24311.8			ppb
Sb	123	18578.8	101.50503		ppb
Ba	135	10810.3			ppb
Ba	137	20644.5	99.87348		ppb
Ho	165	49950.5			ppb
Tl	205	142946.2	100.80089		ppb
Pb	208	186272.9	99.90119		ppb
Kr	83	30.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Tuesday, June 19, 2018 16:54:30

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	4266.3			ppb
Be	9	9409.4	501.3338		ppb
P	31	67535.4	4996.5145		ppb
Sc	45	6630.9			ppb
Cr	52	107988.7	500.51367		ppb
Cr	53	12878	500.54094		ppb
Mn	55	138399.4	500.28846		ppb
Co	59	93893.7	500.18059		ppb
Ni	60	20336.6	500.29563		ppb
Cu	63	48440.2	500.29119		ppb
Cu	65	21615	500.55779		ppb
Zn	66	11076.5	500.33207		ppb
Zn	67	1667.1	500.45891		ppb
Zn	68	7607.8	500.2532		ppb
As	75	11035.4	500.49763		ppb
Se	77	642	503.2776		ppb
Se	82	834.8	502.11935		ppb
Rh	103	5145.5			ppb
Ag	107	48763.2	500.18923		ppb
Ag	109	46576			ppb
Cd	111	17546.3	500.38029		ppb
Cd	114	66410.7	499.81024		ppb
Sb	121	119188.1			ppb
Sb	123	89452.1	499.69904		ppb
Ba	135	52099.6			ppb
Ba	137	101099.7	500.0255		ppb
Ho	165	48910.8			ppb
Tl	205	693784	499.83985		ppb
Pb	208	912049	500.01986		ppb
Kr	83	31.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 16:57:37

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	3944		ppb
Be	9	3	0.07531	ppb
P	31	1411.4	-17.95806	ppb
Sc	45	6223.4		ppb
Cr	52	638.3	0.24874	ppb
Cr	53	485.3	1.82359	ppb
Mn	55	113	0.01533	ppb
Co	59	24.7	0.03981	ppb
Ni	60	14.3	0.10015	ppb
Cu	63	62.3	0.0771	ppb
Cu	65	23.3	-0.04416	ppb
Zn	66	24	-0.05617	ppb
Zn	67	11.3	-1.60861	ppb
Zn	68	104.7	0.22266	ppb
As	75	79.7	1.98229	ppb
Se	77	51.7	-9.12114	ppb
Se	82	3.8	1.92323	ppb
Rh	103	4824.5		ppb
Ag	107	48	0.34669	ppb
Ag	109	52		ppb
Cd	111	8.1	-0.10624	ppb
Cd	114	18.1	0.04679	ppb
Sb	121	45.7		ppb
Sb	123	38.3	0.05787	ppb
Ba	135	28		ppb
Ba	137	32	0.0038	ppb
Ho	165	46260.1		ppb
Tl	205	146	0.04407	ppb
Pb	208	284	0.03661	ppb
Kr	83	23.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Tuesday, June 19, 2018 17:00:44

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	4003.5		ppb
Be	9	18.7	0.96418	ppb
P	31	1607.7	-5.27464	ppb
Sc	45	6380.5		ppb
Cr	52	811.3	1.00869	ppb
Cr	53	529.3	3.15843	ppb
Mn	55	354.7	0.95042	ppb
Co	59	187.3	0.96597	ppb
Ni	60	52.3	1.09982	ppb
Cu	63	147.3	1.01768	ppb
Cu	65	72	1.16214	ppb
Zn	66	33.7	0.41493	ppb
Zn	67	13	-1.06245	ppb
Zn	68	113	0.82913	ppb
As	75	101.5	3.04992	ppb
Se	77	60.7	-0.64747	ppb
Se	82	0.1	-0.46167	ppb
Rh	103	4815.5		ppb
Ag	107	110.3	1.0315	ppb
Ag	109	110		ppb
Cd	111	38	0.80585	ppb
Cd	114	141.2	1.03705	ppb
Sb	121	268.3		ppb
Sb	123	200.6	1.01706	ppb
Ba	135	107.3		ppb
Ba	137	207.7	0.92342	ppb
Ho	165	46229.4		ppb
Tl	205	1397.4	0.99814	ppb
Pb	208	1893.4	0.9704	ppb
Kr	83	29.3		ppb

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PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date: Tuesday, June 19, 2018 17:03:50

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	4093.3			ppb
Be	9	4409.7	244.55514		ppb
P	31	31783.9	2365.4739		ppb
Sc	45	6406.8			ppb
Cr	52	53092.3	253.20892		ppb
Cr	53	6506.5	252.65596		ppb
Mn	55	66895.7	249.11229		ppb
Co	59	45660.7	250.76455		ppb
Ni	60	9739.6	246.92187		ppb
Cu	63	23647.2	251.51075		ppb
Cu	65	10485.9	250.0511		ppb
Zn	66	5337.6	248.00151		ppb
Zn	67	818	250.56926		ppb
Zn	68	3885.3	260.03341		ppb
As	75	5418	252.44451		ppb
Se	77	354	261.40207		ppb
Se	82	414.4	256.83518		ppb
Rh	103	4990.5			ppb
Ag	107	24018.2	253.90043		ppb
Ag	109	22916.8			ppb
Cd	111	8363.4	245.80421		ppb
Cd	114	31938.5	247.81755		ppb
Sb	121	57797.7			ppb
Sb	123	43843.4	251.70458		ppb
Ba	135	25556.7			ppb
Ba	137	49021.7	249.18015		ppb
Ho	165	47579.9			ppb
Tl	205	337372.2	249.83664		ppb
Pb	208	435317.1	245.28197		ppb
Kr	83	30.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 17:06:57

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	4248.1			ppb
Be	9	1766.4	94.35078		ppb
P	31	14896.1	989.18781		ppb
Sc	45	6687.9			ppb
Cr	52	22171.8	99.56037		ppb
Cr	53	2937.8	98.47395		ppb
Mn	55	27802.1	97.60709		ppb
Co	59	18955.2	98.32578		ppb
Ni	60	4040	96.6452		ppb
Cu	63	9596.2	96.10669		ppb
Cu	65	4277.4	96.05555		ppb
Zn	66	2252.8	98.197		ppb
Zn	67	338.3	94.79465		ppb
Zn	68	1635.7	99.12493		ppb
As	75	2335.2	101.70176		ppb
Se	77	179	95.05403		ppb
Se	82	163.4	95.35152		ppb
Rh	103	5279.6			ppb
Ag	107	9990	99.72632		ppb
Ag	109	9480.8			ppb
Cd	111	3603.4	99.87654		ppb
Cd	114	13363.9	97.9512		ppb
Sb	121	23929.4			ppb
Sb	123	17940	100.09717		ppb
Ba	135	10647.3			ppb
Ba	137	20170.8	99.65189		ppb
Ho	165	48903.5			ppb
Tl	205	139052.4	100.14122		ppb
Pb	208	183756.7	100.66229		ppb
Kr	83	32.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date: Tuesday, June 19, 2018 17:10:05

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	4288			ppb
Be	9	956.4	50.54924		ppb
P	31	3918.3	159.09649		ppb
Sc	45	6777.9			ppb
Cr	52	11421.6	49.17767		ppb
Cr	53	1740.1	49.67159		ppb
Mn	55	14026.6	49.76277		ppb
Co	59	9303.1	48.91934		ppb
Ni	60	1978.1	47.87503		ppb
Cu	63	4861.5	49.10553		ppb
Cu	65	2187.1	49.52918		ppb
Zn	66	1114.7	48.70211		ppb
Zn	67	179	48.43047		ppb
Zn	68	871	50.23273		ppb
As	75	1228.6	53.42694		ppb
Se	77	120.7	46.96166		ppb
Se	82	99.4	58.67938		ppb
Rh	103	5202.9			ppb
Ag	107	4961.5	50.16929		ppb
Ag	109	4702.1			ppb
Cd	111	1740	48.76041		ppb
Cd	114	6688.9	49.69685		ppb
Sb	121	12810.6			ppb
Sb	123	9681.5	53.46226		ppb
Ba	135	5328.9			ppb
Ba	137	10058.4	49.16867		ppb
Ho	165	49339.6			ppb
Tl	205	69021.2	49.2335		ppb
Pb	208	91853.5	49.80823		ppb
Kr	83	29			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Tuesday, June 19, 2018 17:13:12

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	5735.5			ppb
Be	9	3	0.02235		ppb
P	31	91832	4889.4066		ppb
Sc	45	9211.7			ppb
Cr	52	664.3	-0.69201		ppb
Cr	53	710.3	1.59725		ppb
Mn	55	142.7	-0.0405		ppb
Co	59	20.3	-0.02045		ppb
Ni	60	11.7	-0.06498		ppb
Cu	63	60.3	-0.1517		ppb
Cu	65	22	-0.24624		ppb
Zn	66	47	0.35162		ppb
Zn	67	27.7	0.88748		ppb
Zn	68	122.3	-1.21254		ppb
As	75	101.2	1.51213		ppb
Se	77	86.7	-1.59502		ppb
Se	82	-3.6	-2.11544		ppb
Rh	103	6996			ppb
Ag	107	27.7	0.03048		ppb
Ag	109	18.7			ppb
Cd	111	4.9	-0.24549		ppb
Cd	114	11	-0.03764		ppb
Sb	121	67			ppb
Sb	123	47.5	0.02498		ppb
Ba	135	21.7			ppb
Ba	137	29	-0.05908		ppb
Ho	165	66983.6			ppb
Tl	205	45.3	-0.04336		ppb
Pb	208	195.3	-0.04986		ppb
Kr	83	33.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Tuesday, June 19, 2018 17:16:19

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report	Unit
> Li	6	5704			ppb
- Be	9	3.7	0.05143		ppb
- P	31	90387.8	4850.1443		ppb
> Sc	45	9135			ppb
- Cr	52	948	0.28738		ppb
- Cr	53	892.7	7.10172		ppb
- Mn	55	477.3	0.84262		ppb
- Co	59	511.3	1.89166		ppb
- Ni	60	136.7	2.18454		ppb
- Cu	63	202	0.91701		ppb
- Cu	65	82	0.76898		ppb
- Zn	66	73.3	1.216		ppb
- Zn	67	26.7	0.64647		ppb
- Zn	68	158.3	0.50203		ppb
- As	75	112.6	1.86546		ppb
- Se	77	94.3	2.9861		ppb
- Se	82	-2.9	-1.80809		ppb
> Rh	103	7035			ppb
- Ag	107	11849.1	88.75013		ppb
- Ag	109	11313.2			ppb
- Cd	111	19.9	0.06306		ppb
- Cd	114	97.9	0.44047		ppb
- Sb	121	50.7			ppb
- Sb	123	39.9	-0.00374		ppb
- Ba	135	19.3			ppb
- Ba	137	22.7	-0.08085		ppb
> Ho	165	66166.8			ppb
- Tl	205	21.7	-0.05566		ppb
- Pb	208	160	-0.06322		ppb
- Kr	83	31.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date: Tuesday, June 19, 2018 17:19:25

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report	Unit
> Li	6	8218.3			ppb
- Be	9	9	0.15295		ppb
- P	31	1228.4	-85.2174		ppb
> Sc	45	13182.1			ppb
- Cr	52	826	-0.98221		ppb
- Cr	53	1221.4	5.77839		ppb
- Mn	55	352.3	0.22225		ppb
- Co	59	103	0.17625		ppb
- Ni	60	85.3	0.78319		ppb
- Cu	63	336	1.14177		ppb
- Cu	65	153	1.16783		ppb
- Zn	66	323	6.16031		ppb
- Zn	67	68.3	5.18515		ppb
- Zn	68	334	4.00481		ppb
- As	75	66.7	-0.35473		ppb
- Se	77	108.3	-9.5545		ppb
- Se	82	3.1	0.42285		ppb
> Rh	103	10203.7			ppb
- Ag	107	18	-0.08528		ppb
- Ag	109	18.7			ppb
- Cd	111	27.8	0.04938		ppb
- Cd	114	75	0.18606		ppb
- Sb	121	196			ppb
- Sb	123	143.2	0.24707		ppb
- Ba	135	51			ppb
- Ba	137	90	0.06738		ppb
> Ho	165	94191.1			ppb
- Tl	205	665.3	0.18173		ppb
- Pb	208	1699.4	0.35585		ppb
- Kr	83	28			ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Tuesday, June 19, 2018 17:22:32

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	3790.7			ppb
Be	9	20.3	1.12141		ppb
P	31	1433	-15.75893		ppb
Sc	45	6202.4			ppb
Cr	52	833	1.23039		ppb
Cr	53	680.7	10.33551		ppb
Mn	55	347.3	0.89487		ppb
Co	59	191	0.9652		ppb
Ni	60	49	0.98683		ppb
Cu	63	146.3	0.97332		ppb
Cu	65	48.7	0.55949		ppb
Zn	66	39.3	0.65076		ppb
Zn	67	13.7	-0.93629		ppb
Zn	68	109	0.38648		ppb
As	75	89.7	2.39872		ppb
Se	77	71	7.65715		ppb
Se	82	-3.3	-2.59239		ppb
Rh	103	4915.1			ppb
Ag	107	108.3	0.98527		ppb
Ag	109	104			ppb
Cd	111	35.3	0.7035		ppb
Cd	114	126.9	0.90152		ppb
Sb	121	261			ppb
Sb	123	189	0.98757		ppb
Ba	135	110.7			ppb
Ba	137	181	0.8156		ppb
Ho	165	44718			ppb
Tl	205	1385.4	1.02475		ppb
Pb	208	1754.7	0.92439		ppb
Kr	83	36.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 17:25:20

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	3896.8			ppb
Be	9	2.3	0.04001		ppb
P	31	1150.7	-38.59908		ppb
Sc	45	6194.1			ppb
Cr	52	611	0.12805		ppb
Cr	53	674	10.09758		ppb
Mn	55	86.3	-0.08584		ppb
Co	59	11.7	-0.03359		ppb
Ni	60	6.7	-0.10069		ppb
Cu	63	46	-0.10104		ppb
Cu	65	17	-0.19938		ppb
Zn	66	28.7	0.17807		ppb
Zn	67	13	-1.05406		ppb
Zn	68	99.7	-0.09574		ppb
As	75	65.4	1.31523		ppb
Se	77	68.3	6.71819		ppb
Se	82	1.1	0.19959		ppb
Rh	103	4800.5			ppb
Ag	107	10.3	-0.0646		ppb
Ag	109	12.7			ppb
Cd	111	2.2	-0.2846		ppb
Cd	114	9	-0.02613		ppb
Sb	121	31			ppb
Sb	123	24.9	-0.01869		ppb
Ba	135	8.3			ppb
Ba	137	15	-0.08344		ppb
Ho	165	45181.8			ppb
Tl	205	14.7	-0.05578		ppb
Pb	208	83.3	-0.0786		ppb
Kr	83	27.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date: Tuesday, June 19, 2018 17:28:27

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	3959.4			ppb
- Be	9	4.3	0.15124		ppb
- P	31	1240	-33.40788		ppb
> Sc	45	6322.1			ppb
- Cr	52	587	-0.05127		ppb
- Cr	53	112.3	-14.27394		ppb
- Mn	55	250.3	0.52874		ppb
- Co	59	8.7	-0.05184		ppb
- Ni	60	13.7	0.07389		ppb
- Cu	63	103	0.5053		ppb
- Cu	65	41.7	0.39145		ppb
- Zn	66	54	1.34679		ppb
- Zn	67	14	-0.77699		ppb
- Zn	68	136	2.27747		ppb
- As	75	74	1.64652		ppb
- Se	77	13	-45.25413		ppb
- Se	82	-4.3	-3.20133		ppb
> Rh	103	4912.1			ppb
- Ag	107	11.3	-0.05709		ppb
- Ag	109	10			ppb
- Cd	111	4.4	-0.21794		ppb
- Cd	114	6.8	-0.04472		ppb
- Sb	121	46.3			ppb
- Sb	123	39.5	0.07035		ppb
- Ba	135	14			ppb
- Ba	137	16.7	-0.0744		ppb
> Ho	165	45166.8			ppb
- Tl	205	11.3	-0.0584		ppb
- Pb	208	205.7	-0.0059		ppb
- Kr	83	34			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date: Tuesday, June 19, 2018 17:31:34

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	4169.8			ppb
- Be	9	855	46.46178		ppb
- P	31	3574.3	149.65171		ppb
> Sc	45	6387.1			ppb
- Cr	52	10797.7	49.34288		ppb
- Cr	53	1260.7	33.7458		ppb
- Mn	55	13183.8	48.57766		ppb
- Co	59	8781.9	47.95939		ppb
- Ni	60	1865.1	46.89031		ppb
- Cu	63	4547.4	47.68644		ppb
- Cu	65	2072.8	48.75726		ppb
- Zn	66	1088	49.40012		ppb
- Zn	67	177	49.9005		ppb
- Zn	68	840	50.35116		ppb
- As	75	1040.8	46.79297		ppb
- Se	77	72.3	7.53232		ppb
- Se	82	71.1	43.54737		ppb
> Rh	103	5009.8			ppb
- Ag	107	4870.1	51.13864		ppb
- Ag	109	4648.1			ppb
- Cd	111	1651.4	48.05175		ppb
- Cd	114	6199.5	47.82784		ppb
- Sb	121	11793.8			ppb
- Sb	123	8834.1	52.02147		ppb
- Ba	135	5056.2			ppb
- Ba	137	9618.5	50.14534		ppb
> Ho	165	46265.8			ppb
- Tl	205	64148.2	48.79891		ppb
- Pb	208	86757.6	50.17135		ppb
- Kr	83	31.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 FH

Sample Date: Tuesday, June 19, 2018 17:34:40

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	4113.7		ppb
T	Be	9	3.7	0.10539	ppb
T	P	31	1986.7	21.21745	ppb
>	Sc	45	6528.2		ppb
T	Cr	52	4847.5	20.05214	ppb
T	Cr	53	572.7	4.46069	ppb
T	Mn	55	11099.8	40.37435	ppb
T	Co	59	150.3	0.71376	ppb
T	Ni	60	1026.7	25.3962	ppb
T	Cu	63	1614.4	16.3456	ppb
T	Cu	65	727	16.49885	ppb
T	Zn	66	136597.5	6281.9616	ppb
T	Zn	67	19983.3	6153.6025	ppb
T	Zn	68	92528.6	6262.7792	ppb
T	As	75	125.3	3.91513	ppb
T	Se	77	27.3	-32.99427	ppb
T	Se	82	21.8	12.79795	ppb
>	Rh	103	5065.2		ppb
T	Ag	107	36.7	0.20346	ppb
T	Ag	109	48.7		ppb
T	Cd	111	1155.1	33.13585	ppb
T	Cd	114	4208.1	32.08141	ppb
T	Sb	121	1165		ppb
T	Sb	123	849.3	4.72213	ppb
T	Ba	135	4107.3		ppb
T	Ba	137	7788.2	39.54644	ppb
>	Ho	165	47459		ppb
T	Tl	205	162.7	0.05359	ppb
T	Pb	208	136426.6	76.97321	ppb
T	Kr	83	31		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date: Tuesday, June 19, 2018 17:37:46

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	4078.5		ppb
T	Be	9	2.3	0.0338	ppb
T	P	31	2437.5	59.19231	ppb
>	Sc	45	6413.5		ppb
T	Cr	52	5096.9	21.64156	ppb
T	Cr	53	590.3	5.59574	ppb
T	Mn	55	12667.9	46.44633	ppb
T	Co	59	201.3	0.99585	ppb
T	Ni	60	1074.4	26.75632	ppb
T	Cu	63	1780.1	18.21636	ppb
T	Cu	65	784.3	17.97803	ppb
T	Zn	66	141363.2	6544.8223	ppb
T	Zn	67	20719.9	6423.4359	ppb
T	Zn	68	95361.9	6498.2276	ppb
T	As	75	98.9	2.71497	ppb
T	Se	77	36	-25.11006	ppb
T	Se	82	28.7	17.13755	ppb
>	Rh	103	5031.8		ppb
T	Ag	107	38	0.21984	ppb
T	Ag	109	34.7		ppb
T	Cd	111	687.2	19.70545	ppb
T	Cd	114	2561.7	19.62546	ppb
T	Sb	121	1472.4		ppb
T	Sb	123	1094.6	6.21039	ppb
T	Ba	135	4132		ppb
T	Ba	137	7870.2	40.43765	ppb
>	Ho	165	46909.3		ppb
T	Tl	205	119.7	0.02266	ppb
T	Pb	208	189356.1	108.14814	ppb
T	Kr	83	34.7		ppb

elementOne
e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date: Tuesday, June 19, 2018 17:40:53

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc. Meas	Report Unit
> Li	6	3996.1		ppb
- Be	9	3.7	0.11261	ppb
- P	31	2322.4	50.28091	ppb
> Sc	45	6410.5		ppb
> Cr	52	4986.2	21.12833	ppb
- Cr	53	558	4.25545	ppb
- Mn	55	12113.3	43.99032	ppb
- Co	59	191.3	0.933	ppb
- Ni	60	1050.4	25.92538	ppb
- Cu	63	1741.7	17.64218	ppb
- Cu	65	782.7	17.76982	ppb
- Zn	66	140192	6432.5081	ppb
- Zn	67	20282.2	6231.0752	ppb
- Zn	68	94346.4	6370.8553	ppb
- As	75	108.3	3.11969	ppb
- Se	77	34.3	-26.85585	ppb
- Se	82	33.1	19.67719	ppb
> Rh	103	5077.2		ppb
- Ag	107	40.7	0.24524	ppb
- Ag	109	23.3		ppb
- Cd	111	630.6	17.8882	ppb
- Cd	114	2482.4	18.83838	ppb
- Sb	121	1487.7		ppb
- Sb	123	1103.8	6.23845	ppb
- Ba	135	4050.3		ppb
- Ba	137	7571.5	38.75605	ppb
> Ho	165	47079.3		ppb
- Tl	205	124	0.02562	ppb
- Pb	208	186670.7	106.23288	ppb
- Kr	83	31.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date: Tuesday, June 19, 2018 17:43:59

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc. Meas	Report Unit
> Li	6	3956.1		ppb
- Be	9	4.3	0.15254	ppb
- P	31	1928.4	21.37242	ppb
> Sc	45	6325.1		ppb
- Cr	52	4196.7	17.58583	ppb
- Cr	53	435.7	-0.59411	ppb
- Mn	55	10546.9	39.67355	ppb
- Co	59	152.3	0.75265	ppb
- Ni	60	387.3	9.73932	ppb
- Cu	63	1478.4	15.45744	ppb
- Cu	65	636.3	14.8926	ppb
- Zn	66	113721.4	5410.3323	ppb
- Zn	67	16580.8	5281.8948	ppb
- Zn	68	76645	5365.8812	ppb
- As	75	107.2	3.23127	ppb
- Se	77	12.3	-45.96379	ppb
- Se	82	5.4	2.86974	ppb
> Rh	103	4898.5		ppb
- Ag	107	21.7	0.05565	ppb
- Ag	109	18		ppb
- Cd	111	591	17.36972	ppb
- Cd	114	2194.5	17.25599	ppb
- Sb	121	837.3		ppb
- Sb	123	687.7	3.87962	ppb
- Ba	135	2827.2		ppb
- Ba	137	5398.2	27.97325	ppb
> Ho	165	46424.4		ppb
- Tl	205	86.7	-0.00136	ppb
- Pb	208	150535	86.84033	ppb
- Kr	83	29.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date: Tuesday, June 19, 2018 17:47:05

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	3969.5		ppb
T	Be	9	897.7	51.26987	ppb
T	P	31	4405.7	215.69977	ppb
V	Sc	45	6376.5		ppb
T	Cr	52	14512.5	67.42324	ppb
T	Cr	53	1650.4	50.20846	ppb
T	Mn	55	23774.3	89.6743	ppb
T	Co	59	9052	50.41179	ppb
T	Ni	60	2304.4	59.13747	ppb
T	Cu	63	6153.8	66.04698	ppb
T	Cu	65	2788.8	67.1096	ppb
T	Zn	66	116231.6	5511.27	ppb
T	Zn	67	16976.4	5389.7622	ppb
T	Zn	68	78397.7	5470.2629	ppb
T	As	75	1132	52.10587	ppb
T	Se	77	56.7	-5.40683	ppb
T	Se	82	78.1	48.80033	ppb
V	Rh	103	4912.5		ppb
T	Ag	107	5019.2	53.7641	ppb
T	Ag	109	4707.1		ppb
T	Cd	111	2260.9	67.24434	ppb
T	Cd	114	8665	68.2298	ppb
T	Sb	121	12989.7		ppb
T	Sb	123	9772.1	57.07894	ppb
T	Ba	135	8133.3		ppb
T	Ba	137	15249.7	78.95236	ppb
V	Ho	165	46653.8		ppb
T	Tl	205	65121.4	49.12765	ppb
T	Pb	208	237758.6	136.5811	ppb
T	Kr	83	34.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 FH

Sample Date: Tuesday, June 19, 2018 17:50:12

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	4186.2		ppb
T	Be	9	3.7	0.10262	ppb
T	P	31	1818.4	5.38715	ppb
V	Sc	45	6656.9		ppb
T	Cr	52	4037.3	15.82462	ppb
T	Cr	53	409.7	-2.56297	ppb
T	Mn	55	11293.2	40.19191	ppb
T	Co	59	99.7	0.42737	ppb
T	Ni	60	364.3	8.63824	ppb
T	Cu	63	1370.4	13.4721	ppb
T	Cu	65	603.3	13.28406	ppb
T	Zn	66	102218.9	4599.7897	ppb
T	Zn	67	15087.9	4544.9711	ppb
T	Zn	68	68895.8	4560.7237	ppb
T	As	75	114.5	3.3065	ppb
T	Se	77	15	-44.18829	ppb
T	Se	82	3.7	1.77442	ppb
V	Rh	103	5177.2		ppb
T	Ag	107	20.3	0.02848	ppb
T	Ag	109	21		ppb
T	Cd	111	538.4	14.92327	ppb
T	Cd	114	2138.8	15.90671	ppb
T	Sb	121	763		ppb
T	Sb	123	600.5	3.26202	ppb
T	Ba	135	2859.5		ppb
T	Ba	137	5431.3	27.29864	ppb
V	Ho	165	47855.8		ppb
T	Tl	205	84.3	-0.00515	ppb
T	Pb	208	101437.4	56.72952	ppb
T	Kr	83	35.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 17:53:20

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report	Unit
> Li	6	4118.3			ppb
- Be	9	1.7	-0.00454		ppb
- P	31	1201.7	-39.22355		ppb
> Sc	45	6510.2			ppb
- Cr	52	609	-0.03085		ppb
- Cr	53	770	12.61333		ppb
- Mn	55	108.7	-0.02588		ppb
- Co	59	7	-0.06301		ppb
- Ni	60	8.3	-0.06987		ppb
- Cu	63	55.7	-0.02911		ppb
- Cu	65	18.3	-0.19162		ppb
- Zn	66	46.3	0.89478		ppb
- Zn	67	18.7	0.42942		ppb
- Zn	68	119.7	0.82452		ppb
- As	75	69.4	1.28436		ppb
- Se	77	72.3	6.45517		ppb
- Se	82	-6.6	-4.49673		ppb
> Rh	103	5111.2			ppb
- Ag	107	7.3	-0.10308		ppb
- Ag	109	14.3			ppb
- Cd	111	2.4	-0.28322		ppb
- Cd	114	10.6	-0.01786		ppb
- Sb	121	29.3			ppb
- Sb	123	21.6	-0.04117		ppb
- Ba	135	13.3			ppb
- Ba	137	22	-0.04886		ppb
> Ho	165	46279.5			ppb
- Tl	205	18	-0.05348		ppb
- Pb	208	101.3	-0.06936		ppb
- Kr	83	30			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 17:56:26

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report	Unit
> Li	6	4331.2			ppb
- Be	9	1781.7	93.38763		ppb
- P	31	14785	957.0674		ppb
> Sc	45	6833.9			ppb
- Cr	52	22324	98.04267		ppb
- Cr	53	3246.2	108.04207		ppb
- Mn	55	28024	96.75223		ppb
- Co	59	18969.5	96.76946		ppb
- Ni	60	4159.7	97.86528		ppb
- Cu	63	9833.9	96.85152		ppb
- Cu	65	4323.4	95.45555		ppb
- Zn	66	2333.4	100.05253		ppb
- Zn	67	350.7	96.6773		ppb
- Zn	68	1600.7	95.11075		ppb
- As	75	2285.9	97.86007		ppb
- Se	77	181.3	94.50433		ppb
- Se	82	155.7	89.37705		ppb
> Rh	103	5368.6			ppb
- Ag	107	10288.5	101.01014		ppb
- Ag	109	9675.9			ppb
- Cd	111	3582.3	97.63305		ppb
- Cd	114	13356.1	96.26622		ppb
- Sb	121	24219.4			ppb
- Sb	123	18236	100.87648		ppb
- Ba	135	10808.7			ppb
- Ba	137	20418.3	100.00695		ppb
> Ho	165	49325.3			ppb
- Tl	205	139942.3	99.92099		ppb
- Pb	208	183299.3	99.54492		ppb
- Kr	83	35			ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 FH

Sample Date: Tuesday, June 19, 2018 17:59:35

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	3970.1		ppb
Be	9	5.3	0.20932	ppb
P	31	1467.4	-12.53805	ppb
Sc	45	6176.8		ppb
Cr	52	3002.5	12.10634	ppb
Cr	53	373	-2.87376	ppb
Mn	55	1956.1	7.13912	ppb
Co	59	55.7	0.21543	ppb
Ni	60	772.3	20.04224	ppb
Cu	63	394.3	3.74538	ppb
Cu	65	160.3	3.34859	ppb
Zn	66	1411.4	67.08136	ppb
Zn	67	200.3	59.71646	ppb
Zn	68	1003	64.26601	ppb
As	75	90.3	2.49893	ppb
Se	77	27.3	-31.7177	ppb
Se	82	26.1	16.20108	ppb
Rh	103	4817.5		ppb
Ag	107	24.7	0.0917	ppb
Ag	109	21		ppb
Cd	111	8.9	-0.07934	ppb
Cd	114	25.9	0.11047	ppb
Sb	121	181.7		ppb
Sb	123	137	0.66281	ppb
Ba	135	3065.9		ppb
Ba	137	5878.7	31.3927	ppb
Ho	165	45077.6		ppb
Tl	205	39.7	-0.03618	ppb
Pb	208	6034.9	3.46329	ppb
Kr	83	28.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 FH

Sample Date: Tuesday, June 19, 2018 18:02:41

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	4001.8		ppb
Be	9	4.3	0.14964	ppb
P	31	1483.7	-14.22008	ppb
Sc	45	6332.8		ppb
Cr	52	3082.9	12.12088	ppb
Cr	53	339.3	-4.6933	ppb
Mn	55	2345.4	8.28522	ppb
Co	59	37.7	0.10639	ppb
Ni	60	859.3	21.42683	ppb
Cu	63	275.7	2.31069	ppb
Cu	65	117.7	2.17697	ppb
Zn	66	706	31.56517	ppb
Zn	67	126	33.94115	ppb
Zn	68	572	31.8998	ppb
As	75	92.9	2.43784	ppb
Se	77	12.7	-45.91554	ppb
Se	82	11.1	6.26181	ppb
Rh	103	5017.8		ppb
Ag	107	16.7	-0.00263	ppb
Ag	109	11		ppb
Cd	111	15.8	0.11439	ppb
Cd	114	16.2	0.02568	ppb
Sb	121	161		ppb
Sb	123	120.9	0.53978	ppb
Ba	135	3279.2		ppb
Ba	137	5999.7	30.93802	ppb
Ho	165	46678.2		ppb
Tl	205	22	-0.05054	ppb
Pb	208	3987.1	2.16344	ppb
Kr	83	25		ppb

elementOne
e 31368-Metals

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PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date: Tuesday, June 19, 2018 18:05:48

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	4059.8			ppb
Be	9	3	0.07318		ppb
P	31	1325.7	-26.41223		ppb
Sc	45	6322.1			ppb
Cr	52	639.7	0.20575		ppb
Cr	53	65.7	-16.24241		ppb
Mn	55	175.7	0.25059		ppb
Co	59	13.3	-0.02515		ppb
Ni	60	10.7	0.0013		ppb
Cu	63	81.7	0.28221		ppb
Cu	65	32.7	0.18075		ppb
Zn	66	221	9.38225		ppb
Zn	67	28.3	3.83411		ppb
Zn	68	246	10.1423		ppb
As	75	68.5	1.41994		ppb
Se	77	9.3	-48.64826		ppb
Se	82	0.8	0.04222		ppb
Rh	103	4866.8			ppb
Ag	107	12.7	-0.04082		ppb
Ag	109	9.7			ppb
Cd	111	7.4	-0.12665		ppb
Cd	114	9	-0.02705		ppb
Sb	121	21			ppb
Sb	123	15.5	-0.07489		ppb
Ba	135	22			ppb
Ba	137	38	0.03921		ppb
Ho	165	45291			ppb
Tl	205	19.3	-0.05215		ppb
Pb	208	287.7	0.04227		ppb
Kr	83	30.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date: Tuesday, June 19, 2018 18:08:55

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	3991.6			ppb
Be	9	910	51.66258		ppb
P	31	3638.9	164.39813		ppb
Sc	45	6179.8			ppb
Cr	52	10903	51.60859		ppb
Cr	53	1202	33.0178		ppb
Mn	55	13524	51.31677		ppb
Co	59	9002	50.61945		ppb
Ni	60	1910.4	49.45226		ppb
Cu	63	4726.8	51.07394		ppb
Cu	65	2100.4	50.88181		ppb
Zn	66	1248.7	58.59084		ppb
Zn	67	196.7	57.84853		ppb
Zn	68	948.7	59.71224		ppb
As	75	1110.9	51.58923		ppb
Se	77	60.7	-1.14364		ppb
Se	82	77.7	48.94389		ppb
Rh	103	4866.8			ppb
Ag	107	4780.8	51.6907		ppb
Ag	109	4548.7			ppb
Cd	111	1625.4	48.69714		ppb
Cd	114	6084.2	48.32564		ppb
Sb	121	12135.3			ppb
Sb	123	9314	55.91584		ppb
Ba	135	5151.5			ppb
Ba	137	9971	52.99289		ppb
Ho	165	45395.5			ppb
Tl	205	64384.5	49.92703		ppb
Pb	208	86061.4	50.72366		ppb
Kr	83	32			ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 BH

Sample Date: Tuesday, June 19, 2018 18:12:02

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	3988.3			ppb
Be	9	3.7	0.11216		ppb
P	31	4917.8	263.58449		ppb
Sc	45	6257.8			ppb
Cr	52	1518.7	4.59635		ppb
Cr	53	146.3	-12.77076		ppb
Mn	55	8628.5	33.11626		ppb
Co	59	155.3	0.78881		ppb
Ni	60	181.3	4.52093		ppb
Cu	63	1015.7	10.67507		ppb
Cu	65	455.7	10.73162		ppb
Zn	66	6381.8	309.25617		ppb
Zn	67	944.7	302.67267		ppb
Zn	68	4383.1	306.80325		ppb
As	75	88.9	2.45257		ppb
Se	77	15	-43.17188		ppb
Se	82	11.1	6.66633		ppb
Rh	103	4789.8			ppb
Ag	107	77	0.67053		ppb
Ag	109	57			ppb
Cd	111	37.3	0.79002		ppb
Cd	114	113.3	0.81755		ppb
Sb	121	165.7			ppb
Sb	123	124.2	0.58721		ppb
Ba	135	782.7			ppb
Ba	137	1466.4	7.73901		ppb
Ho	165	44906.3			ppb
Tl	205	42	-0.03421		ppb
Pb	208	22511	13.31728		ppb
Kr	83	30.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Tuesday, June 19, 2018 18:15:08

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	3959.4			ppb
Be	9	3.7	0.1146		ppb
P	31	5270.2	300.05335		ppb
Sc	45	6139.4			ppb
Cr	52	2609.8	10.21721		ppb
Cr	53	280.3	-6.81524		ppb
Mn	55	12886	50.53794		ppb
Co	59	320.7	1.76746		ppb
Ni	60	915.4	24.3565		ppb
Cu	63	3983.7	44.42098		ppb
Cu	65	1723.4	43.06206		ppb
Zn	66	11491.6	567.60381		ppb
Zn	67	1711.7	562.38745		ppb
Zn	68	7688.8	553.46142		ppb
As	75	126	4.38107		ppb
Se	77	17.7	-40.37433		ppb
Se	82	22.4	14.23524		ppb
Rh	103	4707.1			ppb
Ag	107	82.3	0.74568		ppb
Ag	109	84			ppb
Cd	111	34.7	0.73013		ppb
Cd	114	131.3	0.98132		ppb
Sb	121	305.3			ppb
Sb	123	225.2	1.22741		ppb
Ba	135	5139.5			ppb
Ba	137	10030	54.88303		ppb
Ho	165	44089.2			ppb
Tl	205	46.7	-0.02991		ppb
Pb	208	66114.8	40.09176		ppb
Kr	83	30			ppb

elementOne

e 31368-Metals

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PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Tuesday, June 19, 2018 18:18:15

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	3947.6			ppb
Be	9	2.7	0.05733		ppb
P	31	5197.2	295.18599		ppb
Sc	45	6123.1			ppb
Cr	52	2504.5	9.71967		ppb
Cr	53	287	-6.4875		ppb
Mn	55	12599.8	49.50448		ppb
Co	59	306.7	1.68915		ppb
Ni	60	894.7	23.84043		ppb
Cu	63	3792.3	42.33158		ppb
Cu	65	1729.1	43.31103		ppb
Zn	66	11251.9	556.68399		ppb
Zn	67	1650.7	543.05207		ppb
Zn	68	7624.5	549.59344		ppb
As	75	70.6	1.62035		ppb
Se	77	21.3	-36.93827		ppb
Se	82	3.4	1.61215		ppb
Rh	103	4700.4			ppb
Ag	107	87	0.79889		ppb
Ag	109	80			ppb
Cd	111	39.8	0.89528		ppb
Cd	114	122	0.90762		ppb
Sb	121	291.7			ppb
Sb	123	238.6	1.30299		ppb
Ba	135	5193.9			ppb
Ba	137	9661.2	52.59664		ppb
Ho	165	44311.9			ppb
Tl	205	45.3	-0.0312		ppb
Pb	208	65372.7	39.44154		ppb
Kr	83	31.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Tuesday, June 19, 2018 18:21:22

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	3974.1			ppb
Be	9	3.3	0.09374		ppb
P	31	4062	198.37903		ppb
Sc	45	6187.8			ppb
Cr	52	1914.4	6.64036		ppb
Cr	53	203.3	-10.23923		ppb
Mn	55	14377.1	55.74108		ppb
Co	59	121	0.59591		ppb
Ni	60	542	14.12729		ppb
Cu	63	1446	15.53039		ppb
Cu	65	661	15.92209		ppb
Zn	66	5153.9	250.77432		ppb
Zn	67	772	247.58774		ppb
Zn	68	3559.9	249.14481		ppb
As	75	72	1.64332		ppb
Se	77	10	-47.80896		ppb
Se	82	1.8	0.61826		ppb
Rh	103	4766.1			ppb
Ag	107	2476.8	27.26241		ppb
Ag	109	2363.8			ppb
Cd	111	63	1.58549		ppb
Cd	114	280.8	2.18336		ppb
Sb	121	589			ppb
Sb	123	462	2.64777		ppb
Ba	135	1144			ppb
Ba	137	2143.4	11.40168		ppb
Ho	165	44861.2			ppb
Tl	205	22.3	-0.04966		ppb
Pb	208	15004.4	8.84468		ppb
Kr	83	29.7			ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Tuesday, June 19, 2018 18:24:28

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	4079.8		ppb
Be	9	835	46.3609	ppb
P	31	6359.5	370.6895	ppb
Sc	45	6367.8		ppb
Cr	52	11833.8	54.5186	ppb
Cr	53	1291.7	35.23022	ppb
Mn	55	26531.4	101.81348	ppb
Co	59	8811.6	49.90566	ppb
Ni	60	2441.1	63.72608	ppb
Cu	63	6057.7	66.1076	ppb
Cu	65	2663.1	65.15669	ppb
Zn	66	6229.1	299.23003	ppb
Zn	67	919.4	291.82658	ppb
Zn	68	4238.7	293.91091	ppb
As	75	1054.3	49.23399	ppb
Se	77	54.3	-6.73169	ppb
Se	82	61.5	38.91039	ppb
Rh	103	4831.1		ppb
Ag	107	7424.1	80.95906	ppb
Ag	109	7068.7		ppb
Cd	111	1690.6	51.03568	ppb
Cd	114	6360.1	50.89424	ppb
Sb	121	12313.7		ppb
Sb	123	9415.4	57.93191	ppb
Ba	135	6306.5		ppb
Ba	137	11648	63.47998	ppb
Hf	165	44287.2		ppb
Tl	205	63094.2	50.14103	ppb
Pb	208	99672.5	60.23544	ppb
Kr	83	27.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 BH

Sample Date: Tuesday, June 19, 2018 18:27:34

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	4122		ppb
Be	9	3	0.07032	ppb
P	31	4002	190.81045	ppb
Sc	45	6238.8		ppb
Cr	52	1405	4.03935	ppb
Cr	53	135.3	-13.22339	ppb
Mn	55	5915.4	22.24029	ppb
Co	59	73	0.3118	ppb
Ni	60	319.3	8.04776	ppb
Cu	63	7243.7	78.71967	ppb
Cu	65	3191.9	77.74452	ppb
Zn	66	4410.4	210.24945	ppb
Zn	67	684.3	214.61487	ppb
Zn	68	3091.5	211.14891	ppb
As	75	92.2	2.55994	ppb
Se	77	12.7	-45.53938	ppb
Se	82	3.8	1.8968	ppb
Rh	103	4859.1		ppb
Ag	107	30	0.14716	ppb
Ag	109	30		ppb
Cd	111	9.7	-0.05833	ppb
Cd	114	51.8	0.31509	ppb
Sb	121	80.3		ppb
Sb	123	56.7	0.17742	ppb
Ba	135	731.3		ppb
Ba	137	1400	7.40556	ppb
Hf	165	44757.7		ppb
Tl	205	22.7	-0.04938	ppb
Pb	208	8065.5	4.70522	ppb
Kr	83	28.7		ppb

elementOne

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e 31368-Metals

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PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 18:30:43

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	4431.2			ppb
- Be	9	2	0.00529		ppb
- P	31	1195.4	-43.80503		ppb
> Sc	45	6813.6			ppb
- Cr	52	625	-0.08588		ppb
- Cr	53	892.7	16.02609		ppb
- Mn	55	104.7	-0.05577		ppb
- Co	59	12	-0.03894		ppb
- Ni	60	8	-0.08618		ppb
- Cu	63	47.7	-0.1372		ppb
- Cu	65	19	-0.19792		ppb
- Zn	66	27.3	-0.02494		ppb
- Zn	67	13	-1.51458		ppb
- Zn	68	108.7	-0.24919		ppb
- As	75	102.5	2.57735		ppb
- Se	77	68.3	0.18122		ppb
- Se	82	5.5	2.49242		ppb
> Rh	103	5350.2			ppb
- Ag	107	11	-0.0698		ppb
- Ag	109	13			ppb
- Cd	111	12	-0.01889		ppb
- Cd	114	9.2	-0.03173		ppb
- Sb	121	21			ppb
- Sb	123	18.9	-0.0639		ppb
- Ba	135	14			ppb
- Ba	137	16.3	-0.08378		ppb
> Ho	165	49444.5			ppb
- Tl	205	24	-0.05011		ppb
- Pb	208	86.7	-0.08109		ppb
- Kr	83	27.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 18:33:49

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	4697.5			ppb
- Be	9	1934.4	93.41292		ppb
- P	31	15420.4	916.13984		ppb
> Sc	45	7406.8			ppb
- Cr	52	23891.4	96.78163		ppb
- Cr	53	3592.3	110.71271		ppb
- Mn	55	29819.4	96.25475		ppb
- Co	59	20495.1	97.75759		ppb
- Ni	60	4362	95.93971		ppb
- Cu	63	10444.2	96.17252		ppb
- Cu	65	4717.8	97.4091		ppb
- Zn	66	2413.1	96.69249		ppb
- Zn	67	366	94.22938		ppb
- Zn	68	1772.1	98.69976		ppb
- As	75	2546.7	102.01122		ppb
- Se	77	199	98.51068		ppb
- Se	82	176.7	94.8386		ppb
> Rh	103	5742			ppb
- Ag	107	11102.1	101.91101		ppb
- Ag	109	10498.5			ppb
- Cd	111	3804.8	96.95633		ppb
- Cd	114	14234.8	95.92249		ppb
- Sb	121	25526			ppb
- Sb	123	19420	101.20321		ppb
- Ba	135	11597.4			ppb
- Ba	137	21839.5	100.77668		ppb
> Ho	165	52358.8			ppb
- Tl	205	148812.3	100.09923		ppb
- Pb	208	194759.6	99.64289		ppb
- Kr	83	33.7			ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH

Sample Date: Tuesday, June 19, 2018 18:36:57

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	4107.8		ppb
Be	9	2.3	0.03149	ppb
P	31	3392.6	147.24713	ppb
Sc	45	6113.1		ppb
Cr	52	1207.4	3.1835	ppb
Cr	53	192.7	-10.59615	ppb
Mn	55	13820.2	53.06648	ppb
Co	59	57	0.22463	ppb
Ni	60	133.3	3.2356	ppb
Cu	63	542	5.38757	ppb
Cu	65	239.3	5.31208	ppb
Zn	66	1587.1	75.675	ppb
Zn	67	240.3	72.738	ppb
Zn	68	1150.4	74.87212	ppb
As	75	47.1	0.40135	ppb
Se	77	14	-44.20179	ppb
Se	82	-5.2	-3.91302	ppb
Rh	103	4809.8		ppb
Ag	107	15.7	-0.00673	ppb
Ag	109	16.3		ppb
Cd	111	7.7	-0.11475	ppb
Cd	114	48.9	0.29562	ppb
Sb	121	63.7		ppb
Sb	123	50.3	0.14121	ppb
Ba	135	557		ppb
Ba	137	1070.4	5.66988	ppb
Ho	165	44403.4		ppb
Tl	205	41	-0.03473	ppb
Pb	208	5969.9	3.47832	ppb
Kr	83	30		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Date: Tuesday, June 19, 2018 18:40:04

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	3961		ppb
Be	9	2.3	0.0368	ppb
P	31	3860.3	191.0782	ppb
Sc	45	6013.7		ppb
Cr	52	1290	3.70803	ppb
Cr	53	148.3	-12.43361	ppb
Mn	55	1007.4	3.54334	ppb
Co	59	24	0.03901	ppb
Ni	60	106.3	2.56701	ppb
Cu	63	404.3	3.93775	ppb
Cu	65	186	4.06665	ppb
Zn	66	737.3	35.08458	ppb
Zn	67	108.3	30.48297	ppb
Zn	68	554	32.96347	ppb
As	75	61.5	1.18686	ppb
Se	77	10.3	-47.44129	ppb
Se	82	-4.9	-3.68903	ppb
Rh	103	4733.1		ppb
Ag	107	13.3	-0.02932	ppb
Ag	109	13.7		ppb
Cd	111	8.6	-0.08361	ppb
Cd	114	43.8	0.25704	ppb
Sb	121	385.3		ppb
Sb	123	286.5	1.64979	ppb
Ba	135	49.7		ppb
Ba	137	89.7	0.33973	ppb
Ho	165	43074.4		ppb
Tl	205	25.3	-0.04651	ppb
Pb	208	710	0.31404	ppb
Kr	83	34.7		ppb

elementOne

e 31368-Metals

ICP-Data 19 of 66

63.19

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Tuesday, June 19, 2018 18:43:10

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
V	Li	6	4652.3			ppb
T	Be	9	866.3	42.20833		ppb
T	P	31	2302.8	31.89704		ppb
V	Sc	45	7070			ppb
T	Cr	52	12900	53.47189		ppb
T	Cr	53	5657.3	195.0241		ppb
T	Mn	55	23159.7	83.20925		ppb
T	Co	59	8708.2	46.2165		ppb
T	Ni	60	3155.5	77.27087		ppb
T	Cu	63	5915.7	60.45465		ppb
T	Cu	65	2589.1	59.33643		ppb
T	Zn	66	1997.1	89.06516		ppb
T	Zn	67	327	93.68904		ppb
T	Zn	68	1442.7	88.83992		ppb
T	As	75	1816.4	80.7037		ppb
T	Se	77	448.7	333.60688		ppb
T	Se	82	121.7	72.7355		ppb
V	Rh	103	5154.9			ppb
T	Ag	107	11957.2	122.30326		ppb
T	Ag	109	11509			ppb
T	Cd	111	1171.2	33.01941		ppb
T	Cd	114	4705.2	35.26124		ppb
T	Sb	121	18741.7			ppb
T	Sb	123	14150.1	81.34657		ppb
T	Ba	135	7877.6			ppb
T	Ba	137	15586.2	79.32334		ppb
V	Ho	165	47449.3			ppb
T	Tl	205	145012.4	107.64233		ppb
T	Pb	208	127400.9	71.88585		ppb
T	Kr	83	38.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Tuesday, June 19, 2018 18:46:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
V	Li	6	4760.5			ppb
T	Be	9	1944.7	92.6501		ppb
T	P	31	4379.4	170.82102		ppb
V	Sc	45	7278.7			ppb
T	Cr	52	24357.5	100.53587		ppb
T	Cr	53	6901.6	234.71591		ppb
T	Mn	55	37183.3	130.17454		ppb
T	Co	59	18218.3	94.14251		ppb
T	Ni	60	5230.2	124.71276		ppb
T	Cu	63	10945.4	109.28361		ppb
T	Cu	65	4882.1	109.26679		ppb
T	Zn	66	3040.2	132.43505		ppb
T	Zn	67	504.3	143.24223		ppb
T	Zn	68	2223.1	136.75507		ppb
T	As	75	2969.7	129.38565		ppb
T	Se	77	475.3	345.92608		ppb
T	Se	82	226.4	131.90979		ppb
V	Rh	103	5300.9			ppb
T	Ag	107	17450.1	173.67026		ppb
T	Ag	109	16864			ppb
T	Cd	111	2697	74.37253		ppb
T	Cd	114	10808.1	78.88638		ppb
T	Sb	121	30837.7			ppb
T	Sb	123	23517.6	132.40468		ppb
T	Ba	135	12801.6			ppb
T	Ba	137	25415.6	126.68594		ppb
V	Ho	165	48483.6			ppb
T	Tl	205	214199.8	155.63319		ppb
T	Pb	208	218389.7	120.68731		ppb
T	Kr	83	28			ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date: Tuesday, June 19, 2018 18:55:37

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	4581.2		ppb
Be	9	2228.1	110.34054	ppb
P	31	4144.7	160.85891	ppb
Sc	45	7121.3		ppb
Cr	52	75274.2	323.78666	ppb
Cr	53	9058.3	321.24513	ppb
Mn	55	44996.8	148.45118	ppb
Co	59	33121.9	161.28235	ppb
Ni	60	9435.4	212.09576	ppb
Cu	63	31662.7	298.82222	ppb
Cu	65	14192.4	300.27455	ppb
Zn	66	5562	229.08559	ppb
Zn	67	814	220.51669	ppb
Zn	68	3905.6	231.05191	ppb
As	75	2381.7	97.29162	ppb
Se	77	257.7	148.42239	ppb
Se	82	288.8	158.5942	ppb
Rh	103	5628.3		ppb
Ag	107	39185.2	367.71917	ppb
Ag	109	39783.3		ppb
Cd	111	3284.2	85.35729	ppb
Cd	114	12078.6	83.04527	ppb
Sb	121	17821		ppb
Sb	123	13454.6	71.71829	ppb
Ba	135	29517.1		ppb
Ba	137	56252.2	266.00547	ppb
Ho	165	51164		ppb
Tl	205	351123.3	241.85028	ppb
Pb	208	451736.5	236.73493	ppb
Kr	83	29.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date: Tuesday, June 19, 2018 18:58:43

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	4500.6		ppb
Be	9	3214.2	162.09	ppb
P	31	6693.9	353.82527	ppb
Sc	45	6936		ppb
Cr	52	84843.4	375.20853	ppb
Cr	53	10071	369.3922	ppb
Mn	55	59033.3	200.22139	ppb
Co	59	42651	213.40015	ppb
Ni	60	11209.8	258.98676	ppb
Cu	63	36043	349.58092	ppb
Cu	65	16069.8	349.43329	ppb
Zn	66	6586.5	279.01526	ppb
Zn	67	985.7	275.80753	ppb
Zn	68	4547.1	277.75561	ppb
As	75	3487.8	147.28989	ppb
Se	77	294	184.01902	ppb
Se	82	350.8	197.84587	ppb
Rh	103	5476.6		ppb
Ag	107	44116.7	425.02865	ppb
Ag	109	44534		ppb
Cd	111	4974.3	133.01699	ppb
Cd	114	18827.3	133.04396	ppb
Sb	121	30618.4		ppb
Sb	123	23383.2	126.14758	ppb
Ba	135	34626.3		ppb
Ba	137	64827.9	309.89653	ppb
Ho	165	50600.5		ppb
Tl	205	414450.8	288.61392	ppb
Pb	208	535021	283.52104	ppb
Kr	83	31.7		ppb

elementOne

e 31368-Metals

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B-227

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PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 19:01:51

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	4337.7			ppb
- Be	9	3.3	0.07846		ppb
- P	31	1124.7	-46.79813		ppb
> Sc	45	6631.9			ppb
- Cr	52	651	0.11266		ppb
- Cr	53	531.7	2.42379		ppb
- Mn	55	124.3	0.01863		ppb
- Co	59	23.7	0.02284		ppb
- Ni	60	13	0.03622		ppb
- Cu	63	60	-0.00461		ppb
- Cu	65	20.7	-0.15328		ppb
- Zn	66	23	-0.19662		ppb
- Zn	67	17	-0.23781		ppb
- Zn	68	106.3	-0.29682		ppb
- As	75	66.4	1.06652		ppb
- Se	77	58.3	-7.49203		ppb
- Se	82	1.8	0.52086		ppb
> Rh	103	5268.2			ppb
- Ag	107	390.7	3.73792		ppb
- Ag	109	305.7			ppb
- Cd	111	5.8	-0.18963		ppb
- Cd	114	8.6	-0.03516		ppb
- Sb	121	130.7			ppb
- Sb	123	96.6	0.3838		ppb
- Ba	135	21			ppb
- Ba	137	36.7	0.02182		ppb
> Ho	165	47817.4			ppb
- Tl	205	123.3	0.02365		ppb
- Pb	208	227.7	-0.00037		ppb
- Kr	83	28.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Tuesday, June 19, 2018 19:04:58

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	4399.3			ppb
- Be	9	21	0.98463		ppb
- P	31	1391.4	-26.59712		ppb
> Sc	45	6636.2			ppb
- Cr	52	829.3	0.94005		ppb
- Cr	53	555.3	3.36137		ppb
- Mn	55	382.7	0.93017		ppb
- Co	59	226.7	1.07778		ppb
- Ni	60	47	0.85404		ppb
- Cu	63	159.7	1.00116		ppb
- Cu	65	61.3	0.769		ppb
- Zn	66	51	1.03799		ppb
- Zn	67	14.7	-0.92453		ppb
- Zn	68	113.3	0.15204		ppb
- As	75	94.3	2.30335		ppb
- Se	77	65	-1.85517		ppb
- Se	82	4.5	2.1271		ppb
> Rh	103	5273.2			ppb
- Ag	107	224.3	2.06824		ppb
- Ag	109	361			ppb
- Cd	111	42.6	0.83546		ppb
- Cd	114	147.1	0.98178		ppb
- Sb	121	344.3			ppb
- Sb	123	262.9	1.32549		ppb
- Ba	135	124.7			ppb
- Ba	137	216.7	0.92671		ppb
> Ho	165	48084.9			ppb
- Tl	205	1424.4	0.97682		ppb
- Pb	208	1948.7	0.95899		ppb
- Kr	83	25.3			ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 19:08:05

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	4583		ppb
Be	9	1898.7	93.99634	ppb
P	31	15064.9	912.49343	ppb
Sc	45	7261.1		ppb
Cr	52	23680.5	97.87472	ppb
Cr	53	3148.2	96.97962	ppb
Mn	55	29348.9	96.27599	ppb
Co	59	20091.7	97.38815	ppb
Ni	60	4259.7	95.20792	ppb
Cu	63	10404.8	97.38966	ppb
Cu	65	4569.4	95.88193	ppb
Zn	66	2455.5	100.05807	ppb
Zn	67	366.3	95.97632	ppb
Zn	68	1771.1	100.35827	ppb
As	75	2480.9	100.98401	ppb
Se	77	177.3	83.79766	ppb
Se	82	165.8	90.43155	ppb
Rh	103	5650		ppb
Ag	107	10835.7	101.08189	ppb
Ag	109	10584.6		ppb
Cd	111	3774.2	97.74347	ppb
Cd	114	14184.8	97.1412	ppb
Sb	121	25708.5		ppb
Sb	123	19326.7	101.55461	ppb
Ba	135	11619.7		ppb
Ba	137	21866.6	101.73	ppb
Ho	165	51932.9		ppb
Tl	205	146847.4	99.59099	ppb
Pb	208	192474.7	99.27889	ppb
Kr	83	29.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 12:23:59

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	2430.2		ppb
Be	9	3.3		ppb
P	31	5423.6		ppb
Sc	45	3683.3		ppb
Cr	52	490		ppb
Cr	53	330.7		ppb
Mn	55	82.7		ppb
Ni	60	8.3		ppb
Cu	63	60.7		ppb
Cu	65	23.3		ppb
Zn	66	75.7		ppb
Zn	67	22.3		ppb
Zn	68	102.3		ppb
As	75	53		ppb
Se	77	47		ppb
Se	82	-0.2		ppb
Rh	103	2965.5		ppb
Ag	107	28		ppb
Ag	109	24.3		ppb
Cd	111	5.5		ppb
Cd	114	14.2		ppb
Sb	121	67.7		ppb
Sb	123	56.7		ppb
Ba	135	12.7		ppb
Ba	137	18		ppb
Ho	165	26296.2		ppb
Pb	208	194.3		ppb
Kr	83	20.3		ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date Wednesday, June 20, 2018 13:44:58

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	2801			ppb
- Be	9	18	1.01847		ppb
- P	31	1539.4	-521.9543		ppb
> Sc	45	3929.3			ppb
- Cr	52	556.3	0.28477		ppb
- Cr	53	295.7	-4.23904		ppb
- Mn	55	219	0.89855		ppb
- Ni	60	26.3	0.77147		ppb
- Cu	63	90	0.50075		ppb
- Cu	65	37	0.53481		ppb
- Zn	66	34.3	-3.4237		ppb
- Zn	67	13.7	-5.02413		ppb
- Zn	68	81.3	-2.85072		ppb
- As	75	85.4	2.07538		ppb
- Se	77	31.3	-30.91776		ppb
- Se	82	0.5	0.76234		ppb
> Rh	103	3077.9			ppb
- Ag	107	70.3	0.66619		ppb
- Ag	109	64.3			ppb
- Cd	111	29	1.06555		ppb
- Cd	114	94.4	0.98581		ppb
- Sb	121	164.3			ppb
- Sb	123	126.4	0.6171		ppb
- Ba	135	60.7			ppb
- Ba	137	114.3	0.91508		ppb
> Ho	165	28395.8			ppb
- Pb	208	1161	0.8818		ppb
- Kr	83	21.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date Wednesday, June 20, 2018 13:47:59

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	2918.8			ppb
- Be	9	1385.4	95.49706		ppb
- P	31	10216.4	504.63693		ppb
> Sc	45	4061.3			ppb
- Cr	52	13248.5	103.02362		ppb
- Cr	53	1757.1	99.10782		ppb
- Mn	55	15531.5	97.83602		ppb
- Ni	60	2440.8	98.35558		ppb
- Cu	63	5753	98.28759		ppb
- Cu	65	2565.5	97.51925		ppb
- Zn	66	1367	92.87956		ppb
- Zn	67	219	95.82645		ppb
- Zn	68	955.4	90.22896		ppb
- As	75	1609.3	101.41533		ppb
- Se	77	100.7	80.96985		ppb
- Se	82	103.8	106.20265		ppb
> Rh	103	3284.5			ppb
- Ag	107	6536.5	98.3948		ppb
- Ag	109	6434.5			ppb
- Cd	111	2304.6	98.66696		ppb
- Cd	114	8703.4	100.41982		ppb
- Sb	121	14668			ppb
- Sb	123	10946.2	97.77022		ppb
- Ba	135	5604.6			ppb
- Ba	137	11225.9	102.45829		ppb
> Ho	165	29936.2			ppb
- Pb	208	114429	100.35868		ppb
- Kr	83	21.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Wednesday, June 20, 2018 12:20:58

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
>	Li	6	2630.7		ppb
-	Be	9	6538.5	500.90055	ppb
-	P	31	48652.6	5101.2404	ppb
>	Sc	45	4046		ppb
-	Cr	52	61913.9	499.39671	ppb
-	Cr	53	7363.4	500.18891	ppb
-	Mn	55	74862.3	500.433	ppb
-	Ni	60	11722.1	500.32934	ppb
-	Cu	63	27474.8	500.34348	ppb
-	Cu	65	12366.1	500.49708	ppb
-	Zn	66	6638.5	501.43294	ppb
-	Zn	67	984.7	500.84676	ppb
-	Zn	68	4545.1	501.96191	ppb
-	As	75	7293.9	499.71478	ppb
-	Se	77	336.7	503.86987	ppb
-	Se	82	463.8	498.75995	ppb
>	Rh	103	3109.5		ppb
-	Ag	107	31359.3	500.32171	ppb
-	Ag	109	30360.8		ppb
-	Cd	111	11041.2	500.26648	ppb
-	Cd	114	40983	499.91607	ppb
-	Sb	121	69843.1		ppb
-	Sb	123	52971.9	500.44672	ppb
-	Ba	135	25811.7		ppb
>	Ba	137	51912.8	499.50851	ppb
-	Ho	165	28437.5		ppb
-	Pb	208	540655.7	499.9285	ppb
-	Kr	83	24		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 12:23:59

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
>	Li	6	2430.2		ppb
-	Be	9	3.3	-0.00029	ppb
-	P	31	5423.6	0.55212	ppb
>	Sc	45	3683.3		ppb
-	Cr	52	490	0.00457	ppb
-	Cr	53	330.7	-0.0042	ppb
-	Mn	55	82.7	0.00019	ppb
-	Ni	60	8.3	0.0006	ppb
-	Cu	63	60.7	-0.00026	ppb
-	Cu	65	23.3	-0.00025	ppb
-	Zn	66	75.7	-0.00088	ppb
-	Zn	67	22.3	-0.00917	ppb
-	Zn	68	102.3	0.0022	ppb
-	As	75	53	-0.00095	ppb
-	Se	77	47	0.04247	ppb
-	Se	82	-0.2	-0.00763	ppb
>	Rh	103	2965.5		ppb
-	Ag	107	28	-0.00002	ppb
-	Ag	109	24.3		ppb
-	Cd	111	5.5	0.0001	ppb
-	Cd	114	14.2	0.00001	ppb
-	Sb	121	67.7		ppb
-	Sb	123	56.7	-0.00002	ppb
-	Ba	135	12.7		ppb
>	Ba	137	18	-0.00019	ppb
-	Ho	165	26296.2		ppb
-	Pb	208	194.3	-0.00005	ppb
-	Kr	83	20.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Wednesday, June 20, 2018 12:27:00

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	2558.5			ppb
- Be	9	16	0.98256		ppb
- P	31	4854.5	-101.0308		ppb
> Sc	45	3843			ppb
- Cr	52	567	0.47789		ppb
- Cr	53	371.7	2.02069		ppb
- Mn	55	216	0.88646		ppb
- Ni	60	23	0.62114		ppb
- Cu	63	108.3	0.84363		ppb
- Cu	65	40.3	0.66457		ppb
- Zn	66	68	-0.80795		ppb
- Zn	67	22.7	-0.21527		ppb
- Zn	68	112.7	0.79154		ppb
- As	75	37.7	-1.21284		ppb
- Se	77	52.3	6.44325		ppb
- Se	82	-4.5	-4.77262		ppb
> Rh	103	3069.5			ppb
- Ag	107	77	0.77724		ppb
- Ag	109	67.7			ppb
- Cd	111	28.3	1.0349		ppb
- Cd	114	97.5	1.02317		ppb
- Sb	121	194.7			ppb
- Sb	123	156.2	0.97013		ppb
- Ba	135	62.7			ppb
> Ba	137	119.7	1.01948		ppb
- Ho	165	27127			ppb
- Pb	208	1178.3	0.9484		ppb
- Kr	83	23			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date: Wednesday, June 20, 2018 12:30:01

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	2598.3			ppb
- Be	9	3259.2	252.67229		ppb
- P	31	24904.1	2326.8386		ppb
> Sc	45	3961.3			ppb
- Cr	52	31635	258.46822		ppb
- Cr	53	3839	254.13358		ppb
- Mn	55	37749.8	247.10575		ppb
- Ni	60	5795.7	242.27234		ppb
- Cu	63	13791.8	245.61576		ppb
- Cu	65	6255.1	247.70743		ppb
- Zn	66	3348.6	244.94608		ppb
- Zn	67	508.3	247.32578		ppb
- Zn	68	2333.4	246.62345		ppb
- As	75	3605	240.03694		ppb
- Se	77	193.7	246.259		ppb
- Se	82	221.5	233.42068		ppb
> Rh	103	3173.2			ppb
- Ag	107	15771.3	246.47865		ppb
- Ag	109	16064.8			ppb
- Cd	111	5595.9	248.38575		ppb
- Cd	114	20853.8	249.25154		ppb
- Sb	121	34752.1			ppb
- Sb	123	25979.7	246.37689		ppb
- Ba	135	12842.3			ppb
> Ba	137	25902.4	250.3653		ppb
- Ho	165	28298.7			ppb
- Pb	208	267069	248.0635		ppb
- Kr	83	26			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Wednesday, June 20, 2018 12:33:01

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	2717.2			ppb
Be	9	1306.4	96.67848		ppb
P	31	12388.1	775.41356		ppb
Sc	45	4026			ppb
Cr	52	13188.5	103.43365		ppb
Cr	53	1789.4	102.50745		ppb
Mn	55	15519.8	99.12972		ppb
Ni	60	2378.1	97.203		ppb
Cu	63	5637.6	97.65254		ppb
Cu	65	2552.1	98.4089		ppb
Zn	66	1352.4	93.23026		ppb
Zn	67	223.7	99.61459		ppb
Zn	68	968.4	93.05026		ppb
As	75	1522.3	97.04986		ppb
Se	77	121	117.46595		ppb
Se	82	96.1	99.13598		ppb
Rh	103	3239.9			ppb
Ag	107	6462.8	98.57794		ppb
Ag	109	6385.8			ppb
Cd	111	2363.6	102.69775		ppb
Cd	114	8623.1	100.86115		ppb
Sb	121	14547.9			ppb
Sb	123	10963.6	99.86155		ppb
Ba	135	5452.9			ppb
Ba	137	10824	100.73444		ppb
Ho	165	29358.6			ppb
Pb	208	111471.9	99.69004		ppb
Kr	83	24.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date: Wednesday, June 20, 2018 12:36:03

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	2635.6			ppb
Be	9	650.7	49.53112		ppb
P	31	4952.5	-118.7098		ppb
Sc	45	4038.3			ppb
Cr	52	6676.9	50.05687		ppb
Cr	53	1086.7	51.83937		ppb
Mn	55	7694.2	49.62266		ppb
Ni	60	1204	49.76658		ppb
Cu	63	2827.8	49.16536		ppb
Cu	65	1306.4	50.67235		ppb
Zn	66	702.3	46.2827		ppb
Zn	67	123.3	50.41663		ppb
Zn	68	538	47.20256		ppb
As	75	803.8	50.25026		ppb
Se	77	85.3	59.26702		ppb
Se	82	47.8	50.30527		ppb
Rh	103	3189.5			ppb
Ag	107	3170.5	48.90124		ppb
Ag	109	3020.5			ppb
Cd	111	1150.4	50.58969		ppb
Cd	114	4207.7	49.87985		ppb
Sb	121	7626.8			ppb
Sb	123	5727.8	53.12434		ppb
Ba	135	2564.8			ppb
Ba	137	5327.6	50.64648		ppb
Ho	165	28687.5			ppb
Pb	208	54787.8	50.04939		ppb
Kr	83	23.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Wednesday, June 20, 2018 12:39:03

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	3055.1			ppb
- Be	9	2	-0.14493		ppb
- P	31	50233.8	4700.5543		ppb
> Sc	45	4488.1			ppb
- Cr	52	514	-0.60995		ppb
- Cr	53	373.3	-1.89406		ppb
- Mn	55	97.3	-0.00145		ppb
- Ni	60	8	-0.07066		ppb
- Cu	63	54.3	-0.28334		ppb
- Cu	65	21	-0.23708		ppb
- Zn	66	46.7	-2.91032		ppb
- Zn	67	18.3	-3.72203		ppb
- Zn	68	88.3	-3.29374		ppb
- As	75	41.8	-1.2598		ppb
- Se	77	52.3	-5.20261		ppb
- Se	82	0.8	0.98851		ppb
> Rh	103	3510.6			ppb
- Ag	107	15	-0.25764		ppb
- Ag	109	17			ppb
- Cd	111	8.1	0.06526		ppb
- Cd	114	13	-0.04244		ppb
- Sb	121	64.7			ppb
- Sb	123	59.2	-0.07677		ppb
- Ba	135	13			ppb
- Ba	137	13.7	-0.06923		ppb
> Ho	165	31649.7			ppb
- Pb	208	136.7	-0.08078		ppb
- Kr	83	21.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Wednesday, June 20, 2018 12:42:04

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	2833.9			ppb
- Be	9	2	-0.13357		ppb
- P	31	49138.6	4765.0735		ppb
> Sc	45	4336.7			ppb
- Cr	52	603	0.19892		ppb
- Cr	53	409.3	1.35283		ppb
- Mn	55	259.3	0.96522		ppb
- Ni	60	71	2.32781		ppb
- Cu	63	123.7	0.84874		ppb
- Cu	65	53.3	0.93264		ppb
- Zn	66	61.7	-1.87304		ppb
- Zn	67	17	-4.30906		ppb
- Zn	68	107.3	-1.32818		ppb
- As	75	46.9	-0.95833		ppb
- Se	77	49	-9.94595		ppb
- Se	82	3.8	3.89319		ppb
> Rh	103	3493.6			ppb
- Ag	107	6482.2	91.67444		ppb
- Ag	109	6216.8			ppb
- Cd	111	17.4	0.44133		ppb
- Cd	114	67.5	0.55087		ppb
- Sb	121	59.7			ppb
- Sb	123	50.9	-0.14135		ppb
- Ba	135	14			ppb
- Ba	137	17	-0.03844		ppb
> Ho	165	31192.4			ppb
- Pb	208	152.3	-0.06595		ppb
- Kr	83	21			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date: Wednesday, June 20, 2018 12:45:04

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
V	Li	6	4356.4		ppb
T	Be	9	11.3	0.24822	ppb
T	P	31	2494.1	-523.3384	ppb
V	Sc	45	6401.2		ppb
T	Cr	52	571.3	-1.44017	ppb
T	Cr	53	810.7	10.64832	ppb
T	Mn	55	183	0.15883	ppb
T	Ni	60	38.3	0.61692	ppb
T	Cu	63	153	0.5246	ppb
T	Cu	65	70.3	0.73061	ppb
T	Zn	66	162.3	1.43025	ppb
T	Zn	67	41	0.69388	ppb
T	Zn	68	170	-0.5372	ppb
T	As	75	16	-3.17502	ppb
T	Se	77	89.3	8.11884	ppb
T	Se	82	-3.5	-2.13081	ppb
V	Rh	103	5152.9		ppb
T	Ag	107	16.3	-0.31166	ppb
T	Ag	109	12.3		ppb
T	Cd	111	12.1	0.0716	ppb
T	Cd	114	44.6	0.14512	ppb
T	Sb	121	134.7		ppb
T	Sb	123	86	-0.0802	ppb
T	Ba	135	22		ppb
T	Ba	137	40.3	0.05126	ppb
V	Ho	165	46240.4		ppb
T	Pb	208	868	0.29962	ppb
T	Kr	83	23.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Wednesday, June 20, 2018 12:48:05

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
V	Li	6	2585.7		ppb
T	Be	9	12.7	0.71302	ppb
T	P	31	2491.1	-393.7418	ppb
V	Sc	45	3792		ppb
T	Cr	52	564.3	0.52726	ppb
T	Cr	53	533.3	14.75403	ppb
T	Mn	55	223.3	0.93957	ppb
T	Ni	60	28.3	0.85866	ppb
T	Cu	63	100.3	0.70303	ppb
T	Cu	65	46.3	0.91957	ppb
T	Zn	66	44.7	-2.58795	ppb
T	Zn	67	20.3	-1.43304	ppb
T	Zn	68	97.7	-0.90666	ppb
T	As	75	63.1	0.60312	ppb
T	Se	77	53.3	8.65925	ppb
T	Se	82	2.8	3.3476	ppb
V	Rh	103	3058.2		ppb
T	Ag	107	70.3	0.67471	ppb
T	Ag	109	75		ppb
T	Cd	111	26.9	0.9753	ppb
T	Cd	114	93.5	0.97803	ppb
T	Sb	121	193		ppb
T	Sb	123	131.3	0.71015	ppb
T	Ba	135	66.3		ppb
T	Ba	137	110	0.91206	ppb
V	Ho	165	27411.7		ppb
T	Pb	208	1104.3	0.86581	ppb
T	Kr	83	21.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Wednesday, June 20, 2018 12:56:45

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas	Report Unit
> Li	6	2623.3			ppb
- Be	9	117	8.69477		ppb
- P	31	2052.1	-454.578		ppb
> Sc	45	3858.3			ppb
- Cr	52	1853.1	11.42703		ppb
- Cr	53	1068.7	54.10754		ppb
- Mn	55	2532.5	16.52215		ppb
- Ni	60	352	14.82061		ppb
- Cu	63	729.3	12.28057		ppb
- Cu	65	324.7	12.29774		ppb
- Zn	66	264.7	14.33885		ppb
- Zn	67	67	23.01253		ppb
- Zn	68	245.7	15.87264		ppb
- As	75	250.2	13.63158		ppb
- Se	77	112.3	112.59571		ppb
- Se	82	6.1	6.91613		ppb
> Rh	103	3084.5			ppb
- Ag	107	1391.7	21.97691		ppb
- Ag	109	1438			ppb
- Cd	111	175.7	7.77852		ppb
- Cd	114	685.9	8.25886		ppb
- Sb	121	2429.1			ppb
- Sb	123	1829.9	17.04967		ppb
- Ba	135	863			ppb
- Ba	137	1723.1	16.7078		ppb
> Ho	165	27917.2			ppb
- Pb	208	15826.9	14.71905		ppb
- Kr	83	24.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Wednesday, June 20, 2018 12:59:45

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas	Report Unit
> Li	6	2558.8			ppb
- Be	9	765	59.9978		ppb
- P	31	2004.7	-451.8508		ppb
> Sc	45	3732.6			ppb
- Cr	52	7681.2	63.39811		ppb
- Cr	53	1614.1	99.12903		ppb
- Mn	55	9704.6	67.31403		ppb
- Ni	60	1481	65.7537		ppb
- Cu	63	3346.6	62.68768		ppb
- Cu	65	1508.4	62.94066		ppb
- Zn	66	876.3	63.97697		ppb
- Zn	67	150.7	69.89105		ppb
- Zn	68	675.7	67.74766		ppb
- As	75	916.8	62.31557		ppb
- Se	77	134.7	160.46985		ppb
- Se	82	50.8	57.2412		ppb
> Rh	103	2974.8			ppb
- Ag	107	4395.1	72.90748		ppb
- Ag	109	4330.4			ppb
- Cd	111	1262.8	59.56197		ppb
- Cd	114	4658.7	59.24315		ppb
- Sb	121	9486.1			ppb
- Sb	123	7165.6	69.8084		ppb
- Ba	135	3401.6			ppb
- Ba	137	6644.9	66.2427		ppb
> Ho	165	27381.3			ppb
- Pb	208	66984	64.1628		ppb
- Kr	83	23			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date Wednesday, June 20, 2018 13:02:46

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
>	Li	6	2563.8		ppb
-	Be	9	1439.4	112.91286	ppb
-	P	31	3636.6	-257.1303	ppb
>	Sc	45	3868.6		ppb
-	Cr	52	39395	331.11088	ppb
-	Cr	53	4905.5	340.8911	ppb
-	Mn	55	22430.7	152.25599	ppb
-	Ni	60	5045.2	219.06618	ppb
-	Cu	63	16351.3	302.71473	ppb
-	Cu	65	7341.4	302.1569	ppb
-	Zn	66	2876.2	217.79353	ppb
-	Zn	67	471.7	237.8691	ppb
-	Zn	68	2049.8	223.8922	ppb
-	As	75	1378.2	92.96486	ppb
-	Se	77	150.3	182.06869	ppb
>	Se	82	118.8	130.11527	ppb
-	Rh	103	3054.9		ppb
-	Ag	107	20093.5	325.81454	ppb
-	Ag	109	21237.4		ppb
-	Cd	111	1836.8	84.52797	ppb
-	Cd	114	6845.3	84.8372	ppb
-	Sb	121	9260.4		ppb
-	Sb	123	6879.1	67.20207	ppb
-	Ba	135	13141.5		ppb
-	Ba	137	26192.7	262.4112	ppb
>	Ho	165	27303.9		ppb
-	Pb	208	245854.7	236.6859	ppb
-	Kr	83	21.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date Wednesday, June 20, 2018 13:05:47

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
>	Li	6	2613.1		ppb
-	Be	9	2118.1	163.21367	ppb
-	P	31	3525.2	-257.112	ppb
>	Sc	45	3748.3		ppb
-	Cr	52	46052.7	400.01939	ppb
-	Cr	53	5488.3	397.20459	ppb
-	Mn	55	30359.1	210.30097	ppb
-	Ni	60	6177.1	273.56903	ppb
-	Cu	63	18988.2	358.72504	ppb
-	Cu	65	8546.1	358.91459	ppb
-	Zn	66	3543.3	275.26302	ppb
-	Zn	67	576.3	299.39954	ppb
-	Zn	68	2515.1	283.27419	ppb
-	As	75	2079.7	145.21436	ppb
-	Se	77	172.7	227.91252	ppb
-	Se	82	190.8	212.9626	ppb
>	Rh	103	2996.2		ppb
-	Ag	107	25673.5	425.11821	ppb
-	Ag	109	25047.6		ppb
-	Cd	111	3025.9	142.14183	ppb
-	Cd	114	11265.5	142.56984	ppb
-	Sb	121	17017.1		ppb
-	Sb	123	12824.4	123.98967	ppb
-	Ba	135	15648.6		ppb
-	Ba	137	31811.6	314.29404	ppb
>	Ho	165	27688.7		ppb
-	Pb	208	301006.5	285.76807	ppb
-	Kr	83	23.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 FH

Sample Date: Wednesday, June 20, 2018 13:14:49

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report	Unit
> Li	6	2683.1			ppb
- Be	9	2.3	-0.10174		ppb
- P	31	1842.1	-481.0837		ppb
> Sc	45	3861			ppb
- Cr	52	1950.1	12.24534		ppb
- Cr	53	279	-5.04725		ppb
- Mn	55	1164.4	7.3131		ppb
- Ni	60	497.7	21.17518		ppb
- Cu	63	274.3	3.91638		ppb
- Cu	65	131.3	4.4025		ppb
- Zn	66	855	60.21956		ppb
- Zn	67	131.7	57.21068		ppb
- Zn	68	632.3	60.35312		ppb
- As	75	77.3	1.6045		ppb
- Se	77	21	-49.11776		ppb
- Se	82	10.8	12.20081		ppb
> Rh	103	3068.9			ppb
- Ag	107	118	1.44405		ppb
- Ag	109	282			ppb
- Cd	111	6.9	0.05258		ppb
- Cd	114	19.6	0.06035		ppb
- Sb	121	208.3			ppb
- Sb	123	165.5	1.02087		ppb
- Ba	135	1573			ppb
- Ba	137	3217.9	31.47037		ppb
> Ho	165	27823.1			ppb
- Pb	208	3954.5	3.54409		ppb
- Kr	83	22			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 13:17:51

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report	Unit
> Li	6	2681			ppb
- Be	9	2.7	-0.07607		ppb
- P	31	1657.4	-499.4706		ppb
> Sc	45	3775			ppb
- Cr	52	439.3	-0.54946		ppb
- Cr	53	313.7	-1.90818		ppb
- Mn	55	89.3	0.0493		ppb
- Ni	60	7.3	-0.04288		ppb
- Cu	63	47.3	-0.25265		ppb
- Cu	65	18.7	-0.19547		ppb
- Zn	66	25	-4.05594		ppb
- Zn	67	12	-5.6097		ppb
- Zn	68	77	-2.97615		ppb
- As	75	44.8	-0.59802		ppb
- Se	77	31.7	-28.0043		ppb
- Se	82	-1.2	-1.2265		ppb
> Rh	103	2954.5			ppb
- Ag	107	17.3	-0.17678		ppb
- Ag	109	11			ppb
- Cd	111	4.7	-0.04391		ppb
- Cd	114	11.7	-0.03138		ppb
- Sb	121	49.7			ppb
- Sb	123	42.9	-0.15449		ppb
- Ba	135	9			ppb
- Ba	137	11	-0.07614		ppb
> Ho	165	27078			ppb
- Pb	208	104.7	-0.09279		ppb
- Kr	83	22.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Wednesday, June 20, 2018 13:20:51

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	2733.2		ppb
Be	9	1335.4	98.23644	ppb
P	31	10055.4	494.56135	ppb
Sc	45	4029		ppb
Cr	52	12886.7	100.92171	ppb
Cr	53	1776.1	101.47747	ppb
Mn	55	15033.5	100.04532	ppb
Ni	60	2385.8	101.56631	ppb
Cu	63	5477.9	98.84819	ppb
Cu	65	2511.1	100.85127	ppb
Zn	66	1291.7	92.72703	ppb
Zn	67	214.3	99.56354	ppb
Zn	68	947.7	95.04831	ppb
As	75	1469.1	97.55665	ppb
Se	77	95	80.34799	ppb
Se	82	85.5	92.01556	ppb
Rh	103	3109.5		ppb
Ag	107	6268.1	99.65985	ppb
Ag	109	6166.8		ppb
Cd	111	2326.2	105.17532	ppb
Cd	114	8273.1	100.78372	ppb
Sb	121	13692.4		ppb
Sb	123	10416.4	97.75169	ppb
Ba	135	5279.9		ppb
Ba	137	10506.5	100.74262	ppb
Ho	165	28493.9		ppb
Pb	208	107952.2	99.46842	ppb
Kr	83	25		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 FH

Sample Date: Wednesday, June 20, 2018 13:23:53

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	2558.1		ppb
Be	9	1.3	-0.17107	ppb
P	31	1745.4	-488.5891	ppb
Sc	45	3780.6		ppb
Cr	52	1907.1	12.22374	ppb
Cr	53	263.3	-5.81213	ppb
Mn	55	1015	6.71079	ppb
Ni	60	473.3	21.33558	ppb
Cu	63	171.3	2.19972	ppb
Cu	65	67.7	1.94914	ppb
Zn	66	403	27.00435	ppb
Zn	67	58	20.23902	ppb
Zn	68	333.3	28.32865	ppb
As	75	37.1	-1.09111	ppb
Se	77	13	-61.95975	ppb
Se	82	-0.5	-0.34678	ppb
Rh	103	2896.8		ppb
Ag	107	14	-0.22831	ppb
Ag	109	28.3		ppb
Cd	111	6.9	0.06982	ppb
Cd	114	11.1	-0.0351	ppb
Sb	121	131		ppb
Sb	123	91.9	0.35153	ppb
Ba	135	1532.7		ppb
Ba	137	3119.5	31.98244	ppb
Ho	165	26536.4		ppb
Pb	208	2372	2.15725	ppb
Kr	83	23		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 C8A

Sample Date: Wednesday, June 20, 2018 13:26:54

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
> Li	6	2704.8		ppb
- Be	9	2.7	-0.07781	ppb
- P	31	1535	-502.0593	ppb
> Sc	45	3539.9		ppb
- Cr	52	466.7	-0.03966	ppb
- Cr	53	69.7	-20.26539	ppb
- Mn	55	116.7	0.22626	ppb
- Ni	60	6.3	-0.09407	ppb
- Cu	63	62.7	0.02002	ppb
- Cu	65	36	0.5152	ppb
- Zn	66	91	1.11867	ppb
- Zn	67	18.3	-2.33765	ppb
- Zn	68	119.3	1.79898	ppb
- As	75	52.3	-0.11146	ppb
- Se	77	7.7	-72.51584	ppb
- Se	82	5.2	5.95857	ppb
> Rh	103	3011.2		ppb
- Ag	107	9.7	-0.30952	ppb
- Ag	109	10		ppb
- Cd	111	5.4	-0.00757	ppb
- Cd	114	9.5	-0.06274	ppb
- Sb	121	41.7		ppb
- Sb	123	38.5	-0.20394	ppb
- Ba	135	13.7		ppb
- Ba	137	14.7	-0.04133	ppb
> Ho	165	27580.9		ppb
- Pb	208	122	-0.07803	ppb
- Kr	83	16.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH

Sample Date: Wednesday, June 20, 2018 13:29:54

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
> Li	6	2517.9		ppb
- Be	9	3.7	0.01725	ppb
- P	31	2968.5	-309.6197	ppb
> Sc	45	3568.9		ppb
- Cr	52	778.3	2.80615	ppb
- Cr	53	105	-17.46464	ppb
- Mn	55	7614.2	56.01999	ppb
- Ni	60	92	3.99325	ppb
- Cu	63	334	5.60901	ppb
- Cu	65	142	5.40529	ppb
- Zn	66	945.4	74.20965	ppb
- Zn	67	126.7	61.0906	ppb
- Zn	68	700	75.81444	ppb
- As	75	55.2	0.38702	ppb
- Se	77	9.7	-67.53684	ppb
- Se	82	2.2	2.68922	ppb
> Rh	103	2800.2		ppb
- Ag	107	14.3	-0.21441	ppb
- Ag	109	17.3		ppb
- Cd	111	4.4	-0.04304	ppb
- Cd	114	35.6	0.3001	ppb
- Sb	121	64.3		ppb
- Sb	123	52.7	-0.02167	ppb
- Ba	135	274.3		ppb
- Ba	137	514.3	5.37038	ppb
> Ho	165	25329.5		ppb
- Pb	208	3502.4	3.4425	ppb
- Kr	83	21.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH Unprep

Sample Date: Wednesday, June 20, 2018 13:32:55

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas	Report Unit
Li	6	2527.7			ppb
Be	9	3.3	-0.01171		ppb
P	31	2094.8	-417.1667		ppb
Sc	45	3439.9			ppb
Cr	52	626.7	1.61883		ppb
Cr	53	77.3	-19.44092		ppb
Mn	55	3523.2	26.67416		ppb
Ni	60	39	1.55423		ppb
Cu	63	164.3	2.30511		ppb
Cu	65	65	2.05648		ppb
Zn	66	427.7	31.70198		ppb
Zn	67	67	28.06098		ppb
Zn	68	320.3	29.73482		ppb
As	75	43.4	-0.39181		ppb
Se	77	8	-70.26333		ppb
Se	82	-4.2	-5.0791		ppb
Rh	103	2690.8			ppb
Ag	107	20.7	-0.08655		ppb
Ag	109	15.7			ppb
Cd	111	6.4	0.07251		ppb
Cd	114	27.4	0.20691		ppb
Sb	121	43.7			ppb
Sb	123	38.7	-0.16135		ppb
Ba	135	126			ppb
Ba	137	258.7	2.66583		ppb
Ho	165	24827			ppb
Pb	208	1612.7	1.5141		ppb
Kr	83	22.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Date: Wednesday, June 20, 2018 13:35:55

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas	Report Unit
Li	6	2554.6			ppb
Be	9	1.3	-0.17249		ppb
P	31	3350.2	-245.7817		ppb
Sc	45	3476.6			ppb
Cr	52	815.3	3.34123		ppb
Cr	53	90	-18.45506		ppb
Mn	55	486.3	3.1343		ppb
Ni	60	59	2.50375		ppb
Cu	63	255	4.15165		ppb
Cu	65	108.7	4.03735		ppb
Zn	66	456.3	33.75822		ppb
Zn	67	74.7	32.22678		ppb
Zn	68	362.3	34.65079		ppb
As	75	46.1	-0.21379		ppb
Se	77	7.7	-71.06822		ppb
Se	82	-1.5	-1.67176		ppb
Rh	103	2723.8			ppb
Ag	107	14.3	-0.20793		ppb
Ag	109	11.3			ppb
Cd	111	8.9	0.1987		ppb
Cd	114	33.2	0.28169		ppb
Sb	121	244			ppb
Sb	123	180	1.34862		ppb
Ba	135	29			ppb
Ba	137	49.3	0.3508		ppb
Ho	165	25109.6			ppb
Pb	208	467	0.29483		ppb
Kr	83	19.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 C8A-C9

Sample Date: Wednesday, June 20, 2018 13:38:56

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	2494.1		ppb
-	Be	9	3.3	-0.0086	ppb
-	P	31	1965.7	-440.0187	ppb
>	Sc	45	3498.2		ppb
-	Cr	52	518.3	0.50122	ppb
-	Cr	53	61	-20.9097	ppb
-	Mn	55	245	1.26029	ppb
-	Ni	60	20.7	0.62026	ppb
-	Cu	63	71.3	0.30059	ppb
-	Cu	65	33.7	0.54082	ppb
-	Zn	66	91.7	1.79539	ppb
-	Zn	67	17.3	-2.07134	ppb
-	Zn	68	118	2.84673	ppb
-	As	75	63.3	1.05322	ppb
-	Se	77	7	-72.60078	ppb
-	Se	82	10.5	12.7856	ppb
>	Rh	103	2770.8		ppb
-	Ag	107	10.3	-0.28436	ppb
-	Ag	109	11.7		ppb
-	Cd	111	2.4	-0.1421	ppb
-	Cd	114	18.1	0.06588	ppb
-	Sb	121	30.3		ppb
-	Sb	123	25.7	-0.30329	ppb
-	Ba	135	12		ppb
-	Ba	137	17.3	0.00335	ppb
>	Ho	165	24961.1		ppb
-	Pb	208	125	-0.06261	ppb
-	Kr	83	16.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 13:51:00

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
>	Li	6	2712.1		ppb
-	Be	9	1.7	-0.15152	ppb
-	P	31	1313	-543.0006	ppb
>	Sc	45	3761.3		ppb
-	Cr	52	464	-0.31515	ppb
-	Cr	53	314.3	-1.7921	ppb
-	Mn	55	83	0.00539	ppb
-	Ni	60	4.7	-0.1646	ppb
-	Cu	63	39.3	-0.40495	ppb
-	Cu	65	17.7	-0.2408	ppb
-	Zn	66	23.7	-4.17764	ppb
-	Zn	67	13.3	-4.8498	ppb
-	Zn	68	77.3	-2.92364	ppb
-	As	75	59.4	0.47357	ppb
-	Se	77	32.3	-27.05931	ppb
-	Se	82	-6.2	-6.86418	ppb
>	Rh	103	2957.2		ppb
-	Ag	107	10.3	-0.29434	ppb
-	Ag	109	13.7		ppb
-	Cd	111	4.7	-0.04092	ppb
-	Cd	114	8.8	-0.06918	ppb
-	Sb	121	30.3		ppb
-	Sb	123	28.6	-0.29935	ppb
-	Ba	135	11.3		ppb
-	Ba	137	12	-0.06743	ppb
>	Ho	165	27399		ppb
-	Pb	208	91.3	-0.10678	ppb
-	Kr	83	26		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Wednesday, June 20, 2018 13:54:00

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	2822			ppb
Be	9	20.3	1.17321		ppb
P	31	1525.4	-520.1207		ppb
Sc	45	3848.6			ppb
Cr	52	573.7	0.52842		ppb
Cr	53	328	-1.30311		ppb
Mn	55	227.7	0.97038		ppb
Ni	60	28.3	0.85971		ppb
Cu	63	94.3	0.59276		ppb
Cu	65	41.7	0.72322		ppb
Zn	66	30	-3.72174		ppb
Zn	67	13.3	-5.11178		ppb
Zn	68	80.7	-2.82		ppb
As	75	62.4	0.58595		ppb
Se	77	36.3	-21.67855		ppb
Se	82	3.2	3.79257		ppb
Rh	103	3052.5			ppb
Ag	107	209	2.8836		ppb
Ag	109	204.3			ppb
Cd	111	130.9	5.68363		ppb
Cd	114	218.3	2.49361		ppb
Sb	121	321.7			ppb
Sb	123	255.2	1.96665		ppb
Ba	135	201			ppb
Ba	137	260.3	2.46337		ppb
Ho	165	27356.6			ppb
Pb	208	1552	1.31055		ppb
Kr	83	18.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Wednesday, June 20, 2018 13:57:01

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	2848.1			ppb
Be	9	1380	97.59129		ppb
P	31	9822.9	505.27079		ppb
Sc	45	3902.3			ppb
Cr	52	12615.8	102.04487		ppb
Cr	53	1710.7	100.79465		ppb
Mn	55	14933.1	98.76724		ppb
Ni	60	2353.8	99.58932		ppb
Cu	63	5498.9	98.62733		ppb
Cu	65	2469.8	98.57443		ppb
Zn	66	1301.7	92.8727		ppb
Zn	67	206	94.48057		ppb
Zn	68	922.7	91.62049		ppb
As	75	1447.9	95.52689		ppb
Se	77	91.7	73.29576		ppb
Se	82	83.8	89.75496		ppb
Rh	103	3128.2			ppb
Ag	107	6190.8	97.81248		ppb
Ag	109	6057.7			ppb
Cd	111	2305.4	103.63002		ppb
Cd	114	8297.2	100.46649		ppb
Sb	121	14012.3			ppb
Sb	123	10387.5	97.40339		ppb
Ba	135	5374.6			ppb
Ba	137	10826.7	103.73964		ppb
Ho	165	28516.6			ppb
Pb	208	108872.2	100.23947		ppb
Kr	83	20.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	143958		ppb
Be	9	3.7		ppb
P	31	2822.5		ppb
Sc	45	93878.6		ppb
Zn	66	216.3		ppb
Zn	67	103		ppb
Zn	68	280.7		ppb
As	75	141.3		ppb
Se	77	410.7		ppb
Se	82	-0.4		ppb
Rh	103	74251.8		ppb
Ho	165	557874.5		ppb
Kr	83	51.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date Thursday, June 21, 2018 11:34:57

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	167105		ppb
Be	9	654	0.94169	ppb
P	31	9710.9	21.38375	ppb
Sc	45	106329.4		ppb
Zn	66	631	1.14371	ppb
Zn	67	150	0.58154	ppb
Zn	68	526	0.8828	ppb
As	75	489.4	1.01847	ppb
Se	77	439	-2.29917	ppb
Se	82	29.6	1.00692	ppb
Rh	103	87413.2		ppb
Ho	165	607499.7		ppb
Kr	83	56.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date Thursday, June 21, 2018 11:36:55

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	165761.6		ppb
Be	9	68418.8	99.96597	ppb
P	31	321261.1	1045.4818	ppb
Sc	45	106205.8		ppb
Zn	66	32183.4	100.72754	ppb
Zn	67	4903.8	100.32401	ppb
Zn	68	21785.8	100.59638	ppb
As	75	30799.3	100.15484	ppb
Se	77	2425.5	105.05005	ppb
Se	82	2909.8	101.10746	ppb
Rh	103	84244		ppb
Ho	165	616939.9		ppb
Kr	83	45		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date Thursday, June 21, 2018 11:38:52

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	160840.4		ppb
Be	9	332032	500.00692	ppb
P	31	1544265.3	4990.8981	ppb
Sc	45	107812.7		ppb
Zn	66	160440.6	499.8542	ppb
Zn	67	24231.1	499.93604	ppb
Zn	68	108152.1	499.88096	ppb
As	75	154753.8	499.969	ppb
Se	77	9880	498.99659	ppb
Se	82	14539.5	499.77849	ppb
Rh	103	85154.4		ppb
Ho	165	632755.7		ppb
Kr	83	50.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 11:40:50

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	143507.3		ppb
Be	9	33.7	0.05063	ppb
P	31	3100.2	0.84599	ppb
Sc	45	95435.5		ppb
Zn	66	247	0.09785	ppb
Zn	67	89	-0.36135	ppb
Zn	68	273.3	-0.06029	ppb
As	75	210.6	0.24593	ppb
Se	77	586.7	10.21472	ppb
Se	82	12.6	0.5048	ppb
Rh	103	75333		ppb
Ho	165	553104.8		ppb
Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date Thursday, June 21, 2018 11:42:48

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	156716.6		ppb
Be	9	682.7	1.04901	ppb
P	31	9508.8	22.65735	ppb
Sc	45	100132.1		ppb
Zn	66	601.3	1.27358	ppb
Zn	67	162	1.21463	ppb
Zn	68	523.7	1.15722	ppb
As	75	482.4	1.17993	ppb
Se	77	723	16.86353	ppb
Se	82	22.3	0.85331	ppb
Rh	103	78041		ppb
Ho	165	582788.2		ppb
Kr	83	47		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date Thursday, June 21, 2018 11:44:45

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	148477.6			ppb
- Be	9	154283.3	251.72184		ppb
- P	31	699270.8	2468.828		ppb
> Sc	45	98456.9			ppb
- Zn	66	73775.4	252.16548		ppb
- Zn	67	11067.8	249.69769		ppb
- Zn	68	48895.1	247.5903		ppb
- As	75	70085.7	248.55395		ppb
- Se	77	4754.5	252.12397		ppb
- Se	82	6540.1	246.96811		ppb
> Rh	103	77497.3			ppb
- Ho	165	579451.4			ppb
- Kr	83	52.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 11:46:43

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	157892.1			ppb
- Be	9	66019.7	101.27188		ppb
- P	31	309993.7	1033.139		ppb
> Sc	45	103702.1			ppb
- Zn	66	31188.4	102.42146		ppb
- Zn	67	4804.8	103.19642		ppb
- Zn	68	21094.9	102.21322		ppb
- As	75	29420	100.35171		ppb
- Se	77	2420.1	111.1521		ppb
- Se	82	2781.7	101.38656		ppb
> Rh	103	80308.8			ppb
- Ho	165	610751.3			ppb
- Kr	83	53			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date Thursday, June 21, 2018 11:48:41

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
> Li	6	154290.5			ppb
- Be	9	32585.9	51.14989		ppb
- P	31	58772.7	195.43836		ppb
> Sc	45	99645.2			ppb
- Zn	66	15292.7	51.78785		ppb
- Zn	67	2338.4	50.96542		ppb
- Zn	68	10180.4	50.49869		ppb
- As	75	13852.4	48.82491		ppb
- Se	77	1578	67.20415		ppb
- Se	82	1365.6	51.72072		ppb
> Rh	103	77302.7			ppb
- Ho	165	587508.8			ppb
- Kr	83	50			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date Thursday, June 21, 2018 11:50:38

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	167268.4		ppb
Be	9	22.3	0.02618	ppb
P	31	1626655.9	4934.1557	ppb
Sc	45	114837.5		ppb
Zn	66	431.3	0.53736	ppb
Zn	67	188.3	1.36103	ppb
Zn	68	378	0.21503	ppb
As	75	136.1	-0.0929	ppb
Se	77	535.7	2.70017	ppb
Se	82	-5.1	-0.15326	ppb
Rh	103	87399.2		ppb
Ho	165	675252.9		ppb
Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date Thursday, June 21, 2018 11:52:36

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	166694.4		ppb
Be	9	3.7	-0.00084	ppb
P	31	1629531.5	4946.0963	ppb
Sc	45	114759.2		ppb
Zn	66	987.4	2.1918	ppb
Zn	67	293.7	3.41179	ppb
Zn	68	806.3	2.10642	ppb
As	75	492.7	1.00929	ppb
Se	77	584	4.84155	ppb
Se	82	27.9	0.93852	ppb
Rh	103	88461.9		ppb
Ho	165	676120		ppb
Kr	83	52		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date Thursday, June 21, 2018 11:54:33

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
Li	6	279600.9		ppb
Be	9	297.7	0.25171	ppb
P	31	4149.7	-2.51245	ppb
Sc	45	181439.4		ppb
Zn	66	3488.9	6.03593	ppb
Zn	67	600	5.33275	ppb
Zn	68	2393.1	5.44762	ppb
As	75	321.8	0.12626	ppb
Se	77	978.4	7.48231	ppb
Se	82	15.9	0.35834	ppb
Rh	103	136129.3		ppb
Ho	165	1046807		ppb
Kr	83	51.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date Thursday, June 21, 2018 11:56:31

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
> Li	6	150100			ppb
- Be	9	646	1.0362		ppb
- P	31	9133	21.16916		ppb
> Sc	45	100685			ppb
- Zn	66	578	1.18502		ppb
- Zn	67	162	1.20012		ppb
- Zn	68	514	1.09615		ppb
- As	75	442.3	1.03071		ppb
- Se	77	441.7	0.47121		ppb
- Se	82	23	0.87365		ppb
> Rh	103	78380			ppb
- Ho	165	590990.5			ppb
- Kr	83	46			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
> Li	6	143958			ppb
- Be	9	3.7	-0.00001		ppb
- P	31	2822.5	0.00122		ppb
> Sc	45	93878.6			ppb
- Zn	66	216.3	0.00006		ppb
- Zn	67	103	0.00015		ppb
- Zn	68	280.7	0.00011		ppb
- As	75	141.3	-0.00004		ppb
- Se	77	410.7	0.00315		ppb
- Se	82	-0.4	-0.00023		ppb
> Rh	103	74251.8			ppb
- Ho	165	557874.5			ppb
- Kr	83	51.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date Thursday, June 21, 2018 12:00:06

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
> Li	6	155595.4			ppb
- Be	9	1.3	-0.00409		ppb
- P	31	3744.6	2.11362		ppb
> Sc	45	103687.9			ppb
- Zn	66	769.3	1.41857		ppb
- Zn	67	124.7	-0.08854		ppb
- Zn	68	617.7	1.12274		ppb
- As	75	159.1	-0.05425		ppb
- Se	77	35.7	-23.25084		ppb
- Se	82	6.9	0.23412		ppb
> Rh	103	93230.2			ppb
- Ho	165	602025			ppb
- Kr	83	52			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date Thursday, June 21, 2018 12:02:04

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	161061.1		ppb
T	Be	9	30546	45.93023	ppb
T	P	31	57658.7	178.23308	ppb
V	Sc	45	106652.7		ppb
T	Zn	66	14707.3	40.89717	ppb
T	Zn	67	2273.8	40.36159	ppb
T	Zn	68	9949.3	40.39204	ppb
T	As	75	13851.7	40.15649	ppb
T	Se	77	833.3	15.15623	ppb
T	Se	82	1266.9	39.56179	ppb
V	Rh	103	93776.2		ppb
T	Ho	165	614930.4		ppb
T	Kr	83	60.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date Thursday, June 21, 2018 12:04:02

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	189515.8		ppb
T	Be	9	3.7	-0.00149	ppb
T	P	31	5987.7	6.82158	ppb
V	Sc	45	120701.4		ppb
T	Zn	66	2954.8	6.41419	ppb
T	Zn	67	439	4.64619	ppb
T	Zn	68	2144.1	6.25702	ppb
T	As	75	131.2	-0.19308	ppb
T	Se	77	24	-23.9842	ppb
T	Se	82	-1.1	-0.01481	ppb
V	Rh	103	109228.4		ppb
T	Ho	165	676666.5		ppb
T	Kr	83	58.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date Thursday, June 21, 2018 12:05:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	196662.8		ppb
T	Be	9	35489.5	43.70419	ppb
T	P	31	63540.7	173.1261	ppb
V	Sc	45	120797.8		ppb
T	Zn	66	16871	40.0239	ppb
T	Zn	67	2585.8	39.09717	ppb
T	Zn	68	11565	40.06096	ppb
T	As	75	14221.4	35.1155	ppb
T	Se	77	770	6.68975	ppb
T	Se	82	1163.5	30.98238	ppb
V	Rh	103	109911.8		ppb
T	Ho	165	689560.9		ppb
T	Kr	83	65.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 FH

Sample Date Thursday, June 21, 2018 12:07:58

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	158741			ppb
- Be	9	4.3	0.00044		ppb
- P	31	3337.9	0.91491		ppb
> Sc	45	102123.5			ppb
- Zn	66	39492.2	122.43805		ppb
- Zn	67	5814.3	118.06895		ppb
- Zn	68	26026.5	119.13127		ppb
- As	75	167.9	0.01709		ppb
- Se	77	312.3	-8.43106		ppb
- Se	82	10	0.35898		ppb
> Rh	103	85186.9			ppb
- Ho	165	610579			ppb
- Kr	83	48.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:09:55

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	161364.6			ppb
- Be	9	4	-0.00017		ppb
- P	31	3549.9	1.70484		ppb
> Sc	45	101584			ppb
- Zn	66	40689.1	125.92311		ppb
- Zn	67	5942	120.49295		ppb
- Zn	68	26620.8	121.66997		ppb
- As	75	171.2	0.02823		ppb
- Se	77	305	-8.83748		ppb
- Se	82	25.3	0.88742		ppb
> Rh	103	85335.1			ppb
- Ho	165	612084.2			ppb
- Kr	83	45.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:11:53

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	161418.3			ppb
- Be	9	2.7	-0.00216		ppb
- P	31	3451.9	1.33465		ppb
> Sc	45	101860.4			ppb
- Zn	66	40950.8	125.52844		ppb
- Zn	67	5978.4	120.07176		ppb
- Zn	68	26788	121.26454		ppb
- As	75	137.8	-0.08344		ppb
- Se	77	304	-9.03721		ppb
- Se	82	-0.8	-0.01116		ppb
> Rh	103	86148.9			ppb
- Ho	165	609097.3			ppb
- Kr	83	57.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date Thursday, June 21, 2018 12:13:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	162679.9		ppb
T	Be	9	4	-0.00021	ppb
T	P	31	3298.6	0.93885	ppb
V	Sc	45	100719.5		ppb
T	Zn	66	34094.9	104.78132	ppb
T	Zn	67	4907.8	98.51143	ppb
T	Zn	68	22270.2	100.94223	ppb
T	As	75	133.2	-0.09718	ppb
T	Se	77	288.3	-9.80374	ppb
T	Se	82	-4.7	-0.14726	ppb
V	Rh	103	85822.7		ppb
T	Ho	165	612398.1		ppb
T	Kr	83	52.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date Thursday, June 21, 2018 12:15:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	154259		ppb
T	Be	9	31542.9	49.52161	ppb
T	P	31	56923.8	192.78655	ppb
V	Sc	45	97740.4		ppb
T	Zn	66	47383.5	154.36081	ppb
T	Zn	67	7017.3	150.23223	ppb
T	Zn	68	31143.1	149.98017	ppb
T	As	75	14026.1	47.05976	ppb
T	Se	77	1146.7	38.78819	ppb
T	Se	82	1365.6	49.26072	ppb
V	Rh	103	81189		ppb
T	Ho	165	590131.9		ppb
T	Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 12:17:47

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
V	Li	6	149761.3		ppb
T	Be	9	12.3	0.01379	ppb
T	P	31	2870.5	0.31351	ppb
V	Sc	45	92722		ppb
T	Zn	66	227.3	-0.00311	ppb
T	Zn	67	85.3	-0.52519	ppb
T	Zn	68	256.7	-0.19811	ppb
T	As	75	105.3	-0.15506	ppb
T	Se	77	272.3	-9.28533	ppb
T	Se	82	9	0.3529	ppb
V	Rh	103	78353		ppb
T	Ho	165	568198.3		ppb
T	Kr	83	46.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 12:19:44

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	154910.5			ppb
- Be	9	61804.3	96.64489		ppb
- P	31	280509.9	1004.9433		ppb
> Sc	45	96425			ppb
- Zn	66	28810.6	93.17313		ppb
- Zn	67	4445.1	93.83881		ppb
- Zn	68	19260.1	91.81443		ppb
- As	75	27106.1	91.08014		ppb
- Se	77	2022.4	87.10264		ppb
- Se	82	2682.1	96.34575		ppb
> Rh	103	81491			ppb
- Ho	165	604856.6			ppb
- Kr	83	44.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 FH

Sample Date Thursday, June 21, 2018 12:21:43

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	147740.4			ppb
- Be	9	10.7	0.01132		ppb
- P	31	3211.5	1.63299		ppb
> Sc	45	92435.6			ppb
- Zn	66	27434.7	91.03863		ppb
- Zn	67	3907.6	84.4463		ppb
- Zn	68	17888.7	87.45782		ppb
- As	75	152.1	0.00205		ppb
- Se	77	311	-7.28221		ppb
- Se	82	-7.4	-0.26121		ppb
> Rh	103	79392.2			ppb
- Ho	165	577561.6			ppb
- Kr	83	56			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date Thursday, June 21, 2018 12:23:40

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	151725.6			ppb
- Be	9	6.3	0.00394		ppb
- P	31	12459.4	34.56154		ppb
> Sc	45	96546.8			ppb
- Zn	66	16511.8	52.4517		ppb
- Zn	67	2434.5	49.69462		ppb
- Zn	68	10910.4	50.76084		ppb
- As	75	121.7	-0.11748		ppb
- Se	77	313	-7.83388		ppb
- Se	82	26	0.93736		ppb
> Rh	103	82427.3			ppb
- Ho	165	591948			ppb
- Kr	83	44.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date Thursday, June 21, 2018 12:25:38

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	155497.8			ppb
Be	9	5.3	0.00214		ppb
P	31	12580.8	34.4922		ppb
Sc	45	97623.9			ppb
Zn	66	16710.6	52.65052		ppb
Zn	67	2491.1	50.46827		ppb
Zn	68	11092.8	51.19787		ppb
As	75	85.6	-0.23953		ppb
Se	77	301	-8.61927		ppb
Se	82	29.3	1.04754		ppb
Rh	103	83117.3			ppb
Ho	165	600917.6			ppb
Kr	83	46.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date Thursday, June 21, 2018 12:27:35

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	162208.7			ppb
Be	9	3.7	-0.0007		ppb
P	31	17411.1	48.95686		ppb
Sc	45	102255.1			ppb
Zn	66	14798	44.49029		ppb
Zn	67	2207.4	42.41883		ppb
Zn	68	9799.3	43.04518		ppb
As	75	135.1	-0.09492		ppb
Se	77	253	-11.80652		ppb
Se	82	-2.8	-0.08285		ppb
Rh	103	86876			ppb
Ho	165	616940.5			ppb
Kr	83	57			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date Thursday, June 21, 2018 12:29:33

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	163358.9			ppb
Be	9	31949.1	47.36451		ppb
P	31	71387.8	230.78318		ppb
Sc	45	103296.3			ppb
Zn	66	28406.1	86.66489		ppb
Zn	67	4090.3	81.21158		ppb
Zn	68	18763	84.31071		ppb
As	75	13460.8	42.41731		ppb
Se	77	1003.7	27.53739		ppb
Se	82	1218.6	41.33102		ppb
Rh	103	86323.5			ppb
Ho	165	614041.6			ppb
Kr	83	50.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date Thursday, June 21, 2018 12:31:31

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	166518.3			ppb
Be	9	29901.9	43.49039		ppb
P	31	18203	56.55662		ppb
Sc	45	94763.6			ppb
Zn	66	23148.7	91.76749		ppb
Zn	67	3634.9	94.09572		ppb
Zn	68	15358	89.73018		ppb
As	75	18796.2	77.3551		ppb
Se	77	2518.8	146.19415		ppb
Se	82	1755.7	77.32069		ppb
Rh	103	66473.6			ppb
Ho	165	566229.8			ppb
Kr	83	49.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date Thursday, June 21, 2018 12:33:28

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	172186.1			ppb
Be	9	67047.5	94.30926		ppb
P	31	18659.3	56.47624		ppb
Sc	45	97258.5			ppb
Zn	66	35668.1	139.64115		ppb
Zn	67	5511.6	141.72751		ppb
Zn	68	23887.1	138.223		ppb
As	75	30319.4	123.18302		ppb
Se	77	3236.5	191.5665		ppb
Se	82	2880.8	124.94146		ppb
Rh	103	67494.7			ppb
Ho	165	573951			ppb
Kr	83	41.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date Thursday, June 21, 2018 12:39:20

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	156064.1			ppb
Be	9	70408.7	109.27587		ppb
P	31	60490.1	215.05302		ppb
Sc	45	93626.3			ppb
Zn	66	62714.6	205.94217		ppb
Zn	67	9504.5	205.70842		ppb
Zn	68	42575.9	206.98819		ppb
As	75	26587.9	90.30722		ppb
Se	77	2944.8	140.02309		ppb
Se	82	4192.3	152.24311		ppb
Rh	103	80618.8			ppb
Ho	165	590306.2			ppb
Kr	83	49.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date Thursday, June 21, 2018 12:41:18

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
> Li	6	151016.9		ppb
- Be	9	97719.3	156.72004	ppb
- P	31	59256.5	210.3908	ppb
> Sc	45	93656.4		ppb
- Zn	66	75231	252.30254	ppb
- Zn	67	11351.2	251.27509	ppb
- Zn	68	50769.2	252.26231	ppb
- As	75	39066.7	135.69011	ppb
- Se	77	3611.3	181.50145	ppb
- Se	82	5345.8	198.10778	ppb
> Rh	103	78982.6		ppb
- Ho	165	583556.5		ppb
- Kr	83	53.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 12:43:17

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
> Li	6	145146		ppb
- Be	9	29.7	0.04321	ppb
- P	31	2653.5	-0.3162	ppb
> Sc	45	90989.3		ppb
- Zn	66	218.3	-0.00925	ppb
- Zn	67	77.3	-0.64779	ppb
- Zn	68	261.7	-0.12951	ppb
- As	75	127.3	-0.06197	ppb
- Se	77	251	-10.02138	ppb
- Se	82	-0.7	-0.01121	ppb
> Rh	103	75801.1		ppb
- Ho	165	560669.3		ppb
- Kr	83	46.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 12:45:14

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
> Li	6	151839.2		ppb
- Be	9	61492.9	98.11273	ppb
- P	31	272095.3	997.07193	ppb
> Sc	45	94284.9		ppb
- Zn	66	27466.4	97.86353	ppb
- Zn	67	4209	97.95786	ppb
- Zn	68	18388.1	96.61411	ppb
- As	75	25763.5	95.3629	ppb
- Se	77	1956.7	94.45269	ppb
- Se	82	2506	99.12571	ppb
> Rh	103	74014.4		ppb
- Ho	165	597006.9		ppb
- Kr	83	53.3		ppb

PerkinElmer NexIon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 FH

Sample Date Thursday, June 21, 2018 12:47:13

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
> Li	6	178084.1		ppb
- Be	9	64	0.08075	ppb
- P	31	21295.1	59.55813	ppb
> Sc	45	106117.4		ppb
- Zn	66	1656898.3	4649.3139	ppb
- Zn	67	245293.7	4571.7301	ppb
- Zn	68	1099866.9	4584.6518	ppb
- As	75	719.6	1.56907	ppb
- Se	77	237	-13.67144	ppb
- Se	82	304.6	9.43231	ppb
> Rh	103	94674.3		ppb
- Ho	165	647362.3		ppb
- Kr	83	52.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:49:10

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
> Li	6	172419.6		ppb
- Be	9	33.7	0.04115	ppb
- P	31	29498.1	88.77444	ppb
> Sc	45	103739.1		ppb
- Zn	66	1810497.4	5222.8203	ppb
- Zn	67	265124.4	5080.386	ppb
- Zn	68	1190212	5100.5951	ppb
- As	75	823.6	1.94108	ppb
- Se	77	380.7	-6.30629	ppb
- Se	82	535.2	17.03136	ppb
> Rh	103	92094.3		ppb
- Ho	165	629962.1		ppb
- Kr	83	59.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:51:07

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
> Li	6	177322.8		ppb
- Be	9	36.3	0.04351	ppb
- P	31	29996.3	88.28029	ppb
> Sc	45	106020.4		ppb
- Zn	66	1800710.2	5077.3281	ppb
- Zn	67	267701.3	5013.7591	ppb
- Zn	68	1187635.7	4974.5281	ppb
- As	75	892.1	2.08291	ppb
- Se	77	380	-6.76114	ppb
- Se	82	569.6	17.70826	ppb
> Rh	103	94218.9		ppb
- Ho	165	648929.9		ppb
- Kr	83	49.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date: Thursday, June 21, 2018 12:53:05

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	184846.5			ppb
Be	9	31.3	0.03485		ppb
P	31	19558	52.20774		ppb
Sc	45	108887.3			ppb
Zn	66	1455734.1	3949.7912		ppb
Zn	67	214111.4	3858.5921		ppb
Zn	68	948947.1	3824.6013		ppb
As	75	378.2	0.53954		ppb
Se	77	24	-23.87145		ppb
Se	82	0.9	0.0457		ppb
Rh	103	97919.4			ppb
Ho	165	665254			ppb
Kr	83	54.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date: Thursday, June 21, 2018 12:55:02

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	179351.2			ppb
Be	9	34748.8	46.92214		ppb
P	31	76441	240.61277		ppb
Sc	45	106271.1			ppb
Zn	66	1437798.2	4041.8217		ppb
Zn	67	212304.8	3964.0104		ppb
Zn	68	945521.8	3948.4183		ppb
As	75	13657.8	39.27404		ppb
Se	77	785	12.54075		ppb
Se	82	1230.7	38.13596		ppb
Rh	103	94504.6			ppb
Ho	165	642834			ppb
Kr	83	47.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 FH

Sample Date: Thursday, June 21, 2018 12:57:00

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
Li	6	177917.9			ppb
Be	9	36	0.04287		ppb
P	31	16547.5	44.57939		ppb
Sc	45	104889.3			ppb
Zn	66	1245602.8	3529.8765		ppb
Zn	67	181332.6	3412.8287		ppb
Zn	68	819970.2	3451.4174		ppb
As	75	475.5	0.87364		ppb
Se	77	59.7	-22.10143		ppb
Se	82	58.9	1.85785		ppb
Rh	103	93754.8			ppb
Ho	165	643643.4			ppb
Kr	83	58			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 BH

Sample Date: Thursday, June 21, 2018 12:58:58

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	229405.9			ppb
- Be	9	11	0.00547		ppb
- P	31	98905.3	272.51945		ppb
> Sc	45	122018.8			ppb
- Zn	66	81249.2	190.16531		ppb
- Zn	67	11873.2	182.97369		ppb
- Zn	68	53613.4	185.707		ppb
- As	75	361.3	0.35506		ppb
- Se	77	95.3	-21.16755		ppb
- Se	82	129.3	3.3575		ppb
> Rh	103	113065.1			ppb
- Ho	165	715585.2			ppb
- Kr	83	52			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Thursday, June 21, 2018 13:00:56

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	217680.7			ppb
- Be	9	15.7	0.01124		ppb
- P	31	106766.5	301.2354		ppb
> Sc	45	119579.7			ppb
- Zn	66	145141.8	347.84863		ppb
- Zn	67	21242	338.57314		ppb
- Zn	68	95220.3	338.31044		ppb
- As	75	499.4	0.71901		ppb
- Se	77	150.3	-18.83978		ppb
- Se	82	223.5	5.92839		ppb
> Rh	103	110620.2			ppb
- Ho	165	703141.6			ppb
- Kr	83	61.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Thursday, June 21, 2018 13:02:53

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	212921.8			ppb
- Be	9	16.7	0.01281		ppb
- P	31	104054.8	296.28412		ppb
> Sc	45	118405.1			ppb
- Zn	66	143473.5	344.47103		ppb
- Zn	67	21113.6	335.13282		ppb
- Zn	68	95566.3	340.18369		ppb
- As	75	373.7	0.40793		ppb
- Se	77	170	-18.02499		ppb
- Se	82	204.9	5.4503		ppb
> Rh	103	110419			ppb
- Ho	165	696678.6			ppb
- Kr	83	49.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date Thursday, June 21, 2018 13:04:51

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
V	Li	6	202535.5		ppb
T	Be	9	5.7	0.00059	ppb
T	P	31	74607.5	215.62928	ppb
V	Sc	45	115181.7		ppb
T	Zn	66	64927.5	163.6739	ppb
T	Zn	67	9351.1	154.94794	ppb
T	Zn	68	42058	156.8156	ppb
T	As	75	186.6	-0.03335	ppb
T	Se	77	28	-23.77067	ppb
T	Se	82	14.3	0.41222	ppb
V	Rh	103	104911.7		ppb
	Ho	165	688561.6		ppb
	Kr	83	49.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date Thursday, June 21, 2018 13:06:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
V	Li	6	202405.2		ppb
T	Be	9	35147	42.06419	ppb
T	P	31	128467.2	381.42791	ppb
V	Sc	45	114428.6		ppb
T	Zn	66	75495.2	189.46152	ppb
T	Zn	67	10989.7	181.56363	ppb
T	Zn	68	49851	185.18592	ppb
T	As	75	12338.9	31.71304	ppb
T	Se	77	688.3	4.51941	ppb
T	Se	82	1055	29.32131	ppb
V	Rh	103	105451.3		ppb
	Ho	165	687342.9		ppb
	Kr	83	48.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 13:08:47

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
V	Li	6	156929.3		ppb
T	Be	9	6.3	0.00362	ppb
T	P	31	2571.8	-0.7061	ppb
V	Sc	45	91708.6		ppb
T	Zn	66	202.3	-0.07157	ppb
T	Zn	67	76.3	-0.68755	ppb
T	Zn	68	257	-0.16589	ppb
T	As	75	117.8	-0.09986	ppb
T	Se	77	228	-11.52677	ppb
T	Se	82	1.3	0.06441	ppb
V	Rh	103	76506.9		ppb
	Ho	165	581944.2		ppb
	Kr	83	41.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 13:10:45

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	163638.6			ppb
- Be	9	64904.2	96.06968		ppb
- P	31	281076.7	1000.6377		ppb
> Sc	45	97059.8			ppb
- Zn	66	27723.4	90.05582		ppb
- Zn	67	4153.7	87.97966		ppb
- Zn	68	18519.9	88.66044		ppb
- As	75	26931.2	90.9227		ppb
- Se	77	1856.7	78.41039		ppb
- Se	82	2642.1	95.37193		ppb
> Rh	103	81104.7			ppb
- Ho	165	621335.1			ppb
- Kr	83	48.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 BH

Sample Date Thursday, June 21, 2018 13:15:20

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	219150.9			ppb
- Be	9	5	-0.00065		ppb
- P	31	72978.7	201.65602		ppb
> Sc	45	120092.8			ppb
- Zn	66	55146.4	130.59026		ppb
- Zn	67	8144.7	126.471		ppb
- Zn	68	36489.3	127.65142		ppb
- As	75	303.4	0.22518		ppb
- Se	77	47.3	-23.06058		ppb
- Se	82	37.9	1.00934		ppb
> Rh	103	111542.3			ppb
- Ho	165	716024.7			ppb
- Kr	83	60			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 13:21:15

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
> Li	6	148886.5			ppb
- Be	9	2.7	-0.00182		ppb
- P	31	2407.8	-0.87314		ppb
> Sc	45	87348.3			ppb
- Zn	66	204.3	-0.02773		ppb
- Zn	67	68.7	-0.78271		ppb
- Zn	68	218	-0.30927		ppb
- As	75	103	-0.13389		ppb
- Se	77	222	-11.19678		ppb
- Se	82	-2	-0.06861		ppb
> Rh	103	72755.4			ppb
- Ho	165	562227.7			ppb
- Kr	83	47.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date Thursday, June 21, 2018 13:23:12

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
V	Li	6	155852.2		ppb
T	Be	9	610.7	0.94289	ppb
T	P	31	8164.7	20.63553	ppb
V	Sc	45	91552.3		ppb
T	Zn	66	481.7	0.88911	ppb
T	Zn	67	117.3	0.24389	ppb
T	Zn	68	430.3	0.71556	ppb
T	As	75	334.4	0.67377	ppb
T	Se	77	212.7	-12.49772	ppb
T	Se	82	20.6	0.80059	ppb
V	Rh	103	76942.6		ppb
	Ho	165	586059		ppb
	Kr	83	48.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 13:25:10

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
V	Li	6	154843.8		ppb
T	Be	9	62068.6	97.07677	ppb
T	P	31	266341.8	992.03153	ppb
V	Sc	45	92742.8		ppb
T	Zn	66	26233.1	88.76075	ppb
T	Zn	67	4032.7	89.00826	ppb
T	Zn	68	17745	88.47886	ppb
T	As	75	25613.8	90.07591	ppb
T	Se	77	1814.7	80.28936	ppb
T	Se	82	2590.1	97.3871	ppb
V	Rh	103	77847.7		ppb
	Ho	165	603963.4		ppb
	Kr	83	44.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 13:27:10

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
V	Li	6	151109.6		ppb
T	Be	9	60957.6	97.70412	ppb
T	P	31	257884.3	980.28517	ppb
V	Sc	45	90865.8		ppb
T	Zn	66	25910.1	96.81333	ppb
T	Zn	67	3894	94.99477	ppb
T	Zn	68	17234.3	94.95524	ppb
T	As	75	24193.6	93.9302	ppb
T	Se	77	1816.4	91.31162	ppb
T	Se	82	2317.1	96.15107	ppb
V	Rh	103	70546.1		ppb
	Ho	165	592682.2		ppb
	Kr	83	45.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Date Thursday, June 21, 2018 13:29:17

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	146502.1		ppb
Sc	45	84260.1		ppb
> Rh	103	67604.6		ppb
Ag	107	115.3		ppb
Ag	109	109		ppb
Cd	111	26		ppb
- Cd	114	73.5		ppb
Ho	165	548864.6		ppb
Kr	83	41.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date Thursday, June 21, 2018 13:31:08

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	154808		ppb
Sc	45	89451.8		ppb
> Rh	103	71154.5		ppb
Ag	107	1699.4	1.01611	ppb
Ag	109	1764.1		ppb
Cd	111	938.2	1.02355	ppb
- Cd	114	3105.3	1.04307	ppb
Ho	165	583082.3		ppb
Kr	83	39.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date Thursday, June 21, 2018 13:32:59

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	156832.1		ppb
Sc	45	92777.2		ppb
> Rh	103	72559.1		ppb
Ag	107	165067	104.15659	ppb
Ag	109	177212.9		ppb
Cd	111	93551.2	103.04509	ppb
- Cd	114	305327.6	103.09996	ppb
Ho	165	604535		ppb
Kr	83	36.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date Thursday, June 21, 2018 13:34:50

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	154065.5		ppb
Sc	45	94144.6		ppb
> Rh	103	70726.2		ppb
Ag	107	770579.8	499.16865	ppb
Ag	109	802246.5		ppb
Cd	111	441790.5	499.39093	ppb
- Cd	114	1441153.1	499.37992	ppb
Ho	165	608044		ppb
Kr	83	38.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 13:36:42

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	145200.9		ppb
Sc	45	86158.5		ppb
Rh	103	65168.2		ppb
Ag	107	942.4	0.58479	ppb
Ag	109	903.7		ppb
Cd	111	126	0.12367	ppb
Cd	114	413.2	0.12862	ppb
Ho	165	551514.8		ppb
Kr	83	38.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 13:38:34

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	150053.8		ppb
Sc	45	87194.8		ppb
Rh	103	65320.6		ppb
Ag	107	1713.1	1.12371	ppb
Ag	109	1747.4		ppb
Cd	111	883.5	1.05075	ppb
Cd	114	2910.9	1.0656	ppb
Ho	165	561879.2		ppb
Kr	83	36		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date: Thursday, June 21, 2018 13:40:25

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	138190.8		ppb
Sc	45	84318.3		ppb
Rh	103	62201		ppb
Ag	107	337722.7	248.77938	ppb
Ag	109	348936.4		ppb
Cd	111	197709.5	254.08201	ppb
Cd	114	648308.1	255.43595	ppb
Ho	165	546642.5		ppb
Kr	83	34.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 13:42:17

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Meas. Report Unit
Li	6	148726.8		ppb
Sc	45	90252.6		ppb
Rh	103	66161.4		ppb
Ag	107	152772.8	105.72726	ppb
Ag	109	160486		ppb
Cd	111	85529.2	103.32465	ppb
Cd	114	287218	106.36492	ppb
Ho	165	580957.9		ppb
Kr	83	47.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date Thursday, June 21, 2018 13:44:08

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	142098.1			ppb
Sc	45	84237			ppb
> Rh	103	63200.8			ppb
Ag	107	70739.9	51.21627		ppb
Ag	109	72460.5			ppb
Cd	111	40259.4	50.90615		ppb
- Cd	114	134003	51.94159		ppb
Ho	165	548744.5			ppb
Kr	83	37.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date Thursday, June 21, 2018 13:45:59

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	155192.7			ppb
Sc	45	96451.1			ppb
> Rh	103	70087.4			ppb
Ag	107	140.7	0.01384		ppb
Ag	109	139.7			ppb
Cd	111	25.6	-0.00155		ppb
- Cd	114	88.7	0.00435		ppb
Ho	165	627691.3			ppb
Kr	83	37			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date Thursday, June 21, 2018 13:47:50

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	156307.8			ppb
Sc	45	98834			ppb
> Rh	103	71351.7			ppb
Ag	107	152240.5	97.68816		ppb
Ag	109	157706.9			ppb
Cd	111	499	0.52834		ppb
- Cd	114	1590.4	0.51966		ppb
Ho	165	640133.5			ppb
Kr	83	48			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date Thursday, June 21, 2018 13:49:43

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	152251.2			ppb
Sc	45	84467.5			ppb
> Rh	103	53823.6			ppb
Ag	107	139869.6	118.99567		ppb
Ag	109	141788			ppb
Cd	111	21532.2	31.96142		ppb
- Cd	114	87737.1	39.92709		ppb
Ho	165	508096.7			ppb
Kr	83	38.7			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Dal Thursday, June 21, 2018 13:51:34

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	163211.3		ppb
Sc	45	87895.6		ppb
Rh	103	55802.2		ppb
Ag	107	210606.1	172.88748	ppb
Ag	109	212408.9		ppb
Cd	111	53619.4	76.80042	ppb
Cd	114	211361	92.81371	ppb
Ho	165	529561.8		ppb
Kr	83	41.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Dal Thursday, June 21, 2018 13:57:11

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	197221.1		ppb
Sc	45	114200.3		ppb
Rh	103	104510		ppb
Ag	107	3659.3	1.52628	ppb
Ag	109	3708.9		ppb
Cd	111	75	0.02655	ppb
Cd	114	-2123.5	-0.52469	ppb
Ho	165	689629		ppb
Kr	83	55		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Dal Thursday, June 21, 2018 14:13:08

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	147171.6		ppb
Sc	45	86151.2		ppb
Rh	103	66372		ppb
Ag	107	272894.3	188.29844	ppb
Ag	109	291655.9		ppb
Cd	111	36382.6	43.80073	ppb
Cd	114	120521.1	44.48606	ppb
Ho	165	570332.6		ppb
Kr	83	35		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Dal Thursday, June 21, 2018 14:15:00

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
Li	6	145334.6		ppb
Sc	45	85740.8		ppb
Rh	103	65954.2		ppb
Ag	107	350615.9	243.50278	ppb
Ag	109	369606.8		ppb
Cd	111	36613.2	44.34943	ppb
Cd	114	120894.8	44.8946	ppb
Ho	165	561550.1		ppb
Kr	83	46.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 14:16:53

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	148600.2			ppb
Sc	45	84422.3			ppb
> Rh	103	69775.5			ppb
Ag	107	432.3	0.2054		ppb
Ag	109	380.7			ppb
Cd	111	57.2	0.03513		ppb
- Cd	114	163.7	0.03069		ppb
Ho	165	563634.7			ppb
Kr	83	41.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date Thursday, June 21, 2018 14:18:44

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	152424.9			ppb
Sc	45	84899.3			ppb
> Rh	103	72768.8			ppb
Ag	107	1878.7	1.10478		ppb
Ag	109	2113.1			ppb
Cd	111	1050.6	1.12317		ppb
- Cd	114	3200.1	1.05119		ppb
Ho	165	575807.2			ppb
Kr	83	45			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 14:20:36

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	147390.2			ppb
Sc	45	88611.4			ppb
> Rh	103	66226.3			ppb
Ag	107	152187.7	105.24755		ppb
Ag	109	160841.7			ppb
Cd	111	88362.8	106.67043		ppb
- Cd	114	293878.3	108.78983		ppb
Ho	165	580843.6			ppb
Kr	83	37.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear	Report Unit
Li	6	143958			ppb
- P	31	2822.5			ppb
> Sc	45	93878.6			ppb
- As	75	141.3			ppb
Se	77	410.7			ppb
Se	82	-0.4			ppb
> Rh	103	74251.8			ppb
Ho	165	557874.5			ppb
Kr	83	51.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Thursday, June 21, 2018 11:34:57

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li		6	167105	ppb
	P		31	9710.9	21.38375 ppb
	Sc		45	106329.4	ppb
	As		75	489.4	1.01847 ppb
	Se		77	439	-2.29917 ppb
	Se		82	29.6	1.00692 ppb
	Rh		103	87413.2	ppb
	Ho		165	607499.7	ppb
	Kr		83	56.3	ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Thursday, June 21, 2018 11:36:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li		6	165761.6	ppb
	P		31	321261.1	1045.4818 ppb
	Sc		45	106205.8	ppb
	As		75	30799.3	100.15484 ppb
	Se		77	2425.5	105.05005 ppb
	Se		82	2909.8	101.10746 ppb
	Rh		103	84244	ppb
	Ho		165	616939.9	ppb
	Kr		83	45	ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Thursday, June 21, 2018 11:38:52

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li		6	160840.4	ppb
	P		31	1544265.3	4990.8981 ppb
	Sc		45	107812.7	ppb
	As		75	154753.8	499.969 ppb
	Se		77	9880	498.99659 ppb
	Se		82	14539.5	499.77849 ppb
	Rh		103	85154.4	ppb
	Ho		165	632755.7	ppb
	Kr		83	50.7	ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 11:40:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li		6	143507.3	ppb
	P		31	3100.2	0.84599 ppb
	Sc		45	95435.5	ppb
	As		75	210.6	0.24593 ppb
	Se		77	586.7	10.21472 ppb
	Se		82	12.6	0.5048 ppb
	Rh		103	75333	ppb
	Ho		165	553104.8	ppb
	Kr		83	50	ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date Thursday, June 21, 2018 11:42:48

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	156716.6			ppb
P	31	9508.8	22.65735		ppb
Sc	45	100132.1			ppb
As	75	482.4	1.17993		ppb
Se	77	723	16.86353		ppb
Se	82	22.3	0.85331		ppb
Rh	103	78041			ppb
Ho	165	582788.2			ppb
Kr	83	47			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date Thursday, June 21, 2018 11:44:45

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	148477.6			ppb
P	31	699270.8	2468.828		ppb
Sc	45	98456.9			ppb
As	75	70085.7	248.55395		ppb
Se	77	4754.5	252.12397		ppb
Se	82	6540.1	246.96811		ppb
Rh	103	77497.3			ppb
Ho	165	579451.4			ppb
Kr	83	52.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 11:46:43

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	157892.1			ppb
P	31	309993.7	1033.139		ppb
Sc	45	103702.1			ppb
As	75	29420	100.35171		ppb
Se	77	2420.1	111.1521		ppb
Se	82	2781.7	101.38656		ppb
Rh	103	80308.8			ppb
Ho	165	610751.3			ppb
Kr	83	53			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date Thursday, June 21, 2018 11:48:41

Sample Description:

Concentration Results

Analyte	Mass	Meas. Intens	Conc.	Mear Report	Unit
Li	6	154290.5			ppb
P	31	58772.7	195.43836		ppb
Sc	45	99645.2			ppb
As	75	13852.4	48.82491		ppb
Se	77	1578	67.20415		ppb
Se	82	1365.6	51.72072		ppb
Rh	103	77302.7			ppb
Ho	165	587508.8			ppb
Kr	83	50			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Thursday, June 21, 2018 11:50:38

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	167268.4		ppb
T	P	31	1626655.9	4934.1557	ppb
V	Sc	45	114837.5		ppb
T	As	75	136.1	-0.0929	ppb
T	Se	77	535.7	2.70017	ppb
T	Se	82	-5.1	-0.15326	ppb
V	Rh	103	87399.2		ppb
	Ho	165	675252.9		ppb
	Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Thursday, June 21, 2018 11:52:36

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	166694.4		ppb
T	P	31	1629531.5	4946.0963	ppb
V	Sc	45	114759.2		ppb
T	As	75	492.7	1.00929	ppb
T	Se	77	584	4.84155	ppb
T	Se	82	27.9	0.93852	ppb
V	Rh	103	88461.9		ppb
	Ho	165	676120		ppb
	Kr	83	52		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date: Thursday, June 21, 2018 11:54:33

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	279600.9		ppb
T	P	31	4149.7	-2.51245	ppb
V	Sc	45	181439.4		ppb
T	As	75	321.8	0.12626	ppb
T	Se	77	978.4	7.48231	ppb
T	Se	82	15.9	0.35834	ppb
V	Rh	103	136129.3		ppb
	Ho	165	1046807		ppb
	Kr	83	51.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 11:56:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	150100		ppb
T	P	31	9133	21.16916	ppb
V	Sc	45	100685		ppb
T	As	75	442.3	1.03071	ppb
T	Se	77	441.7	0.47121	ppb
T	Se	82	23	0.87365	ppb
V	Rh	103	78380		ppb
	Ho	165	590990.5		ppb
	Kr	83	46		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
	Li	6	143958			ppb
	P	31	2822.5	0.00122		ppb
>	Sc	45	93878.6			ppb
	As	75	141.3	-0.00004		ppb
	Se	77	410.7	0.00315		ppb
	Se	82	-0.4	-0.00023		ppb
>	Rh	103	74251.8			ppb
	Ho	165	557874.5			ppb
	Kr	83	51.3			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 14:43:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
	Li	6	137691			ppb
	P	31	2350.8	-0.48624		ppb
>	Sc	45	81986.5			ppb
	As	75	112.1	0.01026		ppb
	Se	77	442.3	9.88131		ppb
	Se	82	3.1	0.17111		ppb
>	Rh	103	57320.3			ppb
	Ho	165	538423.9			ppb
	Kr	83	35			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 14:44:45

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
	Li	6	144581.4			ppb
	P	31	256501.4	1017.6215		ppb
>	Sc	45	87099.8			ppb
	As	75	21459.7	97.32006		ppb
	Se	77	1786.1	108.55434		ppb
	Se	82	2086.8	101.13835		ppb
>	Rh	103	60406.9			ppb
	Ho	165	576075.9			ppb
	Kr	83	33.7			ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 FH

Sample Date Thursday, June 21, 2018 14:46:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report	Unit
	Li	6	156975.3			ppb
	P	31	7979.6	18.46844		ppb
>	Sc	45	96181.3			ppb
	As	75	410	0.88823		ppb
	Se	77	230	-11.97123		ppb
	Se	82	302.3	11.09113		ppb
>	Rh	103	79862.7			ppb
	Ho	165	606444.3			ppb
	Kr	83	43.3			ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 FH

Sample Date Thursday, June 21, 2018 14:48:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	160263.1		ppb
>	P	31	7938.3	18.68471	ppb
>	Sc	45	94971.7		ppb
>	As	75	160.4	0.03472	ppb
>	Se	77	21	-23.77796	ppb
>	Se	82	4.6	0.1854	ppb
>	Rh	103	79010.3		ppb
>	Ho	165	601309.2		ppb
>	Kr	83	47.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH

Sample Date Thursday, June 21, 2018 14:50:02

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	202726.5		ppb
>	P	31	53557	161.85816	ppb
>	Sc	45	108476.5		ppb
>	As	75	155.9	-0.08244	ppb
>	Se	77	46	-22.83755	ppb
>	Se	82	30.3	0.92622	ppb
>	Rh	103	97057.1		ppb
>	Ho	165	683778.1		ppb
>	Kr	83	52.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Date Thursday, June 21, 2018 14:51:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	205551.8		ppb
>	P	31	66469.2	198.06365	ppb
>	Sc	45	111272.8		ppb
>	As	75	116.6	-0.19917	ppb
>	Se	77	14.7	-24.30429	ppb
>	Se	82	-6.4	-0.17579	ppb
>	Rh	103	98680.4		ppb
>	Ho	165	691653.1		ppb
>	Kr	83	56		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 14:53:35

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	152147		ppb
>	P	31	2784.8	0.64645	ppb
>	Sc	45	87248.7		ppb
>	As	75	130.9	-0.00505	ppb
>	Se	77	230	-10.00336	ppb
>	Se	82	-5.3	-0.21052	ppb
>	Rh	103	69367.8		ppb
>	Ho	165	581706		ppb
>	Kr	83	42		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date Thursday, June 21, 2018 14:55:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	157175.9		ppb
>	P	31	8469.8	22.84839	ppb
>	Sc	45	88669.3		ppb
>	As	75	323.1	0.71651	ppb
>	Se	77	256	-8.85407	ppb
>	Se	82	24.7	1.02295	ppb
>	Rh	103	71684.6		ppb
>	Ho	165	597138.4		ppb
>	Kr	83	39.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 14:57:06

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	163934.3		ppb
>	P	31	270912.6	1013.5002	ppb
>	Sc	45	92368.3		ppb
>	As	75	24476	90.94526	ppb
>	Se	77	1727.7	80.9151	ppb
>	Se	82	2471.5	98.15579	ppb
>	Rh	103	73710.2		ppb
>	Ho	165	626013.3		ppb
>	Kr	83	42		ppb

PerkinElmer FIMS-100 CVA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2	Cor. Coeff.
Calib Blank	6/18/2018	10:18:46 AM	0.0003108			µg			0.0002852			0.0003363			
STD1 = .004ug	6/18/2018	10:20:29 AM	0.0016067			µg			0.0016231			0.0015904			
STD2 = .04ug	6/18/2018	10:22:12 AM	0.0165419			µg			0.0167294			0.0163543			
STD3 = .08ug	6/18/2018	10:24:07 AM	0.0327106			µg			0.0331139			0.0323072			
STD4 = .16ug	6/18/2018	10:26:02 AM	0.064227			µg			0.0647892			0.0636647			
STD5 = .2ug	6/18/2018	10:27:56 AM	0.0775815			µg			0.0789415			0.0762215			
Reagent Blank	6/18/2018	10:29:49 AM	-1.28E-06	-3.24E-06	-3.24E-06	µg			-2.10E-06	-5.31E-06	-5.31E-06	-4.60E-07	-1.16E-06	-1.16E-06	
0.004ug = DL	6/18/2018	10:31:31 AM	0.0016736	0.0042352	0.0042352	µg			0.0017145	0.0043389	0.0043389	0.0016326	0.0041315	0.0041315	0.99941919
0.080ug = QC STD 2	6/18/2018	10:33:14 AM	0.0289509	0.0732643	0.0732643	µg			0.0293242	0.074209	0.074209	0.0285776	0.0723197	0.0723197	0.99941919
0.080ug = QC STD 2	6/18/2018	10:35:08 AM	0.0315163	0.0797564	0.0797564	µg			0.0318639	0.0806362	0.0806362	0.0311686	0.0788767	0.0788767	0.99941919
Reagent Blank	6/18/2018	10:37:00 AM	-7.34E-05	-0.0001858	-0.0001858	µg			-6.91E-05	-0.000175	-0.000175	-7.77E-05	-0.0001967	-0.0001967	0.99941919
6/18/2018	10:42:21 AM	0.0511265	0.1293861	12.938607	µg	0.05	5		0.0510464	0.1291833	12.918335	0.0512066	0.1295888	12.95888	0.99941919
31368-10	6/18/2018	10:46:07 AM	0.0002902	0.0007377	0.0007377	µg	4	505	0.0003056	0.0007766	0.0007766	0.0002749	0.0006989	0.0006989	0.99941919
31368-2 BH	6/18/2018	10:49:49 AM	0.0007849	0.0019894	0.0019894	µg	4	310	0.0007879	0.0019972	0.0019972	0.0007818	0.0019817	0.0019817	0.99941919
31368-2 BH DUP	6/18/2018	10:51:31 AM	0.0004349	0.0011037	0.0011037	µg	4	310	0.0004366	0.0011082	0.0011082	0.0004331	0.0010993	0.0010993	0.99941919
31368-3 BH	6/18/2018	10:53:14 AM	0.0003628	0.0009214	0.0009214	µg	4	325	0.0003753	0.0009529	0.0009529	0.0003504	0.0008899	0.0008899	0.99941919
31368-3 BH SPK	6/18/2018	10:54:56 AM	0.0310989	0.0787035	0.0787035	µg	4	325	0.0313066	0.079229	0.079229	0.0308913	0.078178	0.078178	0.99941919
0.004ug = DL	6/18/2018	10:56:50 AM	0.0016403	0.0041509	0.0041509	µg			0.0016514	0.0041792	0.0041792	0.0016291	0.0041226	0.0041226	0.99941919
0.080ug = QC STD 2	6/18/2018	10:58:32 AM	0.0310667	0.0786186	0.0786186	µg			0.0311703	0.078881	0.078881	0.030963	0.0783562	0.0783562	0.99941919
Reagent Blank	6/18/2018	11:00:25 AM	-6.66E-05	-0.0001686	-0.0001686	µg			-9.57E-05	-0.0002421	-0.0002421	-3.76E-05	-9.51E-05	-9.51E-05	0.99941919
31368-4 BH	6/18/2018	11:02:07 AM	0.0002971	0.0007551	0.0007551	µg	4	350	0.0003063	0.0007763	0.0007763	0.0002878	0.0007318	0.0007318	0.99941919
31368-5 BH	6/18/2018	11:03:49 AM	0.0001904	0.0004851	0.0004851	µg	4	230	0.0001866	0.0004755	0.0004755	0.0001942	0.0004947	0.0004947	0.99941919
31368-6 BH	6/18/2018	11:05:32 AM	4.93E-05	0.0001281	0.0001281	µg	4	205	0.0001185	0.000303	0.000303	0.0001185	0.000303	0.000303	0.99941919
31368-1 A	6/18/2018	11:07:15 AM	-3.91E-05	-9.58E-05	-9.58E-05	µg	4	200	-4.32E-05	-0.0001061	-0.0001061	-3.51E-05	-8.55E-05	-8.55E-05	0.99941919
31368-2 A	6/18/2018	11:08:59 AM	-4.26E-05	-0.0001044	-0.0001044	µg	4	200	-5.15E-05	-0.0001272	-0.0001272	-3.36E-05	-8.17E-05	-8.17E-05	0.99941919
31368-2 A DUP	6/18/2018	11:10:43 AM	-6.13E-06	-1.23E-05	-1.23E-05	µg	4	200	-1.52E-05	-3.52E-05	-3.52E-05	2.93E-06	1.07E-05	1.07E-05	0.99941919
31368-3 A	6/18/2018	11:12:28 AM	-7.19E-05	-0.0001786	-0.0001786	µg	4	200	-9.08E-05	-0.0002264	-0.0002264	-5.30E-05	-0.0001308	-0.0001308	0.99941919
31368-3 A SPK	6/18/2018	11:14:11 AM	0.03081	0.0779723	0.0779723	µg	4	200	0.0309555	0.0783405	0.0783405	0.0306645	0.0776041	0.0776041	0.99941919
31368-4 A	6/18/2018	11:16:05 AM	-7.47E-05	-0.0001859	-0.0001859	µg	4	200	-5.59E-05	-0.0001383	-0.0001383	-9.35E-05	-0.0002335	-0.0002335	0.99941919
31368-5 A	6/18/2018	11:17:47 AM	-7.42E-05	-0.0001845	-0.0001845	µg	4	200	-9.75E-05	-0.0002435	-0.0002435	-5.09E-05	-0.0001255	-0.0001255	0.99941919
0.004ug = DL	6/18/2018	11:19:30 AM	0.0016301	0.0041253	0.0041253	µg			0.0016526	0.0041821	0.0041821	0.0016077	0.0040686	0.0040686	0.99941919
0.080ug = QC STD 2	6/18/2018	11:21:12 AM	0.0311272	0.0787718	0.0787718	µg			0.0313464	0.0793266	0.0793266	0.0309079	0.0782169	0.0782169	0.99941919
Reagent Blank	6/18/2018	11:23:05 AM	-0.0001088	-0.0002752	-0.0002752	µg			-0.0001264	-0.0003198	-0.0003198	-9.11E-05	-0.0002306	-0.0002306	0.99941919
31368-6 A	6/18/2018	11:24:47 AM	9.70E-05	0.0002488	0.0002488	µg	4	200	9.12E-05	0.0002341	0.0002341	0.0001028	0.0002635	0.0002635	0.99941919
0.004ug = DL	6/18/2018	11:42:45 AM	0.0015948	0.0040357	0.0040357	µg			0.0015787	0.0039952	0.0039952	0.0016108	0.0040763	0.0040763	0.99941919
0.080ug = QC STD 2	6/18/2018	11:44:27 AM	0.0308811	0.0781491	0.0781491	µg			0.0308864	0.0781624	0.0781624	0.0308759	0.0781358	0.0781358	0.99941919
Reagent Blank	6/18/2018	11:46:20 AM	-8.25E-05	-0.0002088	-0.0002088	µg			-0.0001026	-0.0002597	-0.0002597	-6.24E-05	-0.0001579	-0.0001579	0.99941919
Calib Blank	6/19/2018	10:23:29 AM	0.001215			µg			0.0012991			0.0011308			
STD1 = .004ug	6/19/2018	10:25:11 AM	0.0013815			µg			0.0013765			0.0013865			
STD2 = .04ug	6/19/2018	10:26:54 AM	0.0153157			µg			0.015336			0.0152954			
STD3 = .08ug	6/19/2018	10:28:48 AM	0.0306179			µg			0.030669			0.0305688			
STD4 = .16ug	6/19/2018	10:30:42 AM	0.0612889			µg			0.0612872			0.0612706			
STD5 = .2ug	6/19/2018	10:32:36 AM	0.0766977			µg			0.0766077			0.0767878			
Reagent Blank	6/19/2018	10:34:28 AM	-0.000183	-0.0004775	-0.0004775	µg			-0.0002268	-0.0005918	-0.0005918	-0.0001392	-0.0003632	-0.0003632	
0.004ug = DL	6/19/2018	10:36:09 AM	0.0013828	0.0036085	0.0036085	µg			0.0013822	0.003607	0.003607	0.0013834	0.00361	0.00361	0.99999622
0.080ug = QC STD 3	6/19/2018	10:37:52 AM	0.0283737	0.0740426	0.0740426	µg			0.0283633	0.0740154	0.0740154	0.0283842	0.0740699	0.0740699	0.99999622
0.080ug = QC STD 2	6/19/2018	10:39:44 AM	0.0293522	0.076596	0.076596	µg			0.0293403	0.0765649	0.0765649	0.0293641	0.0766271	0.0766271	0.99999622
Reagent Blank	6/19/2018	10:41:37 AM	-0.0001871	-0.0004883	-0.0004883	µg			-0.0002377	-0.0006203	-0.0006203	-0.0001365	-0.0003562	-0.0003562	0.99999622
31368-10	6/19/2018	10:48:57 AM	0.0510971	0.1338178	0.1338178	µg	0.05	5	0.0511403	0.1339306	0.1339306	0.0510538	0.133705	0.133705	0.99999622
31368-10 DUP	6/19/2018	10:48:52 AM	0.050834	0.1331314	0.1331314	µg	0.05	5	0.0508362	0.1331371	0.1331371	0.0508318	0.1331257	0.1331257	0.99999622
31368-10 SPK	6/19/2018	10:50:47 AM	0.0781564	0.2044304	0.2044304	µg	0.05	5	0.0780306	0.2041021	0.2041021	0.0782822	0.2047587	0.2047587	0.99999622
0.004ug = DL	6/19/2018	11:02:04 AM	0.001405	0.0036665	0.0036665	µg			0.0013919	0.0036323	0.0036323	0.0014182	0.0037008	0.0037008	0.99999622
0.080ug = QC STD 2	6/19/2018	11:03:46 AM	0.02921	0.076225	0.076225	µg			0.0291619	0.0760994	0.0760994	0.0292582	0.0763507	0.0763507	0.99999622
Reagent Blank	6/19/2018	11:05:38 AM	-8.86E-05	-0.0002311	-0.0002311	µg			4.37E-05	0.0001142	0.0001142	-0.0002209	-0.0005764	-0.0005764	0.99999622
31368-5 B	6/19/2018	11:09:14 AM	0.0001764	0.0009378	0.0009378	µg	4	500	0.0001851	0.0009605	0.0009605	0.0001677	0.0009152	0.0009152	0.99999622
31368-6 B	6/19/2018	11:10:56 AM	-1.23E-05	0.0004455	0.0004455	µg	4	500	2.41E-05	0.0005044	0.0005044	-4.87E-05	0.0003506	0.0003506	0.99999622
0.004ug = DL	6/19/2018	11:25:44 AM	0.001372	0.0035804	0.0035804	µg			0.0013461	0.0035128	0.0035128	0.0013979	0.003648	0.003648	0.99999622
0.080ug = QC STD 2	6/19/2018	11:27:26 AM	0.0292908	0.0764359	0.0764359	µg			0.0293017	0.0764642	0.0764642	0.02928	0.0764076	0.0764076	0.99999622
Reagent Blank	6/19/2018	11:29:19 AM	-0.0001229	-0.0003207	-0.0003207	µg			-0.0001841	-0.0004805	-0.0004805	-6.16E-05	-0.0001609	-0.0001609	0.99999622
Calib Blank	6/20/2018	9:12:41 AM	0.0002328			µg			0.0002248			0.0002409			
STD1 = .004ug	6/20/2018	9:14:22 AM	0.0013591			µg			0.0013564			0.0013618			
STD2 = .04ug	6/20/2018	9:16:05 AM	0.0134926			µg			0.0135189			0.0134663			
STD3 = .08ug	6/20/2018	9:18:00 AM	0.0269172			µg			0.0269939			0.0268404			
STD4 = .16ug	6/20/2018	9:19:54 AM	0.0540921			µg			0.0543094			0.0538748			
STD5 = .2ug	6/20/2018	9:21:48 AM	0.0670589			µg			0.067114			0.0670037			
Reagent Blank	6/20/2018	9:23:40 AM	2.26E-05	6.73E-05	6.73E-05	µg			1.14E-05	3.38E-05	3.38E-05	3.39E-05	0.0001007	0.0001007	
0.004ug = DL	6/20/2018	9:25:21 AM	0.0013982	0.0041561	0.0041561	µg			0.0014013	0.0041655					

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2	Cor. Coeff.
31368-LRB FH SPK	6/20/2018	10:20:16 AM	0.0252578	0.0750126	4.6882869	µg	1.6	100	0.0253153	0.0751834	4.6989595	0.0252004	0.0748418	4.6776143	0.99997981
31368-1 FH	6/20/2018	10:22:09 AM	0.0006871	0.0019752	0.0493792	µg	4	100	0.0006905	0.0019554	0.0488854	0.0006937	0.0019949	0.049873	0.99997981
31368-2 FH	6/20/2018	10:23:51 AM	0.0010339	0.0030059	0.0751486	µg	4	100	0.0010163	0.0029537	0.0738428	0.0010514	0.0030582	0.0764545	0.99997981
31368-2 FH DUP	6/20/2018	10:25:34 AM	0.0010568	0.0030742	0.0768551	µg	4	100	0.0010419	0.0030297	0.0757425	0.0010718	0.0031187	0.0779678	0.99997981
31368-3 FH	6/20/2018	10:27:17 AM	0.0011456	0.0033381	0.0834526	µg	4	100	0.0011486	0.003347	0.0836739	0.0011426	0.0033293	0.0832313	0.99997981
31368-3 FH SPK	6/20/2018	10:29:00 AM	0.0318873	0.0947188	2.3679703	µg	4	100	0.0319312	0.0948493	2.3712325	0.0318434	0.0945883	2.3647081	0.99997981
31368-4 FH	6/20/2018	10:30:54 AM	0.0005225	0.0014859	0.0371475	µg	4	100	0.0005278	0.0015017	0.0375429	0.0005172	0.0014701	0.0367521	0.99997981
31368-5 FH	6/20/2018	10:32:38 AM	0.0002848	0.0007794	0.0194854	µg	4	100	0.0002839	0.0007785	0.0194126	0.0002858	0.0007823	0.0195582	0.99997981
31368-6 FH	6/20/2018	10:34:22 AM	0.0004788	0.001356	0.0338998	µg	4	100	0.0004768	0.00135	0.0337512	0.0004808	0.0013619	0.0340484	0.99997981
0.004ug = DL	6/20/2018	10:37:58 AM	0.0015919	0.0047318	0.0047318	µg			0.0016049	0.0047705	0.0047705	0.0015788	0.0046931	0.0046931	0.99997981
0.080ug = QC STD 2	6/20/2018	10:39:40 AM	0.0285349	0.084821	0.084821	µg			0.0285812	0.0849585	0.0849585	0.0284886	0.0846835	0.0846835	0.99997981
Reagent Blank	6/20/2018	10:41:32 AM	0.0001354	0.0004024	0.0004024	µg			0.0001435	0.0004264	0.0004264	0.0001273	0.0003784	0.0003784	0.99997981
Calib Blank	6/20/2018	11:05:19 AM	0.0005793			µg			0.0002706			0.000888			
STD1 = .004ug	6/20/2018	11:07:02 AM	0.0019935			µg			0.0020501			0.0019369			
STD2 = .04ug	6/20/2018	11:08:44 AM	0.0163529			µg			0.0163667			0.0163391			
STD3 = .08ug	6/20/2018	11:10:39 AM	0.0320206			µg			0.0321378			0.0319033			
STD4 = .16ug	6/20/2018	11:12:34 AM	0.063096			µg			0.0630141			0.0631778			
STD5 = .2ug	6/20/2018	11:14:27 AM	0.0782141			µg			0.0781116			0.0783165			
Reagent Blank	6/20/2018	11:16:19 AM	0.0003454	0.0008779	0.0008779	µg			0.0003158	0.0008027	0.0008027	0.000375	0.0009531	0.0009531	
0.004ug = DL	6/20/2018	11:18:01 AM	0.0018703	0.0047536	0.0047536	µg			0.0018805	0.0047796	0.0047796	0.0018601	0.0047276	0.0047276	0.99986748
0.080ug = QC STD 2	6/20/2018	11:19:43 AM	0.0300584	0.0763958	0.0763958	µg			0.0300879	0.0764707	0.0764707	0.0300289	0.0763208	0.0763208	0.99986748
0.080ug = QC STD 2	6/20/2018	11:21:36 AM	0.0299669	0.0761631	0.0761631	µg			0.0298781	0.0759374	0.0759374	0.0300557	0.0763888	0.0763888	0.99986748
Reagent Blank	6/20/2018	11:23:28 AM	0.0003718	0.000945	0.000945	µg			0.0003477	0.0008837	0.0008837	0.0003959	0.0010063	0.0010063	0.99986748
0.004ug = DL	6/20/2018	12:32:28 PM	0.0018329	0.0046584	0.0046584	µg			0.0018454	0.0046903	0.0046903	0.0018204	0.0046266	0.0046266	0.99986748
0.080ug = QC STD 2	6/20/2018	12:34:10 PM	0.0321148	0.0816222	0.0816222	µg			0.0323356	0.0821833	0.0821833	0.0318941	0.0810612	0.0810612	0.99986748
Reagent Blank	6/20/2018	12:36:02 PM	0.0001575	0.0004004	0.0004004	µg			0.0001806	0.000459	0.000459	0.0001345	0.0003418	0.0003418	0.99986748
31368-2 C	6/20/2018	12:43:27 PM	0.0391313	0.0985774	19.175484	µg	2	400	0.0392966	0.0989975	19.799505	0.0389661	0.0981573	19.631463	0.99986748
31368-2 C DUP	6/20/2018	12:45:22 PM	0.0379677	0.09562	19.124002	µg	2	400	0.0377195	0.0949892	18.997842	0.0382159	0.0962508	19.250163	0.99986748
31368-3 C	6/20/2018	12:47:18 PM	0.0400097	0.1008099	100.80989	µg	0.4	400	0.0400159	0.1008255	100.82554	0.0400036	0.1007942	100.79424	0.99986748
31368-3 C SPK	6/20/2018	12:49:13 PM	0.0720337	0.1822014	182.20138	µg	0.4	400	0.0723684	0.1830518	183.05184	0.0718991	0.1813509	181.35091	0.99986748
0.004ug = DL	6/20/2018	12:51:06 PM	0.0018594	0.0047258	0.0047258	µg			0.0018475	0.0046955	0.0046955	0.0018713	0.0047561	0.0047561	0.99986748
0.080ug = QC STD 2	6/20/2018	12:52:48 PM	0.0317486	0.0806916	0.0806916	µg			0.031729	0.0806418	0.0806418	0.0317682	0.0807414	0.0807414	0.99986748
Reagent Blank	6/20/2018	12:54:41 PM	0.0002111	0.0005364	0.0005364	µg			0.0002168	0.0005511	0.0005511	0.0002053	0.0005218	0.0005218	0.99986748
Calib Blank	6/21/2018	10:45:40 AM	0.0002303			µg			0.0002167			0.0002438			
STD1 = .004ug	6/21/2018	10:47:22 AM	0.0014462			µg			0.001486			0.0014064			
STD2 = .04ug	6/21/2018	10:49:05 AM	0.0150542			µg			0.0153235			0.0147849			
STD3 = .08ug	6/21/2018	10:50:59 AM	0.0291811			µg			0.0295606			0.0288017			
STD4 = .16ug	6/21/2018	10:52:54 AM	0.0607169			µg			0.0616011			0.0598328			
STD5 = .2ug	6/21/2018	10:54:49 AM	0.0743148			µg			0.075114			0.0735157			
Reagent Blank	6/21/2018	10:56:41 AM	-6.60E-05	-0.0001765	-0.0001765	µg			-6.89E-05	-0.0001843	-0.0001843	-6.31E-05	-0.0001688	-0.0001688	
0.004ug = DL	6/21/2018	10:58:23 AM	0.0014443	0.0038629	0.0038629	µg			0.0014635	0.0039142	0.0039142	0.0014251	0.0038116	0.0038116	0.99979153
0.080ug = QC STD 2	6/21/2018	11:00:06 AM	0.0276693	0.0740037	0.0740037	µg			0.0280462	0.0750118	0.0750118	0.0272923	0.0729956	0.0729956	0.99979153
0.080ug = QC STD 2	6/21/2018	11:05:44 AM	0.0286836	0.0767167	0.0767167	µg			0.0288845	0.0772539	0.0772539	0.0284828	0.0761796	0.0761796	0.99979153
Reagent Blank	6/21/2018	11:07:37 AM	-6.74E-05	-0.0001802	-0.0001802	µg			-6.56E-05	-0.0001754	-0.0001754	-6.92E-05	-0.0001851	-0.0001851	0.99979153
31368-1 B	6/21/2018	11:20:26 AM	0.0034082	0.0092921	23.23029	µg	0.02	500	0.003399	0.0092675	23.168806	0.0034174	0.0093167	23.291775	0.99979153
31368-3 B	6/21/2018	11:22:10 AM	0.0030445	0.0083193	20.798197	µg	0.02	500	0.0029965	0.008191	20.477598	0.0030924	0.0084475	21.16797	0.99979153
31368-3 B SPK	6/21/2018	11:23:53 AM	0.0301869	0.0809139	202.2847	µg	0.02	500	0.0298943	0.0801313	200.2822	0.0304795	0.0816965	204.2119	0.99979153
0.004ug = DL	6/21/2018	11:27:40 AM	0.0013639	0.0036478	0.0036478	µg			0.0013775	0.0036842	0.0036842	0.0013502	0.0036113	0.0036113	0.99979153
0.080ug = QC STD 2	6/21/2018	11:33:08 AM	0.0282898	0.0756634	0.0756634	µg			0.0284427	0.0760724	0.0760724	0.0281369	0.0752543	0.0752543	0.99979153
Reagent Blank	6/21/2018	11:35:01 AM	-7.60E-05	-0.0002033	-0.0002033	µg			-7.84E-05	-0.0002097	-0.0002097	-7.38E-05	-0.0001968	-0.0001968	0.99979153

elementOne

Hg-Data 2 of 2

e 31368-Hg
B-274

64.2

R10004151



June 21, 2018

Ben Hilgendorf
Montrose Environmental Services
1371 Brummel Ave.
Elk Grove Village, IL 60007

Enclosed is your final report for ERA's Stationary Source Audit Sample (SSAS) Program. Your final report includes an evaluation of all results submitted by your laboratory to ERA.

Data Evaluation Protocols: All analytes in ERA's SSAS Program have been evaluated comparing the reported result to the acceptance limits generated using the criteria contained in the TNI SSAS Table.

For any "Not Acceptable" results, please contact your state regulator for any corrective action requirements.

Thank you for your participation in ERA's SSAS Program. If you have any questions, please contact our Proficiency Testing Department at 1-800-372-0122.

Sincerely,

Matthew Seebeck
Quality Officer

cc: Project File Number 061318S



A Waters Company

Recipient Type	Report Recipient	Contact	Project ID
Agency	IL EPA Des Plaines (SSAS) 9511 Harrison Street Des Plaines, IL 60016 USA	Kevin Mattison kevin.mattison@illinois.gov Phone: 847-294-4019	
Facility	General Iron Industries 1909 N Clifton Ave Chicago, IL 60614 USA	John Pinion jpinion@rka-inc.com Phone: 630-393-9000 x 208	
Lab	Element One Inc 6319-D Carolina Beach Road Wilmington, NC 28412 USA	Paula Smith paula.smith@e1lab.com Phone: 910-793-0128	
Tester	Montrose Environmental Services 1371 Brummel Ave. Elk Grove Village, IL 60007 USA	Ben Hilgendorf bhilgendorf@montrose-env.com Phone: 630-860-4740	General Iron Industries



Project #: 061318S





A Waters Company.

061318S Laboratory Exception Report

Paula Smith
 Element One Inc
 6319-D Carolina Beach Road
 Wilmington, NC 28412
 910-793-0128

EPA ID:
 ERA Customer Number:

Not Reported
 E533235

Evaluation Checks

There are no values reported with < where the assigned value was greater than 0.

Not Acceptable Evaluations

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
<i>SSAP Metals on Filter Paper (cat# 1425, lot# 061318S) Study Dates: 06/13/18 - 06/21/18</i>							
1030	Cadmium	µg/Filter	16.0	20.6	16.5 - 24.7	Not Acceptable	EPA Method 29.2000

B-277





Final Report Results For Laboratory Element One Inc

B-278

R 000419



Q1000455



A Waters Company

SSAP Evaluation Report

Project Number: **061318S**

ERA Customer Number: **E533235**

Laboratory Name: **Element One Inc**

B-279

Inorganic Results

G10000456



R 000420



A Waters Company

061318S Evaluation Final Complete Report

Paula Smith
Element One Inc
6319-D Carolina Beach Road
Wilmington, NC 28412
910-793-0128

EPA ID:
ERA Customer Number:

Not Reported
E533235

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
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SSAP Metals in Impinger Solution (cat# 1426, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1005	Antimony	µg/mL	0.896	1.05	0.788 - 1.31	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1010	Arsenic	µg/mL	1.13	1.20	0.900 - 1.50	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1015	Barium	µg/mL	3.28	3.19	2.39 - 3.99	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1020	Beryllium	µg/mL	1.41	1.40	1.05 - 1.75	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1030	Cadmium	µg/mL	1.07	1.06	0.848 - 1.27	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1040	Chromium	µg/mL	4.05	3.99	3.19 - 4.79	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1050	Cobalt	µg/mL	2.02	1.99	1.49 - 2.49	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1055	Copper	µg/mL	3.74	3.83	2.87 - 4.79	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1075	Lead	µg/mL	2.96	2.94	2.20 - 3.68	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1090	Manganese	µg/mL	1.86	1.96	1.47 - 2.45	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1105	Nickel	µg/mL	2.65	2.74	2.19 - 3.29	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1140	Selenium	µg/mL	1.90	1.97	1.48 - 2.46	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1150	Silver	µg/mL	4.71	4.77	3.58 - 5.96	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1165	Thallium	µg/mL	3.02	3.06	2.30 - 3.82	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1190	Zinc	µg/mL	2.86	2.84	2.13 - 3.55	Acceptable	EPA Method 20.2000	6/19/2018	DMR

R 000421



61000457



A Waters Company

061318S Evaluation Final Complete Report

Paula Smith
Element One Inc
6319-D Carolina Beach Road
Wilmington, NC 28412
910-793-0128

EPA ID:
ERA Customer Number:

Not Reported
E533235

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
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SSAP Metals on Filter Paper (cat# 1425, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1005	Antimony	µg/Filter	40.7	42.5	31.9 - 53.1	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1010	Arsenic	µg/Filter	38.7	39.7	29.8 - 49.6	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1015	Barium	µg/Filter	39.7	41.8	31.4 - 52.2	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1020	Beryllium	µg/Filter	21.7	21.6	16.2 - 27.0	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1030	Cadmium	µg/Filter	16.0	20.6	16.5 - 24.7	Not Acceptable	EPA Method 20.2000	6/19/2018	DMR
1040	Chromium	µg/Filter	26.7	28.2	22.6 - 33.8	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1050	Cobalt	µg/Filter	23.1	22.1	16.6 - 27.6	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1055	Copper	µg/Filter	30.2	30.9	23.2 - 38.6	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1075	Lead	µg/Filter	35.9	36.9	29.5 - 44.3	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1090	Manganese	µg/Filter	41.6	42.9	34.3 - 51.5	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1105	Nickel	µg/Filter	38.6	38.3	30.6 - 46.0	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1140	Selenium	µg/Filter	38.7	40.7	30.5 - 50.9	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1150	Silver	µg/Filter	59.5	57.2	40.0 - 74.4	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1165	Thallium	µg/Filter	53.8	55.5	41.6 - 69.4	Acceptable	EPA Method 20.2000	6/19/2018	DMR
1190	Zinc	µg/Filter	45.9	45.2	33.9 - 56.5	Acceptable	EPA Method 20.2000	6/19/2018	DMR

SSAP Mercury on Filter Paper (cat# 1427, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1095	Mercury	µg/Filter	16.2	18.3	13.7 - 22.9	Acceptable	EPA Method 20.2000	6/20/2018	MMP
------	---------	-----------	------	------	-------------	------------	--------------------	-----------	-----

SSAP Mercury in Impinger Solution (cat# 1428, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1095	Mercury	ng/mL	13.3	15.1	11.3 - 18.9	Acceptable	EPA Method 20.2000	6/19/2018	MMP
------	---------	-------	------	------	-------------	------------	--------------------	-----------	-----



General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM
Protected by the Attorney Client Privilege and Attorney Work Product Doctrine

APPENDIX G CALIBRATION DATA

Montrose Air Quality Services, LLC
Meter Box Full Test Calibration

Date: 1/30/2018

Operator: J Burton

Meter Box ID	M-39	Meter Box $\Delta H@$	1.899	Meter Box Y_d	0.9987	Barometric Pressure (In. Hg.)	29.70								
Time	Orifice Data			Meter Box Data								Results			
θ (min)	K	Vacuum	T_{amb}	V_{cr}	V_{Inlet}	V_{out}	V_d	ΔH	T_i	T_o	T_{avg}	V_{std}	Q	Y_d	$\Delta H@$
5.0	0.7904	18.0	69	5.103	581.80	566.77	5.17	3.60	79	72	76.5	5.103	1.021	1.000	1.942
5.0	0.7904	18.0	69	5.103	586.77	571.93	5.18	3.60	81	73	77.0	5.079	1.021	1.0048	1.955
5.0	0.7904	18.0	69	5.103	571.83	577.11	5.18	3.60	82	73	77.5	5.094	1.021	1.0018	1.941
5.0	0.5959	20.0	69	3.847	579.00	582.89	3.89	2.00	82	74	78.0	3.807	0.769	1.0107	1.914
5.0	0.5959	20.0	69	3.847	582.89	586.78	3.89	2.00	82	75	78.5	3.803	0.769	1.0116	1.916
5.0	0.5959	20.0	69	3.847	586.78	590.67	3.89	2.00	82	75	78.5	3.803	0.769	1.0116	1.916
5.0	0.4418	22.0	69	2.852	591.60	594.56	2.90	1.10	81	76	78.5	2.888	0.570	0.9876	1.820
5.0	0.4418	22.0	69	2.852	594.56	597.53	2.97	1.10	81	77	79.0	2.895	0.570	0.9854	1.810
5.0	0.4418	22.0	69	2.852	597.53	600.48	2.95	1.10	81	77	79.0	2.875	0.570	0.9921	1.834
5.0	0.3452	24.0	69	2.229	600.90	603.20	2.30	0.70	80	77	78.5	2.242	0.446	0.9943	1.918
5.0	0.3452	24.0	69	2.229	603.20	605.51	2.31	0.70	80	77	78.5	2.251	0.446	0.9900	1.902
5.0	0.3452	24.0	69	2.229	605.51	607.81	2.30	0.70	80	77	78.5	2.242	0.446	0.9943	1.918
5.0				0.000			0.00				#DIV/0!	#DIV/0!	0.000	#DIV/0!	#DIV/0!
5.0				0.000			0.00				#DIV/0!	#DIV/0!	0.000	#DIV/0!	#DIV/0!
5.0				0.000			0.00				#DIV/0!	#DIV/0!	0.000	#DIV/0!	#DIV/0!
													Average	0.9987	1.899

B-283

Nomenclature	
K	Critical Orifice Coefficient
T_{amb}	Ambient Temperature ($^{\circ}F$)
V_{cr}	Volume Through Orifice (scf)
V_d	Gas Meter Volume (ft ³)
ΔH	Orifice Pressure Differential (In. H ₂ O)
T_i	Meter Inlet Temperature ($^{\circ}F$)
T_o	Meter Outlet Temperature ($^{\circ}F$)
T_{avg}	Average Meter Box Temperature ($^{\circ}F$)
V_{std}	Volume Metered Standardized (scf)
Q	Flow Rate (scfm)
Y_d	Meter Correction Factor (dimensionless)
$\Delta H@$	ΔH yielding 0.75 scfm

Vacuum Gauge (In. Hg.)		Thermometers ($^{\circ}F$)			Equations
Standard	Vacuum Gauge	Standard	Ch. No.	Ch. No.	
5	5.0	32	1	2	
10	10.0	50	32	32	
15	15.0	100	51	51	
20	20.0	150	101	101	
25	25.0	212	151	151	
		250	213	213	
		300	251	252	
		350	301	302	
		400	351	352	
		500	401	402	
		600	501	502	
			601	602	

R 000424

GI0000460

Montrose Air Quality Services, LLC

Meter Post Calibration

Average Field Sample Rate (cfm)	1.600	Date	6/18/2018
Highest Field Vacuum (Inches Hg)	11	Client	Iron Ind. Inc.
Critical Orifice ID	AA-63	Project No.	023AS-383040
Orifice Flow Rate (cfm)	0.790	Meter ID	M-39

	Run 1	Run 2	Run 3
Initial Volume (ft ³)	211.40	215.35	219.30
Final Volume (ft ³)	215.35	219.30	223.25
Volume Metered (ft ³)	3.95	3.95	3.95
DGM Inlet Temperature (°F)	83	84	85
DGM Outlet Temperature (°F)	78	78	79
Average DGM Temperature (°F)	80.5	81.0	82.0
Ambient Temperature (°F)	73	73	73
Elapsed Time (min.)	5	5	5
ΔH (inches H ₂ O)	2.00	2.00	2.00
Barometric Pressure (Inches Hg)	29.14	29.14	29.14
Pump Vacuum (inches Hg)	21	21	21
K'	0.5909	0.5909	0.5909
V _{cr} (ft ³)	3.729	3.729	3.729
V _{mstd} (ft ³)	3.776	3.772	3.765
Post Test Yc	0.9877	0.9886	0.9905
Full Test Yd	0.9987	0.9987	0.9987
% Difference	1.10	1.01	0.82
Average % Difference			0.98

Montrose Air Quality Services, LLC S-Type Pitot Tube Inspection Form

Date 3/9/18
 Pitot ID AE5-6-7
 Operator DD

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.356	NA
Base To Opening Distance - Pb (inches)	0.356	NA
Pa/Dt	1.42	1.05-1.50
Pb/Dt	1.42	1.05-1.50
Angle $\alpha 1$ ($^{\circ}$)	0.3	10
Angle $\alpha 2$ ($^{\circ}$)	0.7	10
Angle B1 ($^{\circ}$)	1.3	5
Angle B2 ($^{\circ}$)	0.7	5
Opening to Opening Distance Pa+Pb (inches)	0.712	NA
Angle Z ($^{\circ}$)	0.9	NA
z (inches)	0.0112	0.125
Angle W ($^{\circ}$)	0.1	NA
w (inches)	0.001	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes

If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle (inches)	NA	0.75 in.
Pitot to Thermocouple Distance (inches)	2.25	2 in.
Pitot to Sample Probe Distance (inches)	6.25	3 in.

Does the Pitot Tube Meet the Above Requirements Yes

Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned

If No to Either, then the Pitot Tube Must be Calibrated

MONTROSE AIR QUALITY SERVICES, LLC

Nozzle Calibration Datasheet

Client	Fanon Industries Inc	Job No.	451732
Plant	Chicago, IL		

	Nozzle 1	Nozzle 2	Nozzle 3
Date	6/13/18		
Nozzle ID	.17		
Operator	BA		
Test Location	Hammer Mill Shredder		
Run Number (s)	1, 2, 3, 4, 5		
Diameter 1	.170		
Diameter 2	.168		
Diameter 3	.171		
Average	.170		

	Nozzle 4	Nozzle 5	Nozzle 6
Date			
Nozzle ID			
Operator			
Test Location			
Run Number (s)			
Diameter 1			
Diameter 2			
Diameter 3			
Average			

Notes:

Measurements must be made to the nearest 0.001 inches.

Three different diameters should be measured.

The difference between the high and low measurement must be less than 0.004 inches.

Signed



Date

6/13/18

Airgas.**CERTIFICATE OF ANALYSIS****Grade of Product: EPA Protocol**

Part Number: E03NI74E15A2VT6 Reference Number: 54-124542331-1
 Cylinder Number: XC025171B Cylinder Volume: 149.0 CF
 Laboratory: ASG - Chicago - IL Cylinder Pressure: 2015 PSIG
 PGVP Number: B12016 Valve Outlet: 590
 Gas Code: CO2,O2,BALN Certification Date: Mar 08, 2016

Expiration Date: Mar 08, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	5.000 %	4.885 %	G1	+/- 1.0% NIST Traceable	03/08/2016
OXYGEN	21.00 %	20.95 %	G1	+/- 0.5% NIST Traceable	03/08/2016
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	97050816	SG9167530BAL	7.029 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	May 01, 2016
NTRM	12082016	CC367570	22.88 % OXYGEN/NITROGEN	+/- 0.2%	Apr 24, 2018

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Feb 16, 2016
O2-1 HORIBA MPA-510 3VUYL8NR	Paramagnetic	Feb 16, 2016

Triad Data Available Upon Request




 Approved for Release



Airgas Specialty Gases
 Airgas USA, LLC
 12722 S. Wentworth Ave.
 Chicago, IL 60628
 Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E03NI80E15A0138	Reference Number: 54-401086478-1
Cylinder Number: CC187397	Cylinder Volume: 150.9 CF
Laboratory: 124 - Chicago (SAP) - IL	Cylinder Pressure: 2015 PSIG
PGVP Number: B12017	Valve Outlet: 590
Gas Code: CO2,O2,BALN	Certification Date: Dec 26, 2017

Expiration Date: Dec 26, 2025

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	10.00 %	9.859 %	G1	+/- 0.9% NIST Traceable	12/26/2017
OXYGEN	10.00 %	9.971 %	G1	+/- 0.8% NIST Traceable	12/26/2017
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12081358	CC361050	11.002 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 11, 2018
NTRM	98051005	SG8181123BAL	12.05 % OXYGEN/NITROGEN	+/- 0.7%	Dec 14, 2023

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Dec 03, 2017
O2-1 HORIBA MPA-510 3VUJL9NR	Paramagnetic	Dec 03, 2017

Triad Data Available Upon Request



 Approved for Release

General Iron Industries: Chicago, Illinois
Hammermill Shredder PM and TSM

Protected by the Attorney Client Privilege and Attorney Work Product Doctrine

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If you have any questions, please contact one of the following individuals by email or phone.

Name: Mr. Matthew Libman
Title: District Manager
Region: Great Lakes Region
Email: mllibman@Montrose-env.com
Phone: (630) 860-4740

Name: Mr. Michael Hess
Title: Client Project Manager
Region: Great Lakes Region
Email: mhess@Montrose-env.com
Phone: (630) 860-4740





**Construction Permit Application for New
Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

September 20, 2019

APPENDIX C

**INSTITUTE OF SCRAP RECYCLING INDUSTRIES
TITLE V WORKBOOK
SELECT EMISSION FACTOR TABLES**

Versar inc.

Title V Applicability

Workbook

Prepared for:

INSTITUTE OF SCRAP RECYCLING INDUSTRIES, INC.

1325 G Street, NW
Washington, DC 20005-3104
(202) 737-1770



Prepared by:

Versar, Inc.
200 West 22nd Street, Suite 250
Lombard, IL 60148

© 1996 Institute of Scrap Recycling Industries
Second Printing, 1998

Table D-9. Conveyor Transfer Point Emission Factors⁽¹⁾⁽²⁾

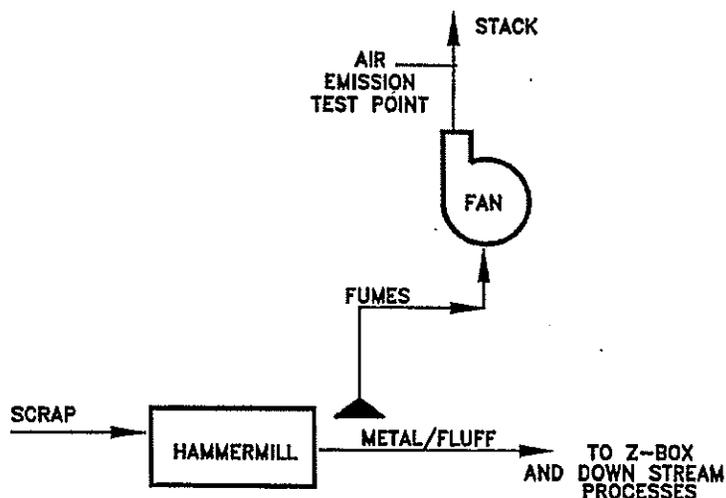
	Total PM ⁽³⁾	Criteria Air Pollutant Factors (lb pollutant/ton transferred)						Hazardous Air Pollutant Factors (lb pollutant/ton transferred)
		PM-10 (Incl. in total PM)	NO _x	VOC	CO	SO ₂	Lead (included in total PM)	HAP
Dry Operation	no data ⁽⁴⁾	0.0014	0.0	0.0	0.0	0.0	no data	no data
Wet Operation	no data ⁽⁴⁾	0.00048	0.0	0.0	0.0	0.0	no data	no data

⁽¹⁾ Emission factors applicable to conveyor transfer points for scrap in feed materials or products are not available. A conservative estimate of PM-10 emissions can be made using emission factors derived from the handling of crushed stone products. The factors in this table were adapted from AP-42, Crushed Stone Processing, Section 11.19.2, Table 11.19.2-2 for uncontrolled and controlled transfer points.

⁽²⁾ Note: Some states classify transfer points as fugitive sources. In the case that they are considered fugitive, transfer point emissions would not be included in determining major source classification. However, contact your state or local Agency to verify whether transfer point emissions are considered fugitive or point source.

⁽³⁾ Recent EPA guidance states that only PM₁₀ is to be included for Title V applicability. However, individual states may require reporting total PM.

⁽⁴⁾ Emission factors available for PM-10 only. Guidance in AP-42, Section 11.19.2 indicates that total PM may be estimated by multiplying the PM-10 factor by 2.1.



VOC's	HAP?	Emission Rate (lb/hr)	Emission Factor (lb/ton feed)
Methylene Chloride	Yes	0.009	0.00006
Acetone (1)	No	0.002	0.0000133
1,1-Dichloroethane	No	0.002	0.0000133
2-Butanone (MEK)	Yes	0.0008	0.00000533
1,1,1-Trichloroethane	Yes	0.03	0.0002
Benzene	Yes	0.05	0.0004
Tetrachloroethane	Yes	0.0004	0.00000267
Trichloroethane	Yes	0.01	0.0000667
Toluene	Yes	0.05	0.000333
Ethylbenzene	Yes	0.01	0.0000667
Styrene	Yes	0.002	0.0000133
O-Xylene	Yes	0.01	0.0000667
M-/P-Xylene	Yes	0.02	0.000133
Total VOC's		0.2042	0.00136
Total PCB's	Yes	0.0131	0.0000873
Metals			
Cadmium	Yes	0.000174	0.00000116
Chromium	Yes	0.000192	0.00000128
Lead	Yes	0.00118	0.00000789
Total Metals		0.001546	0.0014456

Total HAPs (VOC, PCB, Metals)	0.214846	0.00143
-------------------------------	----------	---------

3 Run Average Total Hydrocarbon (THC) = 7.53 lb/hr (1) = DELISTED AS A VOC PER USEPA GUIDANCE

% of THC that is VOC = 2.71%

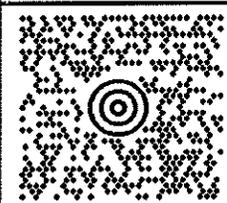
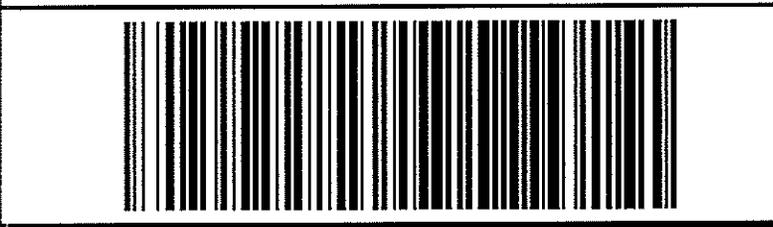
% of THC that is HAP = 2.85%

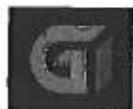
FEED MIX - 75% AUTO BODIES, 25% MIXED SCRAP AND WHITE GOODS.
 ALL AUTO BODIES HAVE BATTERIES, GAS TANKS, TIRES, RADIATORS, AND TRANSMISSIONS REMOVED. ABOUT 50% OF AUTO BODIES HAVE ENGINES REMOVED. 75% OF AUTOS FULLY DRAINED, OTHER 25% OF AUTOS AT LEAST 60% DRAINED. TEMPORARY HOOD, FAN, AND STACK CONSTRUCTED FOR TEST.

NOTE: SCRAP THROUGHPUT OF SHREDDER = 150 TONS/HR

TABLE D-11.F
ORGANICS AND METALS
EMISSION TEST FOR:
MILL DEFUMER W/NO CONTROLS.

R 000436

KATHY PINION 630-393-9000 RK & ASSOCIATES, INC. 2S631 STATE ROUTE 59 WARRENVILLE IL 60555	8 LBS	1 OF 1 DWT: 18,13,3
SHIP TO: BUREAU OF AIR 217-782-3397 ILLINOIS EPA P.O. BOX 19276 1021 NORTH GRAND AVE., EAST SPRINGFIELD IL 62702		
	IL 627 0-01 	
UPS NEXT DAY AIR 1 TRACKING #: 1Z 455 4W3 01 9123 9512		
		
BILLING: P/P Reference #1: Mr. Ray Pilapal Reference #2: R17421-7 XOL 19.09.23 NV45 15.0A 07/2019  TM		



General Iron

1909 N. Clifton Avenue | Chicago, IL 60614-4803 | 773-327-9600

November 14, 2019

VIA OVERNIGHT DELIVERY

Mr. Bob Bernoteit
 Illinois Environmental Protection Agency
 Division of Air Pollution Control
 PO Box 19506 - 1021 North Grand Avenue East
 Springfield, IL 62794-9506

RECEIVED
STATE OF ILLINOIS

NOV 15 2019

Environmental Protection Agency
BUREAU OF AIR

**Claim of TRADE SECRET and Justification of Claim for TRADE SECRET Designation
 Supplemental Information for Construction Permit Application 19090021
 General III, LLC – 11600 South Burley Avenue – Chicago, Illinois - Site ID No.: 031600SFX**

Mr. Bernoteit:

The attached supplemental information was requested by the IEPA to support the Agency's review of the above-referenced construction permit application. The supplemental information consists of (a) a table with detailed equipment listings for the Ferrous Material Processing System and Non-Ferrous Material Processing System, identifying equipment identification numbers, process throughput rates, emission factors, and particulate matter emission calculations for each individual piece of equipment and (b) detailed equipment layout drawings for the proposed scrap metal recycling facility described in the above-referenced construction permit application.

General III, LLC's (GIII) Claim for Trade Secret designation is limited to the equipment layout drawings for the Ferrous Material Processing System and the Non-Ferrous Material Processing System. These drawings are claimed by GIII to represent trade secret information as defined in 35 IAC 101.202 and Section 3.490 of the Illinois Environmental Protection Act [415 ILCS 5/3.490].

The drawings, included in the attached submittal, are hereby claimed as trade secret information in accordance with 35 IAC 130 and are clearly marked with the words "Trade Secret" in red letters on each page of the drawings (total of four pages). Two copies of the supplemental information submittal are attached to this claim, one including the clearly marked drawings claimed as trade secret and one copy with the drawings redacted noting that they have been claimed as trade secret information.

IEPA - DIVISION OF RECORDS MANAGEMENT
 RELEASABLE

DEC 06 2019

REVIEWER: JMR

Mr. Bob Bernoteit
Illinois Environmental Protection Agency
Division of Air Pollution Control
November 14, 2019
Page 2

Pursuant to 35 IAC 130.203, GIII is providing the following information as its statement of justification for the claim of trade secret information. Each specific element, identified in 35 IAC 130.203(a) through (e), required for a statement of justification for the trade secret claim is identified below.

§130.203(a) *A detailed description of the procedures used by the owner to safeguard the article from becoming available to persons other than those selected by the owner to have access thereto for limited purposes;*

The equipment layout drawings, prepared under a strict confidentiality agreement between GIII and a prospective equipment manufacturer, have only been provided to select GIII management personnel and outside consultants as required for preparation of facility permit applications and other information required for local governmental approval. This information is maintained on a password protected server at GIII with limited access. All equipment drawings produced to date have been labeled as confidential. to protect this information and prevent its public dissemination.

§130.203(b) *A detailed statement identifying the persons or class of persons to whom the article has been disclosed;*

This information has only been disclosed to the top management of GIII and select outside consultants.

§130.203(c) *A certification that the owner has no knowledge that the article has ever been published or disseminated or has otherwise become a matter of general public knowledge;*

GIII hereby certifies that it has no knowledge that these identified articles claimed as trade secret information have been published or disseminated or have otherwise become a matter of general public information.

§130.203(d) *A detailed discussion of why the owner believes the article to be of competitive value; and*

The equipment drawings claimed as trade secret information were produced at great expense to GIII and represent months of intense effort by GIII and a prospective equipment manufacturer. The final design is a product of GIII's over 60 years of experience recycling scrap metal in the Chicago market and the considerable technological expertise of the prospective equipment manufacturer and represents a state-of-the-art recycling process that will maximize recovery and production of high value ferrous and non-ferrous metals in a sustainable and economic manner. GIII believes that the specific design and equipment layout will provide GIII with a

Mr. Bob Bernoteit
Illinois Environmental Protection Agency
Division of Air Pollution Control
November 14, 2019
Page 3

significant competitive advantage over its competitors by providing increased metal recovery at reduced operating expense.

§130.203(e) *Any other information that will support the claim.*

The equipment layout drawings represent a process design that is unique to GIII and is not available in any market.

We believe that the above information is sufficient to justify a claim of trade secret for the equipment layout drawings described herein. If you believe that additional information is required to approve this designation, please contact Mr. Adam Labkon of GIII at 773-868-3491 (adamlabkon@general-iron.com).

Yours very truly,
General III, LLC


Mr. Adam Labkon
V.P.

cc: Ms. Ann Zwick – Freeborn & Peters – Chicago, Illinois

TRADE SECRET

Figure 3-2A Redacted

IEPA - DIVISION OF RECORDS MANAGEMENT
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DEC 06 2019

REVIEWER: JMR

Figure 3-2A - Ferrous Processing System Layout

General III, LLC
11600 South Burley Avenue
Chicago, Illinois

TRADE SECRET

Figure 3-2B Redacted

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**Figure 3-2B - Ferrous Material Processing
Flow Diagram**

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

Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Max Monthly Throughput
 100,000 tpm
 Annual Throughput
 1,000,000 tpy

Row #	Equipment Generating Emissions		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			PM Emissions				PM10 Emissions				PM2.5 Emissions			
	ID #	Description									Material Throughput Rates			PM Emissions				PM10 Emissions				PM2.5 Emissions			
											tpm	tpm	tpy	lb/hr	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy
1	Barge 1	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	367	73,400	734,000	0.00014 ⁴	0.0514	0.0051	0.0514	0.000046 ⁵	0.0169	0.0017	0.0169	0.000013 ⁴	0.0048	0.0005	0.0048
2	C-001	Shredded Material Transfer Conveyor	Shred	Y	Outside	N		NA		A	500	100,000	1,000,000	0.00014 ⁴	0.0700	0.0070	0.0700	0.000046 ⁵	0.0230	0.0023	0.0230	0.000013 ⁴	0.0065	0.0007	0.0065
3	C-002	Shredded Material Transfer Conveyor	Shred	Y	Outside	N		NA		A	1.0	200.0	2,000	0.00014 ⁴	0.0001	0.0001	0.000046 ⁵	0.0000	0.0000	0.0000	0.000013 ⁴	0.0000	0.0000	0.0000	
4	C-002	Met'l Hot Removed by Polar Filter	Shred	Y	Outside	N		NA		A	499	99,800	998,000	0.00014 ⁴	0.0699	0.0070	0.0699	0.000046 ⁵	0.0230	0.0023	0.0230	0.000013 ⁴	0.0065	0.0006	0.0065
5	C-003	Ferrous Transfer Conveyor	Residue	Y	Outside	N		NA		A	130	26,000	260,000	0.00014 ⁴	0.0182	0.0018	0.0182	0.000046 ⁵	0.0060	0.0006	0.0060	0.000013 ⁴	0.0017	0.0002	0.0017
6	C-003	Ferrous Transfer Conveyor	Ferrous	Y	Outside	N		NA		A	369	73,800	738,000	0.00014 ⁴	0.0517	0.0052	0.0517	0.000046 ⁵	0.0170	0.0017	0.0170	0.000013 ⁴	0.0048	0.0005	0.0048
7	C-006	Ferrous Transfer Conveyor	Shred	Y	Outside	Y	Z-Box Air Loop	100%	100%	A	183	36,600	366,000	0.00014 ⁴	0.0000	0.0026	0.0000	0.000046 ⁵	0.0000	0.0008	0.0000	0.000013 ⁴	0.0000	0.0002	0.0000
8	C-007	Ferrous Transfer Conveyor	Shred	Y	Outside	Y	Z-Box Air Loop	100%	100%	A	183	36,600	366,000	0.00014 ⁴	0.0000	0.0026	0.0000	0.000046 ⁵	0.0000	0.0008	0.0000	0.000013 ⁴	0.0000	0.0002	0.0000
9	C-008	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	56	11,200	112,000	0.00014 ⁴	0.0078	0.0008	0.0078	0.000046 ⁵	0.0026	0.0003	0.0026	0.000013 ⁴	0.0007	0.0001	0.0007
10	C-009	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	128	25,600	256,000	0.00014 ⁴	0.0179	0.0018	0.0179	0.000046 ⁵	0.0059	0.0006	0.0059	0.000013 ⁴	0.0017	0.0002	0.0017
11	C-010	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	128	25,600	256,000	0.00014 ⁴	0.0179	0.0018	0.0179	0.000046 ⁵	0.0059	0.0006	0.0059	0.000013 ⁴	0.0017	0.0002	0.0017
12	C-011	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	55	11,000	110,000	0.00014 ⁴	0.0077	0.0008	0.0077	0.000046 ⁵	0.0025	0.0003	0.0025	0.000013 ⁴	0.0007	0.0001	0.0007
13	C-012	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	56	11,200	112,000	0.00014 ⁴	0.0078	0.0008	0.0078	0.000046 ⁵	0.0026	0.0003	0.0026	0.000013 ⁴	0.0007	0.0001	0.0007
14	C-013	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	128	25,600	256,000	0.00014 ⁴	0.0179	0.0018	0.0179	0.000046 ⁵	0.0059	0.0006	0.0059	0.000013 ⁴	0.0017	0.0002	0.0017
15	C-014	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	128	25,600	256,000	0.00014 ⁴	0.0179	0.0018	0.0179	0.000046 ⁵	0.0059	0.0006	0.0059	0.000013 ⁴	0.0017	0.0002	0.0017
16	C-015	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	55	11,000	110,000	0.00014 ⁴	0.0077	0.0008	0.0077	0.000046 ⁵	0.0025	0.0003	0.0025	0.000013 ⁴	0.0007	0.0001	0.0007
17	C-018	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	367	73,400	734,000	0.00014 ⁴	0.0514	0.0051	0.0514	0.000046 ⁵	0.0169	0.0017	0.0169	0.000013 ⁴	0.0048	0.0005	0.0048
18	C-020	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	367	73,400	734,000	0.00014 ⁴	0.0514	0.0051	0.0514	0.000046 ⁵	0.0169	0.0017	0.0169	0.000013 ⁴	0.0048	0.0005	0.0048
19	C-022	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	55	11,000	110,000	0.00014 ⁴	0.0077	0.0008	0.0077	0.000046 ⁵	0.0025	0.0003	0.0025	0.000013 ⁴	0.0007	0.0001	0.0007
20	C-023	Ferrous Transfer Conveyor	Shred	Y ²¹	Outside	N		NA		A	55	11,000	110,000	0.00014 ⁴	0.0077	0.0008	0.0077	0.000046 ⁵	0.0025	0.0003	0.0025	0.000013 ⁴	0.0007	0.0001	0.0007
21	C-024	Non-metallic transfer conveyor	Ferrous	Y	Outside	N		NA		A	4	800	8,000	0.00014 ⁴	0.0006	0.0001	0.0006	0.000046 ⁵	0.0002	0.0000	0.0002	0.000013 ⁴	0.0001	0.0000	0.0001
22	C-025	Non-metallic not removed by magnet E-	Ferrous	Y	Outside	N		NA		A	2	400	4,000	0.00014 ⁴	0.0003	0.0000	0.0003	0.000046 ⁵	0.0001	0.0000	0.0001	0.000013 ⁴	0.0000	0.0000	0.0000
23	C-025	material removed by first magnet to second	Ferrous	Y ²¹	Outside	N		NA		A	1	200	2,000	0.00014 ⁴	0.0001	0.0000	0.0001	0.000046 ⁵	0.0000	0.0000	0.0000	0.000013 ⁴	0.0000	0.0000	0.0000
24	C-026	Ferrous Transfer Conveyor	Ferrous	Y ²¹						A	1	200	2,000	0.00014 ⁴	0.0001	0.0000	0.0001	0.000046 ⁵	0.0000	0.0000	0.0000	0.000013 ⁴	0.0000	0.0000	0.0000
25	C-027	Ferrous Transfer Conveyor	Ferrous	Y ²¹	Outside	N		NA		A	1	200	2,000	0.00014 ⁴	0.0001	0.0000	0.0001	0.000046 ⁵	0.0000	0.0000	0.0000	0.000013 ⁴	0.0000	0.0000	0.0000
26	C-028	Non-metallic Transfer Conveyor	Ferrous	Y	Outside	N		NA		A	1	200	2,000	0.00014 ⁴	0.0001	0.0000	0.0001	0.000046 ⁵	0.0000	0.0000	0.0000	0.000013 ⁴	0.0000	0.0000	0.0000

Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Max Monthly Throughput
100,000 tpm
Annual Throughput
1,000,000 tpy

Row #	Equipment Generating Emissions		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				PM Emissions				PM10 Emissions				PM2.5 Emissions				
	ID #	Description									tpm	tpm	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr
27	C-029	Non-metallic Transfer Conveyor	Ferrous	Y						A	1	200	2,000	0.00014 ^a	0.0001	0.0000	0.0001	0.000046 ^b	0.0000	0.0000	0.0000	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
28	C-031	ASR Transfer Conveyor	Residue	Y	Outside	N	NA			A	4	800	8,000	0.00014 ^a	0.0006	0.0001	0.0006	0.000046 ^b	0.0002	0.0000	0.0002	0.0000	0.000013 ^a	0.0001	0.0000	0.0001	0.0000
29	C-032	ASR Transfer Conveyor	Residue	Y	Outside	N	NA			A	4	800	8,000	0.00014 ^a	0.0006	0.0001	0.0006	0.000046 ^b	0.0002	0.0000	0.0002	0.0000	0.000013 ^a	0.0001	0.0000	0.0001	0.0000
30	C-033	Magnetic Material	Shred	Y	Outside	N	NA			A	5	1,000	10,000	0.00014 ^a	0.0007	0.0001	0.0007	0.000046 ^b	0.0002	0.0000	0.0002	0.0000	0.000013 ^a	0.0001	0.0000	0.0001	0.0000
31	C-033	ASR Not Removed by Magnet E-12	Residue	Y	Outside	N	NA			A	129	25,800	258,000	0.00014 ^a	0.0181	0.0018	0.0181	0.000046 ^b	0.0059	0.0006	0.0059	0.0000	0.000013 ^a	0.0017	0.0002	0.0017	0.0002
32	C-034	Ferrous Transfer Conveyor	Shred	Y	Outside	N	NA			A	5	1,000	10,000	0.00014 ^a	0.0007	0.0001	0.0007	0.000046 ^b	0.0002	0.0000	0.0002	0.0000	0.000013 ^a	0.0001	0.0000	0.0001	0.0000
33	C-035	Ferrous Transfer Conveyor	Shred	Y	Outside	N	NA			A	5	1,000	10,000	0.00014 ^a	0.0007	0.0001	0.0007	0.000046 ^b	0.0002	0.0000	0.0002	0.0000	0.000013 ^a	0.0001	0.0000	0.0001	0.0000
34	C-036	ASR Transfer Conveyor	Residue	Y	Outside	N	NA			A	129	25,800	258,000	0.00014 ^a	0.0181	0.0018	0.0181	0.000046 ^b	0.0059	0.0006	0.0059	0.0000	0.000013 ^a	0.0017	0.0002	0.0017	0.0002
35	E-01	Drop Raw Scrap onto Shredder Feed Chute	Unprepared	Y ¹⁴	Outside	N	NA			A	500	100,000	1,000,000	0.00014 ^a	0.0700	0.0070	0.0700	0.000046 ^b	0.0230	0.0023	0.0230	0.0000	0.000013 ^a	0.0065	0.0007	0.0065	0.0007
36	E-015	2-Box Separator Cyclone	Ferrous	Y	Outside	N	NA			A	2	400	4,000	0.00014 ^a	0.0003	0.0000	0.0003	0.000046 ^b	0.0001	0.0000	0.0001	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
37	E-016	2-Box Separator Cyclone	Ferrous	Y	Outside	N	NA			A	2	400	4,000	0.00014 ^a	0.0003	0.0000	0.0003	0.000046 ^b	0.0001	0.0000	0.0001	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
38	E-05	Shredder Under Mill Vibratory Conveyor	Shred	Y	Inside	N	NA			A	500	100,000	1,000,000	0.00014 ^a	0.0700	0.0070	0.0700	0.000046 ^b	0.0230	0.0023	0.0230	0.0000	0.000013 ^a	0.0065	0.0007	0.0065	0.0007
39	E-07	Magnet Discharge to Chute	Shred	Y	Outside	N	NA			A	187	37,400	374,000	0.00014 ^a	0.0262	0.0026	0.0262	0.000046 ^b	0.0086	0.0009	0.0086	0.0000	0.000013 ^a	0.0024	0.0002	0.0024	0.0002
40	E-07	Magnet Discharge to Chute	Shred	Y	Outside	N	NA			A	187	37,400	374,000	0.00014 ^a	0.0262	0.0026	0.0262	0.000046 ^b	0.0086	0.0009	0.0086	0.0000	0.000013 ^a	0.0024	0.0002	0.0024	0.0002
41	E-08	ASR Not Removed by Magnet	Shred	Y	Outside	N	NA			A	2	400	4,000	0.00014 ^a	0.0003	0.0000	0.0003	0.000046 ^b	0.0001	0.0000	0.0001	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
42	E-08	Ferrous Removed by Magnet E-7	Residue	Y	Outside	N	NA			A	185	37,000	370,000	0.00014 ^a	0.0259	0.0026	0.0259	0.000046 ^b	0.0085	0.0009	0.0085	0.0000	0.000013 ^a	0.0024	0.0002	0.0024	0.0002
43	E-10	Ferrous Removed by Magnet	Shred	Y ¹⁴	Outside	N	NA			A	128	25,600	256,000	0.00014 ^a	0.0179	0.0018	0.0179	0.000046 ^b	0.0059	0.0006	0.0059	0.0000	0.000013 ^a	0.0017	0.0002	0.0017	0.0002
44	E-11	Ferrous Removed by Magnet	Shred	Y ¹⁴	Outside	N	NA			A	128	25,600	256,000	0.00014 ^a	0.0179	0.0018	0.0179	0.000046 ^b	0.0059	0.0006	0.0059	0.0000	0.000013 ^a	0.0017	0.0002	0.0017	0.0002
45	E-11	Ferrous Removed by Magnet	Shred	Y ¹⁴	Outside	N	NA			A	55	11,000	110,000	0.00014 ^a	0.0077	0.0008	0.0077	0.000046 ^b	0.0025	0.0003	0.0025	0.0000	0.000013 ^a	0.0007	0.0001	0.0007	0.0001
46	E-11	Ferrous Removed by Magnet	Shred	Y ¹⁴	Outside	N	NA			A	55	11,000	110,000	0.00014 ^a	0.0077	0.0008	0.0077	0.000046 ^b	0.0025	0.0003	0.0025	0.0000	0.000013 ^a	0.0007	0.0001	0.0007	0.0001
47	E-12	Ferrous Removed by Magnet	Ferrous	Y	Outside	N	NA			A	5	1,000	10,000	0.00014 ^a	0.0007	0.0001	0.0007	0.000046 ^b	0.0002	0.0000	0.0002	0.0000	0.000013 ^a	0.0001	0.0000	0.0001	0.0000
48	E-13	Ferrous Removed by E-13	Ferrous	Y ¹⁴	Outside	N	NA			A	1	200	2,000	0.00014 ^a	0.0001	0.0000	0.0001	0.000046 ^b	0.0000	0.0000	0.0000	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
49	E-13	Ferrous Removed by E-13	Ferrous	Y	Outside	N	NA			A	1	200	2,000	0.00014 ^a	0.0001	0.0000	0.0001	0.000046 ^b	0.0000	0.0000	0.0000	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
50	E-14	Magnet Not removed by Separator	Ferrous	Y	Outside	N	NA			A	0.25	50.00	500	0.00014 ^a	0.0000	0.0000	0.0000	0.000046 ^b	0.0000	0.0000	0.0000	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
51	E-7	ASR Not Removed by Magnet	Shred	Y ¹⁴	Outside	N	NA			A	2	400	4,000	0.00014 ^a	0.0003	0.0000	0.0003	0.000046 ^b	0.0001	0.0000	0.0001	0.0000	0.000013 ^a	0.0000	0.0000	0.0000	0.0000
52	E-7	Ferrous Removed by Magnet E-7	Residue	Y	Outside	N	NA			A	185	37,000	370,000	0.00014 ^a	0.0259	0.0026	0.0259	0.000046 ^b	0.0085	0.0009	0.0085	0.0000	0.000013 ^a	0.0024	0.0002	0.0024	0.0002

Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Max Monthly Throughput
100,000 tpm
Annual Throughput
1,000,000 tpy

Row #	Equipment Generating Emissions ID # Description		Material Conveyor	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			PM Emissions				PM10 Emissions				PM2.5 Emissions							
											tpm	tpm	tpy	lb/ton	lb/hr	ton/ton	tpy	lb/ton	lb/hr	ton/ton	tpy	lb/ton	lb/hr	ton/ton	tpy	lb/ton	lb/hr	ton/ton	tpy
											tpm	tpm	tpy	lb/ton	lb/hr	ton/ton	tpy	lb/ton	lb/hr	ton/ton	tpy	lb/ton	lb/hr	ton/ton	tpy	lb/ton	lb/hr	ton/ton	tpy
53		Truck Dumping of Raw Feed	Unprepared	5.4 ²³	Outside	N				Drop	300	100,000	1,000,000	0.00127 ^a	0.3797	0.0633	0.6328	0.00060 ^a	0.1796	0.0299	0.2993	0.00009 ^a	0.0272	0.0045	0.0453				
54		Raw Feed from Ground after Truck Dumping	Unprepared	5.4 ²³	Outside	N				Drop	300	100,000	1,000,000	0.00127 ^a	0.3797	0.0633	0.6328	0.00060 ^a	0.1796	0.0299	0.2993	0.00009 ^a	0.0272	0.0045	0.0453				
55		Non-metallic Loadout	Non-metallic	N	Outside	N				D	187	37,400	374,000	0.00020 ^f	0.0382	0.0038	0.0382	0.000100 ^f	0.0187	0.0019	0.0187	0.000015 ^f	0.0028	0.0003	0.0028				
56		Poker Loadout	Pokers	N	Outside	N				D	183	36,600	366,000	0.00020 ^f	0.0374	0.0037	0.0374	0.000100 ^f	0.0183	0.0018	0.0183	0.000015 ^f	0.0028	0.0003	0.0028				
57		Magnet/Clam	Drop Raw Scrap to Infeed Conveyor	Unprepared	N ²⁴	Outside	N		NA	D	500	100,000	1,000,000	0.00020 ^f	0.1022	0.0102	0.1022	0.000100 ^f	0.0500	0.0050	0.0500	0.000015 ^f	0.0076	0.0008	0.0076				
58		Barge 2	Ferrous Transfer Conveyor	Shred	5.4% ²³	Outside	N		0%	Drop	867	73,400	734,000	0.00127 ^a	0.4645	0.0465	0.4645	0.00060 ^a	0.2197	0.0220	0.2197	0.00009 ^a	0.0333	0.0093	0.0333				
59		C-030	MelT not Removed by Separator	Ferrous	1.5% ²³	Outside	Y	Cover	0%	Drop	2.25	450.00	4,500	0.00761 ^a	0.0171	0.0017	0.0171	0.00360 ^a	0.0081	0.0008	0.0081	0.00004 ^a	0.0012	0.0001	0.0012				
60		C-037	ASR Transfer Conveyor to Stockpile	Residue	10.0% ²³	Outside	N		0%	Drop	129	25,800	258,000	0.00053 ^a	0.0689	0.0069	0.0689	0.00025 ^a	0.0326	0.0033	0.0326	0.00004 ^a	0.0049	0.0005	0.0049				
61		E-06	Poker Picker Chute to Stockpile	Shred	1.5% ²³	Outside	N		0%	Drop	1	200	2,000	0.00761 ^a	0.0076	0.0008	0.0076	0.00360 ^a	0.0036	0.0004	0.0036	0.00004 ^a	0.0005	0.0001	0.0005				
62		E-14	Final Discharge from MelT Separator	Ferrous	1.5% ²³	Outside	N		0%	Drop	0.75	150.00	1,500	0.00761 ^a	0.0057	0.0006	0.0057	0.00360 ^a	0.0027	0.0003	0.0027	0.00004 ^a	0.0004	0.0000	0.0004				
63		SC-001	Supplemental Conveyor	Shred	Y	Outside	N		NA	A	183	36,600	366,000	0.00014 ^d	0.0256	0.0026	0.0256	0.000046 ^d	0.0084	0.0008	0.0084	0.000013 ^d	0.0024	0.0002	0.0024				
64		SC-009	Supplemental Conveyor	Ferrous	Y	Outside	N		NA	A	2	400	4,000	0.00014 ^d	0.0003	0.0000	0.0003	0.000046 ^d	0.0001	0.0000	0.0001	0.000013 ^d	0.0000	0.0000	0.0000				
64		SC-002	Supplemental Conveyor	Shred	Y	Outside	N		NA	A	183	36,600	366,000	0.00014 ^d	0.0256	0.0026	0.0256	0.000046 ^d	0.0084	0.0008	0.0084	0.000013 ^d	0.0024	0.0002	0.0024				
65		SC-010	Supplemental Conveyor	Ferrous	Y	Outside	N		NA	A	2	400	4,000	0.00014 ^d	0.0003	0.0000	0.0003	0.000046 ^d	0.0001	0.0000	0.0001	0.000013 ^d	0.0000	0.0000	0.0000				
65		SC-005	Supplemental Conveyor	Shred	Y	Outside	N		NA	A	128	25,600	256,000	0.00014 ^d	0.0179	0.0018	0.0179	0.000046 ^d	0.0059	0.0006	0.0059	0.000013 ^d	0.0017	0.0002	0.0017				
66		SC-008	Supplemental Conveyor	Shred	Y	Outside	N		NA	A	128	25,600	256,000	0.00014 ^d	0.0179	0.0018	0.0179	0.000046 ^d	0.0059	0.0006	0.0059	0.000013 ^d	0.0017	0.0002	0.0017				
69		C-004	Ferrous Transfer Conveyor	Shred	Y	Outside	N		NA	A	185	37,000	370,000	Emissions captured by inward air flow at inlet to Z-box separator															
70		C-014	Ferrous Transfer Conveyor	Shred	Y ²³	Outside	N		NA	A	367	73,400	734,000	Alternate to C-014 to C-016. Emissions from 100% of material throughput assigned to C-014 to C-016.															
70		C-005	Ferrous Transfer Conveyor	Shred	Y	Outside	N		NA	A	185	37,000	370,000	Emissions captured by inward air flow at inlet to Z-box separator															
73		C-012	Ferrous Transfer Conveyor	Shred	Y ²³	Outside	N		NA	A	367	73,400	734,000	Alternate to C-012 to C-016. Emissions from 100% of material throughput assigned to C-012 to C-016.															
73		C-015	Ferrous Transfer Conveyor	Shred	Y ²³	Outside	N		NA	A	367	73,400	734,000	Alternate to C-015 to C-016. Emissions from 100% of material throughput assigned to C-015 to C-016.															
73		C-019	Ferrous Transfer Conveyor	Shred	Y ²³	Outside	N		NA	A	367	73,400	734,000	Alternate to C-016 to C-017. Emissions from 100% of material throughput assigned to C-016 to C-017.															
73		C-011	Ferrous Transfer Conveyor	Shred	Y ²³	Outside	N		NA	A	367	73,400	734,000	Alternate to C-013 to C-016. Emissions from 100% of material throughput assigned to C-013 to C-016.															
73		C-017	Ferrous Transfer Conveyor	Shred	Y ²³	Outside	N		NA	A	367	73,400	734,000	Alternate to C-020, C-021 or C-017/C-018. Emissions from 100% of material throughput assigned to C-017 to C-018.															
73		C-020	Ferrous Transfer Conveyor	Shred	Y ²³	Outside	N		NA	A	367	73,400	734,000	Alternate to C-017 to C-018. Emissions from 100% of material throughput assigned to C-017 to C-018.															
73		E-02	Shredder Bottom Discharge	Shred	Y	Outside	N		shredder emissions captured by shredder hood and controlled by RTV scrubber	A	500	100,000	1,000,000	Emissions captured and controlled by shredder emission control system															

Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Max Monthly Throughput
100,000 tpm
Annual Throughput
1,000,000 tpy

Row #	Equipment 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			PM Emissions				PM10 Emissions				PM2.5 Emissions									
											tpm	tpm	tpy	lb/ton	lb/hr	ton/100	tpy	lb/ton	lb/hr	ton/100	tpy	lb/ton	lb/hr	ton/100	tpy						
73	C-018	Ferrous Transfer Conveyor	Shred	5.4% ^{a1}	Outside	N		NA		Drop	367	73,400	734,000	Alternates to C-021 to S Ferrous Stockpile or Barge 2 to Barge. Emissions from 100% of material throughput assigned to Barge 2 to Barge. Alternates to C-018 to H Ferrous Stockpile or Barge 2 to Barge. Emissions from 100% of material throughput assigned to Barge 2 to Barge. Emission captured and controlled by shredder emission control system.																	
73	C-21	Ferrous Transfer Conveyor	Shred	5.4% ^{a1}	Outside	N		NA		Drop	367	73,400	734,000	Alternates to C-021 to S Ferrous Stockpile or Barge 2 to Barge. Emissions from 100% of material throughput assigned to Barge 2 to Barge. Alternates to C-018 to H Ferrous Stockpile or Barge 2 to Barge. Emissions from 100% of material throughput assigned to Barge 2 to Barge. Emission captured and controlled by shredder emission control system.																	
74	E-01	Shredder Chute	Unleached	Y	shredder emissions captured by shredder hood and controlled by HTO/Scrubber					A		500	100,000	1,000,000	Ratio of HAP metal to total PM from June 2018 emission test of existing roll media filter at GH.																
Totals Ferrous Plant Material Handling PM Emissions														2.41	0.80	2.82	1.01	0.13	1.25	0.19	0.02	0.23									
Totals Ferrous Plant Material Handling HAP Metal Emissions											1.67%	^b	0.0003	0.0000	0.0488																

- a1. Controlled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying used based on conservative assumption that moisture content is greater than 1.5% due to water added in the shredder.
- a2. Material moisture was assumed to be the mean of material moisture contents identified in AP-42, 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 COM-G-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 crushed stone. Use uncontrolled emission 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.
- h. Metal HAPs as percent of total PM measured at the discharge of the existing roll media filter in June 2018.

Material Drop PM Equations (AP-42, Section 13.2.4.3)

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

E = emission factor (lb/ton of material dropped)
 k = particle size multiplier (dimensionless)
 U = mean wind speed
<https://www.timeanddate.com/weather/usa/chicago/climate>
 M = material moisture content (%)

- U = 9.0 mph - annual average wind speed for Chicago (Midway Airport)
- k = 0.74 PM - AP-42, Section 13.2.4, for particle size < 30 um
- 0.35 PM - AP-42, Section 13.2.4, for particle size < 10 um
- 0.053 PM - AP-42, Section 13.2.4, for particle size < 2.5 um
- M = 1.5 Moisture content for use of controlled emission factors for crushed stone processing - Conveyor Transfer Points - AP-42, Table 11.19.2-2.

Figure 3-3A Redacted

TRADE SECRET

Figure 3-3A - Non-Ferrous Processing System Layout

General III, LLC
11600 South Burley Avenue
Chicago, Illinois

Figure 3-3B Redacted

TRADE SECRET

Figure 3-3B - Non-Ferrous Material Processing
Flow Diagram

General III, LLC
11600 South Burley Avenue
Chicago, Illinois

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Rev 1 - GIII Emission Tables - Nov. 12, 2019

Max Monthly Throughput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM ₁₀ Control Eff	80.00%	DC PM ₁₀ Control Eff	80.00%	DC PM _{2.5} Control Eff	80.00%

Row #	Equipment Generating Emissions ID # Description	Material Conveyed	Moisture > 1.5% Y/N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Basis			PM Emissions				PM10 Emissions				PM2.5 Emissions				
											ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr
											gph	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton
1	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	0.25	92.1	921	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
2	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	0.25	92.1	921	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
3	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	1.00	368.6	3,686	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
4	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	1.00	368.6	3,686	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
5	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	0.42	154.8	1,548	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
6	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	0.42	154.8	1,548	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
7	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	0.42	154.8	1,548	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
8	Shaker	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	0.42	154.8	1,548	0.002200	Note f	Note f	Note f	0.000740	Note f	Note f	Note f	0.000050	Note f	Note f	Note f	
9	E-19	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	5.84	2,152.5	21,525	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
10	E-19	Induction Sorter	Wire Fuzz	N	Inside		Y	Dust Collector	100%	DC Eff.	A	1.5	552.9	5,529	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
11	E-20	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	1	368.6	3,686	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
12	E-20	Induction Sorter	Wire	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.5	184.3	1,843	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
13	E-25	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	5.84	2,152.5	21,525	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
14	E-25	Induction Sorter	Wire Fuzz	N	Inside		Y	Dust Collector	100%	DC Eff.	A	1.5	552.9	5,529	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
15	E-26	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	1	368.6	3,686	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
16	E-26	Induction Sorter	Wire	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.5	184.3	1,843	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
17	E-30	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	6.5	2,396.7	23,967	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
18	E-30	Induction Sorter	Zuric	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.65	239.6	2,396	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
19	E-31	Induction Sorter	Zuric	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.65	239.6	2,396	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
20	E-37	Induction Sorter	Zone	N	Inside		Y	Dust Collector	100%	DC Eff.	A	1.5	552.9	5,529	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
21	E-37	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	3.55	1,308.4	13,084	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
22	E-39	Induction Sorter	Drops Zuric Recov Finder	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.3	110.6	1,106	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
23	E-39	Induction Sorter	Zone	N	Inside		Y	Dust Collector	100%	DC Eff.	A	1.2	442.3	4,423	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
24	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.22	81.1	811	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
25	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.22	81.1	811	0.000340	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
26	Material Separator	Drop to container	Residue	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.03	11.1	111	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
27	Material Separator	Drop to container	Residue	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.03	11.1	111	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Rev 1 - GIII Emission Tables - Nov. 12, 2019

Max Monthly Throughput 25,800 ton/mo	ECS Enc. PM Control Eff	99.00%	ECS Enc. PM Control Eff	99.00%	ECS Enc. PM Control Eff	99.00%
Annual Throughput 268,000 tpy	DC PM Control Eff	99.00%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	99.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates			PM Emissions				PM10 Emissions				PM2.5 Emissions			
	ID #	Description										tph	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy
28	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.94	346.5	3,465	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
29	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.94	346.5	3,465	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
30	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.06	22.1	221	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
31	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.06	22.1	221	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
32	Shakar Flaps		Zorba	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.19	70.0	700	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
33	Shakar Mills		Zorba	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.12	44.2	442	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
34	Shakar Mills		Zorba	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.12	44.2	442	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
35	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.02	7.4	74	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
36	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.02	7.4	74	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
37	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.10	36.9	369	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
38	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.10	36.9	369	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
39	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.05	18.4	184	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
40	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.41	151.1	1,511	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
41	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.41	151.1	1,511	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
42	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.41	151.1	1,511	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
43	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.41	151.1	1,511	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
44	Material Separator	Drop to container	Zorba	1.5% *	Inside		Y	Dust Collector	100%	DC Eff.	Drop	0.14	51.8	518	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
45	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.0084	3.1	31	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
46	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.0084	3.1	31	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
47	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.0084	3.1	31	0.000140	Note f	Note f	Note f	0.000046	Note f	Note f	Note f	0.000013	Note f	Note f	Note f
48	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	0.0084	3.1	31	0.000140	Note f	Note f	Note f	0.000046 *	Note f	Note f	Note f	0.000013 *	Note f	Note f	Note f
49	Shakar		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	1.40	516.0	5,160	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f
50	Shakar		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	1.40	516.0	5,160	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f
51	Shakar		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	1.05	387.0	3,870	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f
52	Shakar		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	1.05	387.0	3,870	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f
53	Shakar		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	1.05	387.0	3,870	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f
54	Shakar		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	1.05	387.0	3,870	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Rev 1 - GIII Emission Tables - Nov. 12, 2019

Max Monthly Throughput 25,800 ton/mo	ECS Enc. PM Control Eff	99.99%	ECS Enc. PM Control Eff	99.99%	ECS Enc. PM Control Eff	99.99%
Annual Throughput 258,000 tpy	DC PM ₁₀ Control Eff	99.99%	DC PM ₁₀ Control Eff	99.99%	DC PM _{2.5} Control Eff	99.99%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y/N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates			PM Emissions				PM10 Emissions				PM2.5 Emissions			
	ID #	Description										tpg	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy
55	Shaker	Drop to container	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.10	36.9	369	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
56	Shaker	Drop to container	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.10	36.9	369	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
57	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.42	154.8	1,548	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
58	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.42	154.8	1,548	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
59	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.42	154.8	1,548	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
60	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.42	154.8	1,548	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
61	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.21	77.4	774	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
62	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.21	77.4	774	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
63	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.21	77.4	774	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
64	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.21	77.4	774	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
65	C-031	Conveyor	Wire	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	1	368.6	3,686	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
66	C-025	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	7.15	2,635.3	26,353	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
67	C-026	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	5.05	1,861.3	18,613	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
68	C-027	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	7.34	2,705.3	27,053	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
69	C-028	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	7.34	2,705.3	27,053	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
70	C-032	Conveyor	Zone	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.50	552.9	5,529	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
71	C-053	Conveyor	Wire	N	Inside		N	Dust Collector	100%	DC Eff.	A	1	368.6	3,686	0.003000 °	Note f	Note f	Note f	0.001100 °	Note f	Note f	Note f	0.000167 °	Note f	Note f	Note f
72	C-069	Conveyor	Lights Zurich	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.35	129.0	1,290	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
73	E-18	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	7.34	2,705.3	27,053	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
74	E-24	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	7.34	2,705.3	27,053	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
75	E-29	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	7.15	2,635.3	26,353	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
76	E-36	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	5.05	1,861.3	18,613	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
77	E-38	Vibratory Feeder	Zone	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.50	552.9	5,529	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
78	E-51	Separator	Heavies Zurich	N	Inside		N	Dust Collector	100%	DC Eff.	B	0.30	110.6	1,106	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f
79	E-51	Separator	Lights Zurich	N	Inside		N	Dust Collector	100%	DC Eff.	B	0.35	129.0	1,290	0.025000	Note f	Note f	Note f	0.008700	Note f	Note f	Note f	0.001317	Note f	Note f	Note f
80	ECS	Eddy Current Separator	Residue/Drops	N	Inside		N	Dust Collector	100%	DC Eff.	A	3.34	1,231.0	12,310	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
81	ECS	Eddy Current Separator	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.40	147.4	1,474	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Max Monthly Throughput 25,800 ton/mo	ECS Enc. PM Control Eff	98.00%	ECS Enc. PM Control Eff	90.00%	ECS Enc. PM Control Eff	90.00%
Annual Throughput 258,000 tpy	DC PM _{2.5} Control Eff	98.00%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates			PM Emissions				PM10 Emissions				PM2.5 Emissions			
	ID #	Description										tpd	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy
82	Elevator	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.44	162.2	1,622	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
83	Elevator	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	3.52	1,297.4	12,974	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
84	FC-01	Conveyor	Zorba	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	0.50	184.3	1,843	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
85	FC-02	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	2.80	1,032.0	10,320	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
86	FC-03	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.88	692.9	6,929	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
87	FC-04	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.44	162.2	1,622	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
88	FC-05	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.88	692.9	6,929	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
89	FC-06	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	3.52	1,297.4	12,974	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
90	FC-07	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	4.20	1,548.0	15,480	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
91	FC-08	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	4.20	1,548.0	15,480	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
92	FC-09	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.68	619.2	6,192	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
93	FC-10	Conveyor drop to stockpile	Residue	1.5%*	Inside		N	Dust Collector	100%	DC Eff.	Drop	0.42	154.8	1,548	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
94	FC-11	Conveyor drop to stockpile	Residue	1.5%*	Inside		N	Dust Collector	100%	DC Eff.	Drop	0.42	154.8	1,548	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
95	FC-12	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.0168	6.2	62	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
96	FC-13	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.0168	6.2	62	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
97	FC-14	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.0336	12.4	124	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
98	FC-15	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.0336	12.4	124	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
99	FC-16	Conveyor drop to container	Product	1.5%*	Inside		N	Dust Collector	100%	DC Eff.	Drop	0.0336	12.4	124	0.00760	Note f	Note f	Note f	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
100	FC-17	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.64	604.5	6,045	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
101	FC-18	Conveyor transfer to shaker	Residue/ Drops	N	Inside		N	Dust Collector	100%	DC Eff.	A	3.34	1,231.0	12,310	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
102	FC-20	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	3.34	1,231.0	12,310	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
103	FC-21	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	2.28	840.3	8,403	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
104	FC-22	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.14	420.2	4,202	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
105	FC-23	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1.14	420.2	4,202	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
106	Feeder	Discharge to conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	9.09	3,350.3	33,503	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
107	Feeder	Transfer to Eddy Current Separator	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.44	162.2	1,622	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
108	Feeder	Transfer to Eddy Current Separator	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	3.52	1,297.4	12,974	0.003000	Note f	Note f	Note f	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Max Monthly Throughput 15,800 ton/mo	ECS Enc. PM Control Eff	99.99%	ECS Enc. PM Control Eff	99.99%	ECS Enc. PM Control Eff	99.99%
Annual Throughput 256,000 tpy	DC PM ₁₀ Control Eff	99.99%	DC PM ₁₀ Control Eff	99.99%	DC PM _{2.5} Control Eff	99.99%

Row #	Equipment ID #	Equipment Generating Emissions Description	Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates			PM Emissions				PM10 Emissions				PM2.5 Emissions			
												tph	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy
109	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	2.94	1,083.6	10,836	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
110	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	0.40	147.4	1,474	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	Note f	0.000167	Note f	Note f	Note f
111	Shaker	Drop to container	Zorba	1.5% *	Inside		N	Dust Collector	100%	DC Eff.	Drop	0.07	25.8	258	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	Note f	0.00050	Note f	Note f	Note f
112	Total Emissions for Sources Inside Building												0.5143	0.1864	1.8639		0.5143	0.1864	1.8639		0.5143	0.1864	1.8639			
113	C-001	Conveyor	Residue	Y	Outside	Y	N	NA			A	70	25,800.0	258,000	0.000140 ^a	0.0098	0.0018	0.0181	0.000046 ^a	0.0032	0.0006	0.0059	0.000013 ^a	0.0009	0.0002	0.0017
114	C-002	Conveyor	Residue	N	Outside	Y	N	NA			A	68	25,026.0	250,260	0.003000 ^a	0.2037	0.0375	0.3754	0.001100 ^a	0.0747	0.0138	0.1376	0.000167 ^a	0.0113	0.0021	0.0208
115	C-002	Conveyor	Ferrous	N	Outside	Y	N	NA			A	2	774.0	7,740	0.003000 ^a	0.0063	0.0012	0.0116	0.001100 ^a	0.0023	0.0004	0.0043	0.000167 ^a	0.0003	0.0001	0.0006
116	C-003	Conveyor	Residue	N	Outside	Y	N	NA			A	67.90	25,026.0	250,260	0.003000 ^a	0.2037	0.0375	0.3754	0.001100 ^a	0.0747	0.0138	0.1376	0.000167 ^a	0.0113	0.0021	0.0208
117	C-004	Conveyor	Residue	N	Outside	Y	N	NA			A	60.90	22,446.0	224,460	0.003000 ^a	0.1827	0.0337	0.3367	0.001100 ^a	0.0670	0.0123	0.1235	0.000167 ^a	0.0101	0.0019	0.0187
118	C-005	Conveyor	Residue	N	Outside	Y	N	NA			A	30.45	11,223.0	112,230	0.003000 ^a	0.0914	0.0168	0.1683	0.001100 ^a	0.0335	0.0062	0.0617	0.000167 ^a	0.0051	0.0009	0.0093
119	C-006	Conveyor	Residue	N	Outside		N	NA			A	30.45	11,223.0	112,230	0.003000 ^a	0.0914	0.0168	0.1683	0.001100 ^a	0.0335	0.0062	0.0617	0.000167 ^a	0.0051	0.0009	0.0093
120	C-007	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	15.75	5,805.0	58,050	0.003000 ^a	0.0095	0.0017	0.0174	0.001100 ^a	0.0035	0.0006	0.0064	0.000167 ^a	0.0005	0.0001	0.0010
121	C-008	Conveyor	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	15.75	5,805.0	58,050	0.003000 ^a	0.0095	0.0017	0.0174	0.001100 ^a	0.0035	0.0006	0.0064	0.000167 ^a	0.0005	0.0001	0.0010
122	C-009	Conveyor	Residue	N	Outside		N	NA			A	9.14	3,368.7	33,687	0.003000 ^a	0.0274	0.0051	0.0505	0.001100 ^a	0.0101	0.0019	0.0185	0.000167 ^a	0.0015	0.0003	0.0028
123	C-010	Conveyor	Residue	N	Outside		N	NA			A	9.14	3,368.7	33,687	0.003000 ^a	0.0274	0.0051	0.0505	0.001100 ^a	0.0101	0.0019	0.0185	0.000167 ^a	0.0015	0.0003	0.0028
124	C-011	Conveyor	Residue	N	Outside	Y	N	NA			A	8.40	3,096.0	30,960	0.003000 ^a	0.0252	0.0046	0.0464	0.001100 ^a	0.0092	0.0017	0.0170	0.000167 ^a	0.0014	0.0003	0.0026
125	C-012	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	9.14	3,368.7	33,687	0.003000 ^a	0.0065	0.0010	0.0101	0.001100 ^a	0.0020	0.0004	0.0037	0.000167 ^a	0.0003	0.0001	0.0006
126	C-013	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	9.14	3,368.7	33,687	0.003000 ^a	0.0065	0.0010	0.0101	0.001100 ^a	0.0020	0.0004	0.0037	0.000167 ^a	0.0003	0.0001	0.0006
127	C-014	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	8.40	3,096.0	30,960	0.003000 ^a	0.0050	0.0009	0.0093	0.001100 ^a	0.0018	0.0003	0.0034	0.000167 ^a	0.0003	0.0001	0.0005
128	C-015	Conveyor	Ferrous	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	.25	92.1	921	0.003000 ^a	0.0002	0.0000	0.0003	0.001100 ^a	0.0001	0.0000	0.0001	0.000167 ^a	0.0000	0.0000	0.0000
129	C-016	Conveyor	Residue	N	Outside	Y	N	NA			A	2.7	995.1	9,951	0.003000 ^a	0.0081	0.0015	0.0149	0.001100 ^a	0.0030	0.0005	0.0055	0.000167 ^a	0.0004	0.0001	0.0008
130	C-017	Conveyor	Ferrous	N	Outside		N	NA			A	1.75	645.0	6,450	0.003000 ^a	0.0053	0.0010	0.0097	0.001100 ^a	0.0019	0.0004	0.0035	0.000167 ^a	0.0003	0.0001	0.0005
131	C-018	Conveyor	Ferrous	N	Outside	Y	N	NA			A	1.75	645.0	6,450	0.003000 ^a	0.0053	0.0010	0.0097	0.001100 ^a	0.0019	0.0004	0.0035	0.000167 ^a	0.0003	0.0001	0.0005
132	C-019	Conveyor	Lights	N	Outside	Y	N	NA			A	0.25	92.1	921	0.003000 ^a	0.0008	0.0001	0.0014	0.001100 ^a	0.0003	0.0001	0.0005	0.000167 ^a	0.0000	0.0000	0.0001
133	C-020	Conveyor	Residue	N	Outside	Y	N	NA			A	11.12	4,098.5	40,985	0.003000 ^a	0.0334	0.0061	0.0615	0.001100 ^a	0.0122	0.0023	0.0225	0.000167 ^a	0.0019	0.0003	0.0034
134	C-021	Conveyor	Residue	N	Outside	Y	N	NA			A	11.12	4,098.5	40,985	0.003000 ^a	0.0334	0.0061	0.0615	0.001100 ^a	0.0122	0.0023	0.0225	0.000167 ^a	0.0019	0.0003	0.0034
135	C-022	Conveyor to Wind Sifter	Mixed Non-Ferrous	N	Outside	Y	Y	Wind Sifter	100%	100%	A	0.80	294.9	2,949	0.003000 ^a	0.0024	0.0004	0.0000	0.001100 ^a	0.0000	0.0002	0.0000	0.000167 ^a	0.0000	0.0000	0.0000

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Rev 1 - GIII Emission Tables - Nov. 12, 2019

Max Monthly Throughput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM ₁₀ Control Eff	98.00%	DC PM ₁₀ Control Eff	93.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates			PM Emissions				PM10 Emissions				PM2.5 Emissions			
	ID #	Description										tpg	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy
163	C-065	Conveyor	Residue	N	Outside	Y	N	NA			A	2.2	810.9	8,109	0.003000 *	0.0066	0.0012	0.001100 *	0.0024	0.0004	0.0045	0.000167 *	0.0004	0.0001	0.0007	
164	C-066	Conveyor	Residue	N	Outside	Y	N	NA			A	54.39	20,046.6	200,466	0.003000 *	0.1632	0.0301	0.3007	0.001100 *	0.0598	0.0110	0.1103	0.000167 *	0.0091	0.0017	0.0167
165	C-067	Conveyor	Residue	N	Outside	Y	N	NA			A	54.39	20,046.6	200,466	0.003000 *	0.1632	0.0301	0.3007	0.001100 *	0.0598	0.0110	0.1103	0.000167 *	0.0091	0.0017	0.0167
166	C-068	Conveyor drop to stockpile	Residue	1.5% *	Outside	Y	N	NA			drop	54.39	20,046.6	200,466	0.00761 *	0.4137	0.0762	0.7624	0.00360 *	0.1957	0.0361	0.3606	0.00054 *	0.0296	0.0055	0.0546
167	C-070	Conveyor drop to stockpile	Waste to Stockpile	1.5% *	Outside		N	NA			Drop	0.55	202.7	2,027	0.00761 *	0.0042	0.0008	0.0077	0.00360 *	0.0020	0.0004	0.0036	0.00054 *	0.0003	0.0001	0.0006
168	C-071	Conveyor	Lights	N	Outside	Y	Y	Cover			A	0.03	11.1	111	0.000140 *	0.0000	0.0000	0.0000046 *	0.0000	0.0000	0.0000	0.000013 *	0.0000	0.0000	0.0000	
169	C-072	Conveyor	Lights	N	Outside	Y	Y	Cover			A	0.03	11.1	111	0.000140 *	0.0000	0.0000	0.0000046 *	0.0000	0.0000	0.0000	0.000013 *	0.0000	0.0000	0.0000	
170	DC-01 Cyc	DC-01 fines discharge to covered conveyor	Lights	N	Outside		Y	Cover			A	0.008	2.9	29	0.000140 *	0.0000	0.0000	0.0000046 *	0.0000	0.0000	0.0000	0.000013 *	0.0000	0.0000	0.0000	
171	DC-02 Cyc	DC-02 fines discharge to covered conveyor	Lights	N	Outside		Y	Cover			A	0.008	2.9	29	0.000140 *	0.0000	0.0000	0.0000046 *	0.0000	0.0000	0.0000	0.000013 *	0.0000	0.0000	0.0000	
172	DC-03 Cyc	DC-03 fines discharge to covered conveyor	Lights	N	Outside		Y	Cover			A	0.008	2.9	29	0.000140 *	0.0000	0.0000	0.0000046 *	0.0000	0.0000	0.0000	0.000013 *	0.0000	0.0000	0.0000	
173	DC-04 Cyc	DC-04 fines discharge to covered conveyor	Lights	N	Outside		Y	Cover			A	0.008	2.9	29	0.000140 *	0.0000	0.0000	0.0000046 *	0.0000	0.0000	0.0000	0.000013 *	0.0000	0.0000	0.0000	
174	E-01	Vibratory Batch Feeder	Residue	Y	Outside		N	NA			A	70	25,800.0	258,000	0.000140 *	0.0098	0.0018	0.0181	0.000046 *	0.0032	0.0006	0.0059	0.000013 *	0.0009	0.0002	0.0017
175	E-03	Screener	Residue	Y	Outside		N	NA			B	60.90	22,448.0	224,460	0.002200 *	0.1340	0.0247	0.2469	0.000740 *	0.0451	0.0083	0.0831	0.000050 *	0.0030	0.0006	0.0056
176	E-03	Screener	Residue	Y	Outside		N	NA			B	6.80	2,506.3	25,063	0.002200 *	0.0150	0.0028	0.0276	0.000740 *	0.0050	0.0009	0.0093	0.000050 *	0.0003	0.0001	0.0006
177	E-03	Screener	Residue	Y	Outside		N	NA			B	2.70	995.1	9,951	0.002200 *	0.0059	0.0011	0.0109	0.000740 *	0.0020	0.0004	0.0037	0.000050 *	0.0001	0.0000	0.0002
178	E-04	Screener	Residue	Y	Outside		N	NA			B	15.75	5,805.0	58,050	0.002200 *	0.0347	0.0064	0.0639	0.000740 *	0.0117	0.0021	0.0215	0.000050 *	0.0008	0.0001	0.0015
179	E-04	Screener	Residue	Y	Outside		N	NA			B	9.14	3,368.7	33,687	0.002200 *	0.0201	0.0037	0.0371	0.000740 *	0.0068	0.0013	0.0125	0.000050 *	0.0005	0.0001	0.0008
180	E-04	Screener	Residue	Y	Outside		N	NA			B	4.20	1,548.0	15,480	0.002200 *	0.0092	0.0017	0.0170	0.000740 *	0.0031	0.0005	0.0057	0.000050 *	0.0002	0.0000	0.0004
181	E-05	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bkg Eff.	A	14.87	5,480.7	54,807	0.003000 *	0.0089	0.0016	0.0164	0.001100 *	0.0033	0.0006	0.0060	0.000167 *	0.0005	0.0001	0.0009
182	E-05	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bkg Eff.	A	9.87	3,637.8	36,378	0.003000 *	0.0059	0.0011	0.0109	0.001100 *	0.0022	0.0004	0.0040	0.000167 *	0.0003	0.0001	0.0006
183	E-05	Magnetic Separation	Ferrous	N	Inside		N	NA			A	0.88	324.3	3,243	0.003000 *	0.0026	0.0005	0.0049	0.001100 *	0.0010	0.0002	0.0018	0.000167 *	0.0001	0.0000	0.0003
184	E-05	Magnetic Separation	Ferrous	N	Inside		N	NA			A	5	1,842.9	18,429	0.003000 *	0.0150	0.0028	0.0276	0.001100 *	0.0055	0.0010	0.0101	0.000167 *	0.0008	0.0002	0.0015
185	E-06	Eddy Current Separator	Residue	N	Outside		N	NA			A	6.12	2,255.7	22,557	0.003000 *	0.0184	0.0034	0.0338	0.001100 *	0.0067	0.0012	0.0124	0.000167 *	0.0010	0.0002	0.0019
186	E-06	Eddy Current Separator	Mids	N	Outside		N	NA			A	3.50	1,290.0	12,900	0.003000 *	0.0105	0.0019	0.0194	0.001100 *	0.0039	0.0007	0.0071	0.000167 *	0.0006	0.0001	0.0011
187	E-06	Eddy Current Separator	Zorba	N	Outside		N	NA			A	0.25	92.1	921	0.003000 *	0.0008	0.0001	0.0014	0.001100 *	0.0003	0.0001	0.0005	0.000167 *	0.0000	0.0000	0.0001
188	E-07	Wind Sifter	Lights	N	Outside		Y	Cover			B	0.25	92.1	921	0.002200 *	0.0006	0.0001	0.0010	0.000740 *	0.0002	0.0000	0.0003	0.000050 *	0.0000	0.0000	0.0000
189	E-07	Wind Sifter	Heavies	1.5% *	Outside		Y	Wind Sifter	90%	100%	Drop	1.50	552.9	5,529	0.00761 *	0.0103	0.0021	0.0200	0.00360 *	0.0000	0.0010	0.0000	0.00054 *	0.0000	0.0002	0.0000

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Max Monthly Throughput 25,800 ton/mo	ECS Enc. PM Control Eff	99.00%	ECS Enc. PM Control Eff	99.00%	ECS Enc. PM Control Eff	99.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	99.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y/N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates			PM Emissions				PM10 Emissions				PM2.5 Emissions			
	ID #	Description										tph	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy
190	E-11	Screener	Residue	N	Outside		N	NA			B	15.75	5,805.0	58,050	0.025000 ^a	0.3938	0.0726	0.7256	0.008700 ^a	0.1370	0.0253	0.2535	0.001317 ^a	0.0207	0.0038	0.0382
191	E-11	Screener	Residue	N	Outside		N	NA			B	9.14	3,368.7	33,687	0.025000 ^a	0.2285	0.0421	0.4211	0.008700 ^a	0.0795	0.0147	0.1465	0.001317 ^a	0.0120	0.0022	0.0222
192	E-11	Screener	Residue	N	Outside		N	NA			B	4.20	1,548.0	15,480	0.025000 ^a	0.1050	0.0194	0.1935	0.008700 ^a	0.0365	0.0067	0.0673	0.001317 ^a	0.0055	0.0010	0.0102
193	E-12	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	14.87	5,480.7	54,807	0.003000	0.0089	0.0016	0.0164	0.001100	0.0033	0.0006	0.0060	0.000167	0.0005	0.0001	0.0009
194	E-12	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	9.87	3,637.8	36,378	0.003000	0.0089	0.0011	0.0109	0.001100	0.0022	0.0004	0.0040	0.000167	0.0003	0.0001	0.0006
195	E-12	Magnetic Separation	Ferrous	N	Inside		N	NA			A	0.88	324.8	3,248	0.003000	0.0026	0.0005	0.0049	0.001100	0.0010	0.0002	0.0018	0.000167	0.0001	0.0000	0.0003
196	E-12	Magnetic Separation	Ferrous	N	Inside		N	NA			A	5	1,842.9	18,429	0.003000	0.0150	0.0028	0.0276	0.001100	0.0055	0.0010	0.0101	0.000167	0.0008	0.0002	0.0015
197	E-12	Magnetic Separation	Zorba	N	Outside		N	NA			A	0.25	92.1	921	0.003000 ^a	0.0008	0.0001	0.0014	0.001100 ^a	0.0003	0.0001	0.0005	0.000167 ^a	0.0000	0.0000	0.0001
198	E-13	Eddy Current Separator	Residue	N	Outside		N	NA			A	6.12	2,255.7	22,557	0.003000 ^a	0.0184	0.0034	0.0388	0.001100 ^a	0.0067	0.0012	0.0124	0.000167 ^a	0.0010	0.0002	0.0019
199	E-13	Eddy Current Separator	Mixd	N	Outside		N	NA			A	3.50	1,290.0	12,900	0.003000 ^a	0.0105	0.0019	0.0194	0.001100 ^a	0.0039	0.0007	0.0071	0.000167 ^a	0.0006	0.0001	0.0011
200	E-14	Wind Sifter	Lights	N	Outside	Y	Y	Cover			B	0.20	73.7	737	0.002200 ^a	0.0004	0.0001	0.0008	0.000740 ^a	0.0001	0.0000	0.0003	0.000050 ^a	0.0000	0.0000	0.0000
201	E-14	Wind Sifter	Heavies	1.5% ^a	Outside	Y	Y	Wind Sifter	100%	100%	Drop	0.60	221.1	2,211	0.00761 ^a	0.0046	0.0008	0.0000	0.00360 ^a	0.0000	0.0004	0.0000	0.00054 ^a	0.0000	0.0001	0.0000
202	E-15	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	9.09	3,350.3	33,503	0.003000	0.0055	0.0010	0.0101	0.001100	0.0020	0.0004	0.0037	0.000167	0.0003	0.0001	0.0006
203	E-15	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	8.29	3,055.5	30,555	0.003000	0.0050	0.0009	0.0092	0.001100	0.0018	0.0003	0.0034	0.000167	0.0003	0.0001	0.0005
204	E-15	Magnetic Separation	Ferrous	N	Outside		N	NA			A	0.05	18.4	184	0.003000 ^a	0.0002	0.0000	0.0003	0.001100 ^a	0.0001	0.0000	0.0001	0.000167 ^a	0.0000	0.0000	0.0000
205	E-15	Magnetic Separation	Mixed Non-Ferrous	N	Outside		N	NA			A	0.40	147.4	1,474	0.003000 ^a	0.0012	0.0002	0.0022	0.001100 ^a	0.0004	0.0001	0.0008	0.000167 ^a	0.0001	0.0000	0.0001
206	E-16	Eddy Current Separator	Residue	N	Outside		N	NA			A	7.28	2,686.9	26,869	0.003000 ^a	0.0219	0.0040	0.0403	0.001100 ^a	0.0080	0.0015	0.0148	0.000167 ^a	0.0012	0.0002	0.0022
207	E-16	Eddy Current Separator	Zorba	N	Outside		N	NA			A	1	368.6	3,686	0.003000 ^a	0.0030	0.0006	0.0055	0.001100 ^a	0.0011	0.0002	0.0020	0.000167 ^a	0.0002	0.0000	0.0003
208	E-17	Wind Sifter	Lights	N	Outside	Y	Y	Cover			B	1.09	401.7	4,017	0.002200 ^a	0.0024	0.0004	0.0044	0.000740 ^a	0.0008	0.0001	0.0015	0.000050 ^a	0.0001	0.0000	0.0001
209	E-17	Wind Sifter	Residue	N	Outside	Y	Y	Wind Sifter	100%	100%	B	6.20	2,285.1	22,851	0.002200 ^a	0.0136	0.0025	0.0000	0.000740 ^a	0.0000	0.0008	0.0000	0.000050 ^a	0.0000	0.0001	0.0000
210	E-21	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	8.29	3,055.5	30,555	0.003000	0.0050	0.0009	0.0092	0.001100	0.0018	0.0003	0.0034	0.000167	0.0003	0.0001	0.0005
211	E-21	Magnetic Separation	Ferrous	N	Outside		N	NA			A	0.05	18.4	184	0.003000 ^a	0.0002	0.0000	0.0003	0.001100 ^a	0.0001	0.0000	0.0001	0.000167 ^a	0.0000	0.0000	0.0000
212	E-21	Magnetic Separation	Mixed Non-Ferrous	N	Outside		N	NA			A	0.40	147.4	1,474	0.003000 ^a	0.0012	0.0002	0.0022	0.001100 ^a	0.0004	0.0001	0.0008	0.000167 ^a	0.0001	0.0000	0.0001
213	E-22	Eddy Current Separator	Zorba	N	Outside		N	NA			A	1	368.6	3,686	0.003000 ^a	0.0030	0.0006	0.0055	0.001100 ^a	0.0011	0.0002	0.0020	0.000167 ^a	0.0002	0.0000	0.0003
214	E-22	Eddy Current Separator	Residue	N	Outside		N	NA			A	7.28	2,686.9	26,869	0.003000 ^a	0.0219	0.0040	0.0403	0.001100 ^a	0.0080	0.0015	0.0148	0.000167 ^a	0.0012	0.0002	0.0022
215	E-23	Wind Sifter	Lights	N	Outside	Y	Y	Cover			B	1.09	401.7	4,017	0.002200 ^a	0.0024	0.0004	0.0044	0.000740 ^a	0.0008	0.0001	0.0015	0.000050 ^a	0.0001	0.0000	0.0001
216	E-23	Wind Sifter	Residue	N	Outside	Y	Y	Wind Sifter	100%	100%	B	6.20	2,285.1	22,851	0.002200 ^a	0.0136	0.0025	0.0000	0.000740 ^a	0.0000	0.0008	0.0000	0.000050 ^a	0.0000	0.0001	0.0000

Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois

Row #	Equipment Description	Material	Maximum V / H	Transfer Location (Inside/Outside)	Transfer Control (Y/N)	Type of Endpoints	Dust Particle Size (µm)	Dust Control Efficiency (%)	Emission Factor (lb/ton)	Material Throughput		PM ₁₀ Emissions		PM _{2.5} Emissions	
										Annual (1000 tons/yr)	DC PM ₁₀ Control Eff	lb/ton	lb/yr	lb/ton	lb/yr
217	Magnetic Separator	Residue	N	Inside	N	ECS	100%	100%	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
218	Magnetic Separator	Ferrous	N	Outside	N	NA			0.25	92.1	0.00000	0.00000	0.00000	0.00000	0.00000
219	Eddy Current Separator	Residue	N	Outside	N	NA			7.15	2,633	0.00000	0.00000	0.00000	0.00000	0.00000
220	Eddy Current Separator	Zn/As	N	Outside	N	NA			1	368	0.00000	0.00000	0.00000	0.00000	0.00000
221	Magnetic Separator	Residue	N	Inside	N	ECS	100%	100%	6.53	2,434	0.00000	0.00000	0.00000	0.00000	0.00000
222	Magnetic Separator	Residue	N	Inside	N	ECS	100%	100%	6.53	2,434	0.00000	0.00000	0.00000	0.00000	0.00000
223	Eddy Current Separator	Zn/As	N	Outside	N	NA			1.50	552.9	0.00000	0.00000	0.00000	0.00000	0.00000
224	Eddy Current Separator	Residue	N	Outside	N	NA			5.05	1,843	0.00000	0.00000	0.00000	0.00000	0.00000
225	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.26	82.5	0.00000	0.00000	0.00000	0.00000	0.00000
226	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.35	123.0	0.00000	0.00000	0.00000	0.00000	0.00000
227	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.35	123.0	0.00000	0.00000	0.00000	0.00000	0.00000
228	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.45	161.1	0.00000	0.00000	0.00000	0.00000	0.00000
229	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.05	18.4	0.00000	0.00000	0.00000	0.00000	0.00000
230	Separator	Low speed shredder for zinc reduction	N	Outside	N	NA			0.55	201.7	0.00000	0.00000	0.00000	0.00000	0.00000
231	Separator	High speed shredder for zinc reduction	N	Outside	N	NA			2.70	995.1	0.00000	0.00000	0.00000	0.00000	0.00000
232	Eddy Current Separator	Residue	N	Inside	N	ECS	100%	100%	0.50	184.3	0.00000	0.00000	0.00000	0.00000	0.00000
233	Eddy Current Separator	Residue	N	Outside	N	NA			2.2	819.0	0.00000	0.00000	0.00000	0.00000	0.00000
234	Eddy Current Separator	Residue	N	Outside	N	NA			1.25	460.7	0.00000	0.00000	0.00000	0.00000	0.00000
235	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.25	92.1	0.00000	0.00000	0.00000	0.00000	0.00000
236	Eddy Current Separator	Light Zinc	N	Outside	N	NA			2.70	995.1	0.00000	0.00000	0.00000	0.00000	0.00000
237	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.45	161.1	0.00000	0.00000	0.00000	0.00000	0.00000
238	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.15	55.3	0.00000	0.00000	0.00000	0.00000	0.00000
239	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.30	110.6	0.00000	0.00000	0.00000	0.00000	0.00000
240	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.15	55.3	0.00000	0.00000	0.00000	0.00000	0.00000
241	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.35	123.0	0.00000	0.00000	0.00000	0.00000	0.00000
242	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.04	14.7	0.00000	0.00000	0.00000	0.00000	0.00000
243	Eddy Current Separator	Light Zinc	N	Outside	N	NA			0.18	64.3	0.00000	0.00000	0.00000	0.00000	0.00000

Layman, Robb

From: John Pinion <jpinion@rka-inc.com>
Sent: Monday, January 27, 2020 5:10 PM
To: Bernoteit, Bob
Cc: Barria, German; GII, LLC; Kallas, Jim (jimkallas@general-iron.com); Zwick, Ann M.
Subject: [External] Revised Emission Estimates for GIII Const Pmt App
Attachments: 2020-01-27 Revised Section 3 of GIII Const Pmt App - Emissions.pdf



Bob,

Attached is an electronic copy of a file containing revisions to Section 3 of the GIII construction permit application – Emission Estimates. The emission estimates were modified to:

- incorporate of the November 2019 RTO/Scrubber Emissions Test results documented in the January 16, 2020 RTO/Scrubber Emissions Test report (provided as Appendix D, attached to these updated emission estimates);
- add six supplemental conveyors for the Ferrous material handling system and six supplemental conveyors for the Non-Ferrous material handling system. These supplemental conveyors have been added to meet the potential need for a limited number of additional conveyors beyond the number of conveyors identified in the original system designs; and,
- incorporate of updated metal emission rates identified in a recent air dispersion modeling assessment provided to IEPA. These updated values are used to update facility-wide metal HAP emissions.

The changes below are relatively insignificant and are being submitted so that the proposed emissions identified in the construction permit application are consistent with those used in the recently submitted metals modeling analysis.

A hard copy of the above document, with a CD ROM containing the GII emission test report has been sent to your attention for delivery on Tuesday morning January 28, 2019 by 10:30 AM.

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
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January 27, 2020

R17421-7

Mr. Ray Pilapil
Illinois Environmental Protection Agency - Bureau of Air
1021 North Grand Avenue East
Springfield, IL 62702

**Updated Emission Estimates
Construction Permit Application 19090021 for a
New Scrap Metal Recycling Facility
General III, LLC – 11600 South Burley - Chicago, Illinois
Site ID No. 031600SFX**

Dear Mr. Pilapil:

Please find attached an updated copy of facility emission estimates for the above referenced construction permit application. This updated Section 3.0 Facility Emissions Estimates of the original GIII construction permit application has been prepared to include the following updates.

- Incorporation of the November 2019 RTO/Scrubber Emissions Test results documented in the January 16, 2020 RTO/Scrubber Emissions Test report (provided as Appendix D, attached to these updated emission estimates).
- Addition of six supplemental conveyors for the Ferrous material handling system and six supplemental conveyors for the Non-Ferrous material handling system. These supplemental conveyors have been added to meet the potential need for a limited number of additional conveyors beyond the number of conveyors identified in the original system designs.
- Incorporation of updated metal emission rates identified in a recent air dispersion modeling assessment provided to IEPA. These updated values are used to update facility-wide metal HAP emissions.

If you have any questions or need any additional information, please don't hesitate to contact us at 630-393-9000.

Yours very truly,
RK & Associates

A handwritten signature in black ink, appearing to read "John A. Pini".

cc: Mr. Jim Kallas – General III, LLC – Chicago, Illinois (via e-mail)

**Updated Emission Estimates
Construction Permit Application 19090021 for a
New Scrap Metal Recycling Facility
General III, LLC - Chicago, Illinois**

January 27, 2020

R17421-7

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

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



**2 South 631 Route 59
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Warrenville, Illinois 60555
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3.0 FACILITY EMISSIONS ESTIMATES – Updated January 22, 2020

Updated Information

This updated Section 3.0 Facility Emissions Estimates of the original GIII construction permit application has been prepared to include the following updates.

- Incorporation of the November 2019 RTO/Scrubber Emissions Test results documented in the January 16, 2020 RTO/Scrubber Emissions Test report (provided as Appendix D, attached to these updated emission estimates).
- Addition of six supplemental conveyors for the Ferrous material handling system and six supplemental conveyors for the Non-Ferrous material handling system. These supplemental conveyors have been added to meet the potential need for a limited number of additional conveyors beyond the number of conveyors identified in the original system designs.
- Incorporation of updated metal emission rates identified in a recent air dispersion modeling assessment provided to IEPA. These updated values are used to estimate of facility-wide metal HAP emissions.

As described in this application, GIII will install a state-of-the-art emissions control system on the hammermill shredder. The shredder will be located inside of a partial enclosure with walls and a vented metal roof to help contain debris and particulate matter (PM) generated during the shredding process. The shredder will be equipped with an integral water injection system to minimize the potential for fires and deflagrations inside the shredder. As established in previous permits, the water injection system is integral to the process and is not a pollution control device for the purposes of this permit application.

GIII has taken other significant measures to limit emissions, and potential impacts, from this facility, including:

- GIII's proposed facility will be a state-of-the-art recycling facility located in the heart of an industrial district well-buffered from residential properties with at least 1,500 feet between the facility property line and the nearest residential area.
- Approximately 95% of interior plant roadways are paved with concrete or asphalt. The remaining approximately 5% of interior plant roadways consist of crushed slag or similar materials and are only lightly traveled.
- The shredder will be one of the first shredders in the nation to install a comprehensive emissions capture and control system to control VOM, PM, and HAPs.

**Facility Emissions Estimates
(Updated January 22, 2020)**

- Many of the conveyors in the Non-Ferrous Material Processing System will be equipped with covers to prevent windblown emissions.
- The majority of the fines processing equipment is located within a building and controlled with dust collectors.
- GIII will implement a fugitive operating program that will require periodic watering and sweeping of traffic areas to minimize fugitive particulate emissions.
- GIII will use a network of dust boss water atomizing cannons to apply water into the ambient air to wet suspended particulate to increase settling.
- The facility has received all necessary zoning approvals from the City of Chicago.

Emission units identified in the application include:

- Shredder controlled by cyclone, roll-media filter, RTO, and packed tower scrubber;
- Ferrous Material Processing System;
- Non-Ferrous Material Processing System;
 - Dust Collector for control of select exhaust streams from the fines handling building;
- Stockpiles (fugitive emissions);
- Paved and Unpaved Roads (fugitive emissions); and
- Miscellaneous Natural Gas Fired Environmental Heaters (exempt from permitting).

Each of the above emission units are discussed in the sections below and emissions for each are summarized in Tables 3-1A through 3-1E and Tables 3-2 through 3-6. Facility-wide criteria and HAP pollutant emissions are summarized in Tables 3-7 and 3-8. The emissions estimates presented in this application demonstrate that the proposed Facility is a minor source with respect to new source review, and Title V permitting requirements and is also a minor source of HAP emissions.

3.1 Shredder Emissions Controlled by Cyclone, Roll-Media Filter, Regenerative Thermal Oxidizer, and Packed Tower Scrubber

Updated Information

As described herein, emission estimates for the proposed Shredder have been updated to incorporate the results from the November 2019 emissions testing performed on the RTO/Scrubber at GII that will be relocated to GIII as part of this project.

This section provides shredder emissions estimates for captured/controlled emissions routed through the proposed emission control system consisting of a cyclone, roll-media filter, RTO, and packed tower scrubber.

GIII will install a new shredder at the proposed facility and will relocate the existing cyclone, roll-media filter, RTO and packed tower scrubber from the existing GII facility to the proposed facility. The raw scrap feed stream received at the existing GII facility is essentially the same feed stream that will be received at GIII's proposed facility. For these reasons, for the purposes of this application, the emission data from the existing shredder and emission control system at the GII facility is assumed to reasonably represent the anticipated emissions from GIII's new shredder at the proposed facility.

The shredder will be located inside of a partial enclosure with walls and a vented metal roof to help contain debris and particulate matter (PM) generated during the shredding process. The shredder will be equipped with an integral water injection system to minimize the potential for fires and deflagrations inside the shredder.

VOM emission estimates presented herein assume an RTO control efficiency of 98% based on the design of the RTO. The RTO/Scrubber currently in use at GII, will be moved to GIII. Compliance demonstration testing of the existing RTO/Scrubber at GII was completed on November 14, 15, and 18, 2019.

The captured shredder emissions identified in this application are based on demonstrated emission factors in units of pounds-of-emissions per ton of gross feed to the shredder derived from November 2019 emissions testing of the existing GII RTO/Scrubber.

The emissions estimates presented in this updated section are calculated using demonstrated emission factors and proposed maximum monthly and annual material throughput rates. This construction permit application does not rely on operating hours to estimate monthly or annual emissions; therefore, no operating hour limits are requested.

This construction permit application requests an annual shredder throughput limit of 1,000,000 tons/year and a monthly throughput limit of 10% of the annual, or 100,000 tons/month.

Visual observations of the shredder capture hood by USEPA representatives during the November 2019 emissions testing indicated that the hood over the shredder achieved an estimated capture efficiency of greater than >90%. The nature of the shredding operation and related safety concerns prevents a direct measurement of emissions capture efficiency using a permanent or temporary total enclosure; therefore, the GII RTO/Scrubber compliance demonstration testing did not require capture efficiency testing.

The Shredder PM/PM₁₀, metals, HCl, HF and total HAPs in this application includes a safety factor applied to the product of November 2019 emission factors multiplied by the maximum projected monthly and annual material throughputs. No safety factor is applied to VOM because permitted emissions are calculated using 98% VOM removal efficiency whereas the demonstrated VOM removal efficiency was 99%.

3.1.1 Shredder VOM and CO Emissions

For the purposes of these emission calculations, it is assumed that THC, as referenced in November 2019 RTO/Scrubber emissions testing report (see Appendix D) is equivalent to VOM.

The proposed VOM and CO emission limits for the proposed Shredder, controlled by a cyclone, roll-media filter, RTO and packed tower scrubber, are presented in Table 3-1A.

The uncontrolled VOM emission factor, was adjusted to subtract methane and ethane pursuant to USEPA Method 25A. It should be noted that the November 2019 VOM emissions testing was performed at a significantly elevated shredder feed rate (444 tph) and End of Live Vehicle (ELV) feed rate (50.9%) in order to maximize VOM loading to the RTO. These operating rates yielded an uncontrolled VOM emission factor of 0.5119 pounds of VOM per ton of gross shredder feed (see test report in Appendix D).

The monthly Shredder RTO/Scrubber VOM emissions rate is calculated using the following equation:

$$100,000 \frac{\text{ton}}{\text{month}} \times 0.5119 \frac{\text{lb VOM}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2,000 \text{ lbs}} \times (1 - 0.98) = 0.51 \frac{\text{ton}}{\text{month}}$$

maximum monthly shredder throughput	adjusted VOM emission factor (captured emissions) November 2019	convert lb/ton	minimum VOM removal efficiency	monthly VOM emissions
--	--	-------------------	---	-----------------------------

The annual Shredder RTO/Scrubber VOM emissions rate is calculated using the following equation:

$$1,000,000 \frac{\text{ton}}{\text{year}} \times 0.5119 \frac{\text{lb VOM}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2,000 \text{ lbs}} \times (1 - 0.98) = 5.12 \frac{\text{tons}}{\text{year}}$$

maximum annual shredder throughput	adjusted VOM emission factor (captured emissions) November 2019	convert lbs to tons	minimum RTO VOM removal efficiency	annual VOM emissions
---	--	------------------------	---	----------------------------

CO emissions are estimated by multiplying the proposed monthly and annual shredder material throughput rates by the CO emission factor measured during the November 2019 RTO/Shredder Emissions Test and the application of a safety factor.

The monthly Shredder RTO/Shredder CO emissions rate is calculated using the following equation:

$$100,000 \frac{\text{ton}}{\text{month}} \times 0.0219 \frac{\text{lb CO}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2,000 \text{ lbs}} \times 2.00 = 1.29 \frac{\text{ton}}{\text{month}}$$

maximum monthly shredder throughput	CO emission factor (captured emissions) November 2019	convert lb to tons	Safety Factor	monthly CO emissions
--	---	-----------------------	------------------	----------------------------

The annual Shredder RTO/Scrubber CO emissions rate is calculated using the following equation:

$$1,000,000 \frac{\text{ton}}{\text{year}} \times 0.0219 \frac{\text{lb CO}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2,000 \text{ lbs}} \times 2.0 = 12.86 \frac{\text{tons}}{\text{year}}$$

maximum annual shredder throughput	CO emission factor (captured emissions) November 2019	convert lbs to tons	safety factor	annual CO emissions
---	---	------------------------	------------------	---------------------------

3.1.2 Shredder Particulate Emissions

The estimated shredder PM/PM₁₀ emissions are presented in Table 3-1B. A PM/PM₁₀ emission factor was developed from filterable PM emissions testing conducted on November 18, 2019, performed in the scrubber exhaust stack. The emissions test report for this testing event is presented in Appendix D of this application.

The demonstrated PM/PM₁₀ emission factor from the November 18, 2019, emissions test was 0.0032 lb/ton of gross shredder feed (see Appendix D).

For the purposes of this permit application, the filterable PM/PM₁₀ emission factor of 0.0047 lb/ton from the original application is used herein to conservatively calculate the proposed filterable PM/PM₁₀ emissions limits. For the purposes of this application, filterable PM is conservatively assumed to be PM₁₀.

A safety factor of 4.0 (consistent with the original permit application) has also been included in the estimated PM/PM₁₀ emission calculations below.

$$100,000 \frac{\text{ton}}{\text{month}} \times 0.0047 \frac{\text{lb filterable PM/PM}_{10}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2,000 \text{ lbs}} \times 4.00 = 0.94 \frac{\text{tons}}{\text{month}}$$

maximum monthly shredder throughput	filterable PM/PM ₁₀ emission factor (captured emissions) from original application	Convert lbs to tons	safety factor	monthly filterable PM/PM ₁₀ emissions
--	--	------------------------	------------------	---

The annual shredder PM/PM₁₀ emissions limit (measured in the scrubber discharge stack) is calculated using the following equation:

$$1,000,000 \frac{\text{ton}}{\text{year}} \times 0.0047 \frac{\text{lb filterable PM/PM}_{10}}{\text{ton shredder feed}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times 4.00 = 9.40 \frac{\text{tons}}{\text{year}}$$

maximum annual shredder throughput	filterable PM/PM ₁₀ emission factor (captured emissions) from original application	convert lbs to tons	safety factor	annual filterable PM/PM ₁₀ emissions
---	--	------------------------	------------------	--

3.1.3 Shredder Hazardous Air Pollutant Emissions

Shredder HAP emissions are summarized in Table 3-1C below. HAP emissions estimates are provided for captured HAP emissions emitted through the RTO/Scrubber stack. Proposed metal HAP and inorganic acid HAPs are based on metals and HCl/HF emission testing performed on November 14, 2019. Organic HAP emissions are estimated based on uncontrolled organic compound emission rates, identified in the Institute of Scrap Recycling Industry, Inc. (ISRI) Title V Applicability Workbook, Table D-11F (Appendix C of the original construction permit application) and adjusted for 98% removal efficiency in the RTO.

For the purposes of this permit application, a safety factor of 4.0 has been applied to the November 2019 measured emission factors for metal HAPs, HCl and HF (consistent with the PM/PM₁₀ safety factor) and a safety factor of 2.0 been applied to organic HAPs.

Shredder metal HAP, organic HAP, and inorganic acid HAP emissions are summarized in Table 3-1C.

3.1.4 Shredder RTO Natural Gas Combustion Emissions

The estimated shredder RTO natural gas combustion emissions are presented in Table 3-1D. Emissions are calculated using a maximum RTO natural gas firing rate of 15 MMBtu/hr, a natural gas higher heating value (HHV) of 1,020 Btu/scf, and standard USEPA natural gas emission factors from AP-42; Chapter 1.4; Tables 1.4-1 and 1.4-2.

Natural gas combustion emission estimates are presented for criteria pollutants, Greenhouse Gases (GHG), and metal and organic HAPs.

3.1.5 Shredder Emissions Summary

Table 3-1E presents a summary of total estimated shredder emissions controlled by the cyclone, roll-media filter, RTO and packed tower scrubber. The values identified in Table 3-1E identify the updated emissions limits and shredder throughput limits requested in this permit application. The proposed emission limits are in units of tons/month and tons/year and correspond to shredder gross feed rates of 100,000 tons/month and 1,000,000 tons/year.

The updated emissions information in this submittal is limited to the addition of six supplemental conveyor transfer points so up to six additional transfer points can be added during construction without requiring revision of the construction permit.

3.2 Ferrous Material Processing System Emissions

Emissions from the Ferrous Material Processing System include PM, PM₁₀, PM_{2.5} and metal HAPs. There is no combustion or high temperature processing performed, so emissions of VOM and other products of combustion are not anticipated.

Updated Information

As described herein, particulate emissions from the Ferrous Material Processing System have been increased slightly by the addition of six supplemental material transfer points. Including these 'extra' material transfer points will allow the addition of up to six additional transfer points (as may be needed) during construction of this system without requiring a modification of the construction permit issued for this project.

Updated estimates of metal HAP emissions from the Ferrous Material Processing System are also incorporated herein.

3.2.1 Particulate Emissions

A review of AP-42 emission factors did not identify any published emission factors for processing shredded scrap metal or ASR using feed hoppers, conveyors, magnetic separators, screens, vibratory feed tables, eddy current separators, wind sifters, induction sorters, polishers, Air Vibe separators, or material transfer to stockpiles or storage containers. RKA is also not aware of any other source of published emission factors for this equipment processing shredded scrap metal or ASR.

In the *Institute of Scrap Recycling Industries (ISRI) Title V Applicability Workbook (1996)*, Footnote 1 on Table D-9, states that;

“Emission factors applicable to conveyor transfer points for scrap in feed material or products are not available. A conservative estimate of PM₁₀ emission can be made using emission factors derived from the handling of crushed stone products. The factors in this table were adapted from AP-42, Crushed Stone Processing, Section 11.19.2, Table 11.19.2-2 for uncontrolled and controlled transfer points.”

The AP-42 emission factors for crushed stone (Section 11.19.2; Table 11.19.2.2) have been uniformly adopted by the metal recycling industry as evidenced by their use in numerous permit applications for metal recycling facilities and have been accepted by IEPA and other state regulatory agencies throughout the United States.

ASR separation processes include only one small low speed high torque shredder used for size reduction of clean metal. All other ASR equipment is designed for material separation. This fact limits the potential generation of total suspended particulate matter (TSP) to only the fines present in the ASR being processed. Based on the above, the application of AP-42 particulate matter emission factors for crushed stone processing to ASR processing is likely to result in estimated emissions that are greater than actual emissions from ASR separation processes.

The following table identifies emission factors from AP-42, Table 11.19.2-2 that are typically used in metal recycling emission calculations. The identifiers in the first column of the table are used in Tables 3-2 and 3-3 to document the specific emission factors used to estimate emissions for each piece of equipment or operation.

Particulate Emission Factors from AP 42; Table 11.19.2-2 Crushed Stone Processing (8/2004) Used in Estimating PM Emissions in Scrap Metal Material Handling and ASR Separation Operations.

Identifier Used in Tables 2 & 3	Equipment	Material	Uncontrolled			Controlled ¹		
			PM lb/ton	PM10 lb/ton	PM2.5 lb/ton	PM lb/ton	PM10 lb/ton	PM2.5 lb/ton
A	Conveyor Transfer Point	Crushed Stone	0.0030	0.0011	0.000167 ²	0.00014	0.000046	0.000013
B	Screening	Crushed Stone	0.0250	0.0087	0.001317 ²	0.00220	0.000740	0.000050
C	Truck loading	Fragmented Stone	0.000033 ³	0.000016	0.000002 ²			
D	Truck Loading	Crushed Stone	0.000204 ³	0.00010	0.000015 ²			

1. Use controlled emission factors when the moisture content of the materials being processed are greater than 1.5% by weight.
2. Where PM2.5 emission factors are not provided in AP-42, 11-19.2-2, a ratio of aerodynamic particle size multipliers from AP-42, 13.2.4 are used to estimate PM2.5 emission factors. PM2.5 EF = (PM10 EF/.035) x .0053.

Aerodynamic Particle sizes from AP-42, 13.2.4				
<30 um	<15 um	<10 um	<5 um	<2.5 um
0.74	0.48	0.35	0.2	0.053

3. PM emissions estimated as % of PM10 pursuant to Appendix A of SCAQMD Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds, October 2006.

Particulate emissions from the Ferrous Material Processing System are generated from material transfer points and material drops (dropping materials onto stockpiles).

Material transfer emissions are calculated by applying selected PM, PM₁₀ and PM_{2.5} emission factors, in units of pounds of particulate matter per ton of material processed, to the projected material throughput rates (tons per hour and tons per year) at each material transfer point. Material transfer points include the points at which material is transferred from one device to another, such as conveyor to conveyer transfers, conveyor to equipment transfers, and equipment to conveyor transfers. Material throughput rates at each transfer point have been estimated by the equipment supplier.

Material drop emissions are calculated using the material drop equation from AP-42 Section 13.2.4.3 for all locations where material is dropped from a conveyor onto a stockpile or into a container.

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

E = emission factor (lb/ton of material dropped)

k = particle size multiplier (dimensionless)

U = mean wind speed

<https://www.timeanddate.com/weather/usa/chicago/climate>

M = material moisture content (%)

U = 9.0 mph - annual average wind speed for Chicago (Midway Airport)

K = 0.74 PM - AP-42, Section 13.2.4, for particle size < 30 um

0.35 PM - AP-42, Section 13.2.4, for particle size < 10 um

0.053 PM - AP-42, Section 13.2.4, for particle size < 2.5 um

M = 1.5 % for light materials - AP-42, Table 13.2.4-1 for crushed limestone - (conservative)

The mean wind speed is annual average wind speed recorded at Midway Airport in Chicago, Illinois. Material discharged from the shredder is sprayed by water due the water injection system. The moisture content of material is conservatively assumed to be 1.5% for most applications (unless otherwise specified in table footnotes) because this is the moisture content that triggers the use of controlled emission factors for material transfer points in AP-42, Section 11.19.2 (Crushed Stone Processing).

Table 3-2 presents a summary of estimated PM/PM₁₀/PM_{2.5} from the Ferrous Material Processing System and has been updated to has six supplemental material transfer points.

3.2.2 Metal HAP Emissions

Detailed metal and metal HAP emissions from the Ferrous Material Processing, Non-Ferrous Material Processing, Stockpile operations, and fugitive road dust were estimated using metals analyses data from samples of material deposition collected from GII. The results of the GII metals analyses were applied to emission units and activities at GIII that correspond to the location of the GII samples. The following table summarizes the results of the metals analyses from GII samples and describes how these results were applied to GIII emission units and activities.

For the purpose of modeling potential off site metal impacts, the Ferrous Material Processing System was divided into several volume sources. Particulate emissions from each volume source were assigned sample results from the GII material deposition sample that represents the emission unit or activity in each volume source.

**Facility Emissions Estimates
(Updated January 22, 2020)**

Summary of Metal Concentrations in Material Deposition¹ at GII

HAP	Metals (Method 29)	Material Deposition Samples Collected from GII				
		Ferrous Roadway mg/kg	ASR Roadway mg/kg	General Roadway mg/kg	Ferrous Transfer mg/kg	Non-Ferrous Transfer mg/kg
Y	Lead	763	1,610	525	4,230	4,720
Y	Manganese	960	1,030	729	2,210	1,760
Y	Mercury	1.77	6.95	2.22	18.8	9.34
Y	Nickel	125	463	106	304	311
Y	Antimony	< 1.23	< 1.22	< 1.16	< 1.17	< 1.21
Y	Arsenic	2.28	1.75	2.70	2.75	4.51
Y	Beryllium	< 5.90	< 1.30	< 5.50	< 1.17	< 1.21
Y	Cadmium	9.63	18.4	5.42	47.6	34.6
Y	Chromium	220	991	173	402	425
Y	Cobalt	15.7	38.5	10.7	52.0	55.8
Y	Phosphorus	598	561	270	833	934
Y	Selenium	< 1.23	< 1.22	< 1.16	< 1.17	< 1.21
N	Zinc	5,470	13,300	3,080	37,300	34,000
N	Barium	388	673	232	984	684
N	Copper	1,110	1,080	841	2,100	1,650
N	Silver	< 12.3	< 12.2	< 11.6	< 11.7	< 12.1
N	Thallium	< 1.23	< 1.22	< 1.16	< 1.17	< 1.21

1. Bulk material samples from designated areas were transported to Environmental Monitoring and Technologies, Inc. (EMT) and sieved to remove oversized material. The resulting materials were analyzed for metals using the analytical methods identified in USEPA Method 29 (Metals Emissions from Stationary Sources).

**GII Material
Deposition
Sample Name**

**Sample Description and
Application of Results to GIII Emission Units and Activities**

Ferrous Roadway Sample collected at GII from the vehicle roadway adjacent to the shredded ferrous metal stockpile. Sample results represent anticipated metals content of fugitive particulate emissions from vehicular traffic near the shredded ferrous material stockpiles at GIII.

ASR Roadway Sample collected at GII from the vehicle roadway adjacent to the ASR handling and stockpile area. Sample results represent anticipated metals content of fugitive particulate emissions from vehicular traffic near the bulk ASR handling and ASR stockpile areas at GIII.

GII Material Deposition Sample Name	Sample Description and Application of Results to GIII Emission Units and Activities
General Roadway	Sample collected from the entrance to GII. Sample results represent anticipated metals content of fugitive particulate emissions from vehicular traffic between the facility entrance gate and the raw scrap unloading area at GIII.
Ferrous Transfer	Sample collected at GII from the pavement adjacent to ferrous material transfer conveyors. Sample results represent anticipated metals content of particulate emissions from the Ferrous Material Processing System from the outlet of the shredder to the ferrous material stockpiles and barge loading area at GIII.
Non-Ferrous Transfer	Sample collected at GII from fines deposited on horizontal surfaces (i.e. beams, pipes, etc.) inside the ASR processing building. Sample results represent anticipated metals content of particulate emissions from the Non-Ferrous Processing System at GIII.

The summary of facility-wide HAP emissions presented in Table 3-8 identifies total metal HAP emissions from the Ferrous Material Processing System.

3.3 Non-Ferrous Material Processing System Emissions

Updated Information

Particulate emissions from the Non-Ferrous Material Processing System have been increased slightly by the addition of six supplemental material transfer points. Including these ‘extra’ material transfer points will allow the addition of up to six additional transfer points (as may be needed) during construction of this system without requiring a modification of the construction permit issued for this project.

Updated estimates of metal HAP emissions from the Ferrous Material Processing System are also incorporated herein.

Emissions from the Non-Ferrous Material Processing System include PM, PM₁₀, PM_{2.5} and metal HAPs. There is no combustion or high temperature processing performed, so emissions of VOM and other products of combustion are not anticipated.

3.3.1 Particulate Emissions

Particulate emissions from the Non-Ferrous Material Processing System are generated from material transfer points, screening, truck loading, and material drops.

Material transfer emissions are calculated by applying selected PM, PM₁₀ and PM_{2.5} emission factors in units of pounds of particulate matter per ton of material processed, to the projected material throughput rates (tons per hour and tons per year) at each material transfer point. Material transfer points include the points at which material is transferred from one device to another, such as conveyor to conveyer transfers, conveyor to equipment transfers and equipment to conveyor transfers. Material throughput rates at each transfer point have been estimated by the applicant and the supplier.

Truck loading emissions are calculated by applying selected PM, PM₁₀ and PM_{2.5} emission factors in units of pounds of particulate matter per ton of material loaded, to the projected truck loading rates (tons per hour and tons per year).

Material drop emissions are calculated using the material drop equation from AP-42 Section 13.2.4.3 (see Section 3.2 above) for all locations where material is dropped from a conveyor onto a stockpile or into a container.

Equipment located in the Fines Building are controlled by one of four identical dust collectors. Each dust collector has a design flow rate of 12,000 cfm. Three of the dust collectors (DC-02, DC-03 and DC-04) will discharge treated air back into the building and therefore, have no emissions and are not emission units with respect to permitting requirements.

One of the dust collectors (DC-01) does vent to the outside atmosphere and its emissions represent emissions from all of the equipment located inside of the fines processing building. Particulate emissions from the dust collector are calculated by multiplying the design air flow rate by a clean side particulate concentration of 0.005 gr/dscf. The result of this calculation is shown on Table 3-3.

Table 3-3 presents a summary of estimated PM/PM₁₀/PM_{2.5} from the Non-Ferrous Material Processing System. This table has been updated to include six supplemental material transfer points.

3.3.2 Metal HAP Emissions

As described in Section 3.2.2 above, detailed metal and metal HAP emissions from the Ferrous Material Processing, Non-Ferrous Material Processing, Stockpile operations, and fugitive road dust were estimated using metals analyses data from samples of material deposition collected from GII. The results of the GII metals analyses were applied to emission units and activities at GIII that correspond to the location of the GII samples. Section 3.2.2 above summarizes the results of the metals analyses from GII samples and describes how these results were applied to GIII emission units and activities.

For the purpose of modeling potential off site metal impacts, the Non-Ferrous Material Processing System was divided into several volume sources. Particulate emissions from each volume source were assigned

sample results from the GII material deposition sample that represents the emission unit or activity in each volume source.

The summary of facility-wide HAP emissions presented in Table 3-8 identifies total metal HAP emissions from the Non-Ferrous Material Processing System.

3.4 Stockpile Fugitive Emissions

Updated Information

Estimates of metal HAP emissions associated with fugitive stockpile particulate emissions were updated by using the results of metal analyses from samples of material deposition at GII (see Section 3.2.2 above).

Fugitive emissions from stockpiles include particulate matter and metal HAPs.

3.4.1 Particulate Emissions

Fugitive particulate emissions from stockpiles are estimated in accordance with procedures recommended by the Texas Commission on Environmental Quality (TCEQ) for calculation of emissions from crushed stone processing. Fugitive emissions from stockpiles are calculated using the following equation:

$$\begin{aligned} \text{PM Emission Rate (tpy)} &= \frac{[(\text{inactive day PM EF} \times \text{No. of inactive days}) \times (\text{stockpile area}/2000) \times \text{control factor}] + [(\text{active day PM EF} \times \text{No. of active days}) \times (\text{stockpile area}/2000) \times \text{control factor}]}{1} \end{aligned}$$

Stockpile control factors are identified as follows:

Stockpile 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

A summary of stockpile fugitive particulate emissions is presented in Table 3-4.

3.4.2 Metal HAP Emissions

As described in Section 3.2.2 above, detailed metal and metal HAP emissions from the Ferrous Material Processing, Non-Ferrous Material Processing, Stockpile operations, and fugitive road dust were estimated using metals analyses data from samples of material deposition collected from GII. The results of the GII metals analyses were applied to emission units and activities at GIII that correspond to the location of the GII samples. Section 3.2.2 above summarizes the results of the metals analyses from GII samples and describes how these results were applied to GIII emission units and activities.

For the purpose of modeling potential off site metal impacts, the various material stockpiles were designated as volume sources associated with either the Ferrous or Non-Ferrous Material Processing Systems. Estimated fugitive particulate emissions from each stockpile were assigned sample results from the GII material deposition sample that represents the material managed in each stockpile.

The summary of facility-wide HAP emissions presented in Table 3-8 identifies total metal HAP emissions from stockpile fugitive emissions.

3.5 Fugitive Emissions from Paved and Unpaved Roads

Updated Information

Estimates of metal HAP emissions included in fugitive particulate emissions from paved and unpaved roads were updated by using the results of metal analyses of samples of material deposition at GII.

Fugitive emissions from paved and unpaved roads include particulate and metal HAPs.

3.5.1 Particulate Emissions

Facility roadways were divided into segments based on the type(s) of materials being transported for the purposes of estimating segment-specific particulate emissions to support an air dispersion modeling assessment of off-site metals impacts. The particulate emissions estimates described herein are greater than the estimated emissions included in the original application and have been updated to be consistent with emissions data used in the modeling assessment.

**Facility Emissions Estimates
(Updated January 22, 2020)**

Fugitive emissions from vehicular traffic on paved and unpaved roadways were estimated by identifying the material streams delivered to the site, transferred internally, and transported from the site. These material streams consist of :

- Peddler Scrap Deliveries;
- Truck Scrap Delivery to the North Scrap Stockpile;
- Truck Scrap Delivery to the South Scrap Stockpile;
- Ferrous Scrap Shipment from the North Ferrous Stockpile;
- Ferrous Scrap Shipments from the South Ferrous Stockpile;
- Ferrous Waste Shipped Off-Site;
- Non-Ferrous Products Shipped Off-Site;
- Non-Ferrous Waste Shipped Off-Site; and,
- Internal Material Transfer by Facility End Loaders.

Facility roadways were divided into segments representing the primary routes taken by vehicles hauling each material stream identified above as shown in Figure 3-1. The number of trips over each segment for each material were estimated by dividing the estimated daily quantity of each material stream handled (tons/day) by the average weight of vehicles used (average of loaded and unloaded weight). The results of this analysis provided an estimate of daily miles traveled for vehicles hauling each material stream.

As described in Tables 3-5A and 3-5B (particulate emissions from paved and unpaved roadways respectively), the average vehicle weights were combined with site-specific parameters to estimate the uncontrolled particulate emissions in units of lb of particulate/vehicle mile traveled. A control efficiency (also identified in Tables 3-5A and 3-5B) was then applied to identify a controlled emission factor (lbs/vehicle mile traveled) for paved and unpaved roads. The facility will employ a program of sweeping and watering described in the facility's Fugitive Particulate Operating Program to minimize generation of fugitive emissions from facility roadways.

The controlled particulate emission factors were then combined with the estimated daily miles traveled for each material/vehicle type to calculate daily emissions of PM, PM₁₀ and PM_{2.5}. Daily emissions were multiplied by annual operating days (6 days per week and 52 weeks per year) to estimate annual emissions. Monthly emissions were assumed to be 10% of annual emissions.

The estimated number and weight of vehicles required to operate the facility at its maximum throughput was calculated, and the mean vehicle weight was used in the fugitive particulate calculations for both paved and unpaved roads. The total daily vehicle miles traveled on-site for each type of vehicle was provided by facility personnel.

Approximately 95% of interior plant roadways will be paved with concrete or asphalt. The remaining approximately 5% of interior plant roadways, consisting of compacted crushed slag or similar materials, will be lightly traveled.

Fugitive particulate emissions from vehicular traffic on paved roadways are calculated pursuant to AP-42, Section 13.2.1 Paved Roads, using the following equation:

$$E_{ext} = (k * (sL)^{0.91} * (W)^{1.02}) * (1 - (P/(4N)))$$

Equation 2, AP42, Section 13.2.1 Paved Roads (Jan 2011)

E_{ext} =		Size specific annual average particulate emission factor (lb/VMT)
	0.011 PM	
K =	0.0022 PM ₁₀ 0.0054 PM _{2.5}	Particle size multiplier lb/VMT (AP-42 Table 13.2.1-1)
sL =	9.7	Mean controlled silt content, % (AP42 Table 13.2.1-3 Jan 2011 - Iron & Steel Range: 0.09 to 79; mean 9.7-g/m2)
W =		Mean vehicle weight, tons (use weighted average where available)
P =	120	Number of precipitation days (>0.01 in) per year (AP42 Fig 13.2.1.2 Jan 2011 - Chicago, IL)
N =	365	Averaging Period, annual
Control Efficiency =	%	Estimated Control Efficiency for periodic sweeping and watering

Table 3-5A presents a summary of the estimated fugitive particulate emissions from paved roadways.

Fugitive particulate emissions from vehicular traffic on unpaved roadways are calculated pursuant to AP-42, Section 13.2.2 Unpaved Roads, using the following equation:

$$E_{ext} = (k * (s/12)^a * (W/3)^b) * ((N-P)/P)$$

Equation 1a & 2, AP42, Section 13.2.2 Paved Roads (Nov 2006)

E_{ext} =		Size specific annual average particulate emission factor (lb/VMT)
	4.9 PM	
K =	1.5 PM ₁₀ 0.15 PM _{2.5}	Particle size multiplier lb/VMT (AP-42 Table 13.2.2-2)
s =	6	Mean controlled silt content, % (AP42 Table 13.2.2-2 Nov 2006 - Iron & Steel Production (%))
W =		Mean vehicle weight, tons (use weighted average where available)
P =	120	Number of precipitation days (>0.01 in) per year – Chicago, IL (AP42 Fig 13.2.2-2 Nov 2006)
N =	365	Averaging Period, annual
Control Efficiency =	%	Estimated Control Efficiency for periodic watering or chemical treatment

Table 3-5B presents a summary of the estimated fugitive particulate emissions from unpaved roadways.

3.5.2 Metal HAP Emissions

As described in Section 3.2.2 above, detailed metal and metal HAP emissions from the Ferrous Material Processing, Non-Ferrous Material Processing, Stockpile operations, and fugitive road dust were estimated using metals analyses data from samples of material deposition collected from GII. The results of the GII metals analyses were applied to emission units and activities at GIII that correspond to the location of the GII samples. Section 3.2.2 above summarizes the results of the metals analyses from GII samples and describes how these results were applied to GIII emission units and activities.

For the purpose of modeling potential off site metal impacts, each identified roadway segment was assigned representative sample results from the GII material deposition samples.

The summary of facility-wide HAP emissions presented in Table 3-8 identifies total metal HAP emissions from roadway fugitive emissions.

3.6 Miscellaneous Natural Gas Combustion

Updated Information

There are no updates to estimated emissions from miscellaneous natural gas combustion.

Miscellaneous natural gas combustion sources will consist of environmental heaters.

The estimated miscellaneous natural gas combustion emissions are presented in Table 3-6. Emissions are calculated using a maximum natural gas firing rate of 10 MMBtu/hr, a natural gas higher heating value (HHV) of 1,020 Btu/scf, and standard USEPA natural gas emission factors from AP-42; Chapter 1.4; Tables 1.4-1 and 1.4-2.

Emission estimates are presented for criteria pollutants, greenhouse gas (GHG), and metal and organic HAPs.

3.7 Facility-Wide Criteria Pollutant Emissions

An updated summary of facility-wide criteria pollutant emissions is presented in Table 3-7.

3.8 Facility-Wide HAP Emissions

An updated summary of facility-wide HAP emissions is presented in Table 3-8.

**Updated Emission Estimates
Construction Permit Application 19090021 for a
New Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

**Updated Emission Estimates
January 27, 2020**

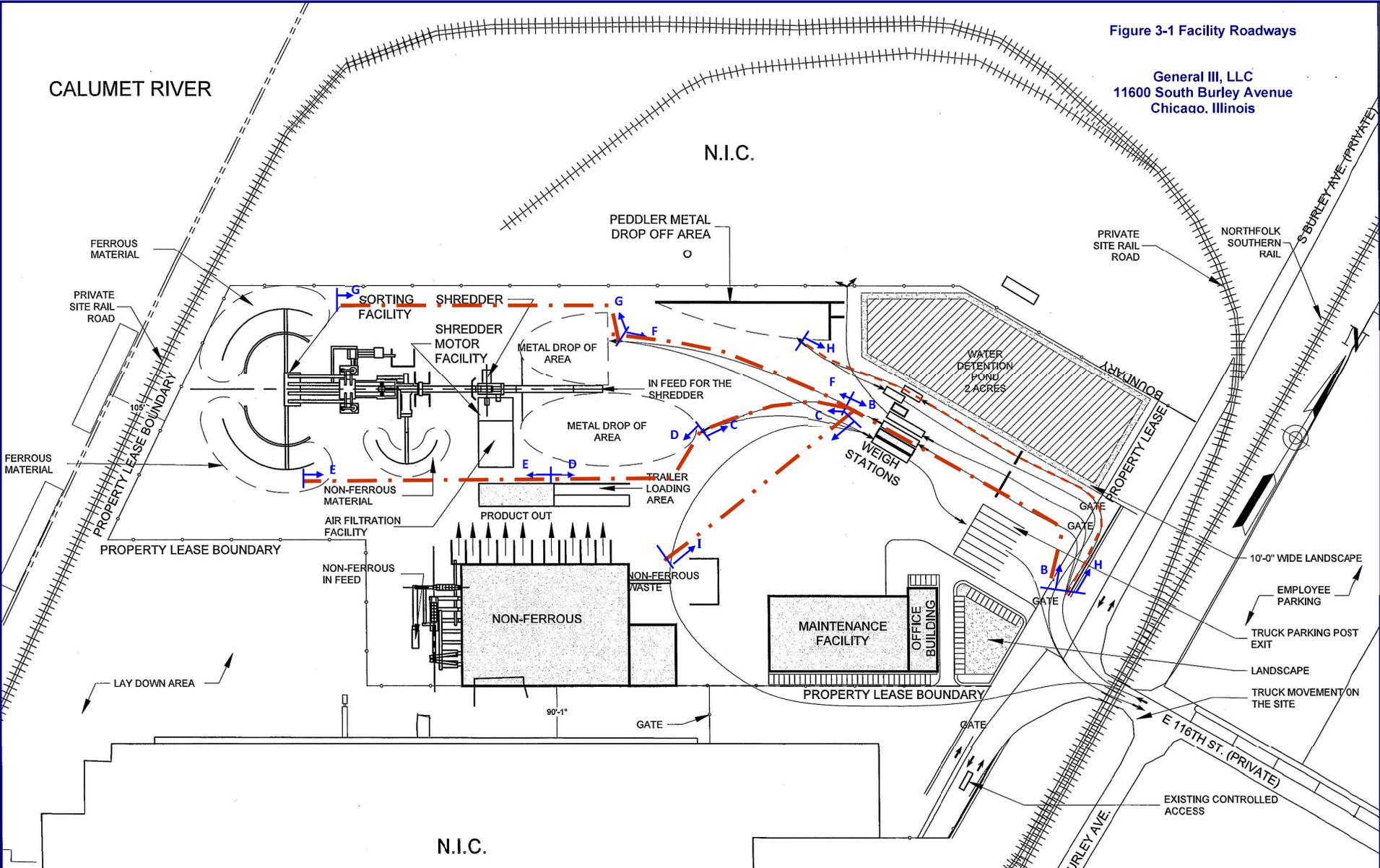
FIGURES

Figure 3-1 – Facility Roadways

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Figure 3-1 Facility Roadways

General III, LLC
11600 South Burley Avenue
Chicago, Illinois



- 10'-0" WIDE LANDSCAPE
- EMPLOYEE PARKING
- TRUCK PARKING POST EXIT
- LANDSCAPE
- TRUCK MOVEMENT ON THE SITE

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**Updated Emission Estimates
Construction Permit Application 19090021 for a
New Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

**Updated Emission Estimates
January 27, 2020**

TABLES

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Table 3-1A Summary of Controlled Shredder VOM and CO Emissions

General III, LLC - Chicago, Illinois

Parameter	Units	Values	Comment
Captured VOC Emissions Controlled by RTO and Emitted Through the RTO/Scrubber Stack			
Demonstrated Captured Shredder VOM Emission Factor ^a	$\frac{\text{lbs of VOM}}{\text{ton of gross shredder feed}}$	0.5119	Worst case value with 51% ELFs from November 18, 2019 testing by Method 25A (as propane). (Assume VOM = THC)
Maximum Gross Shredder Feed Rate	tons/month	100,000	Permitted maximum shredder feed rates requested in shredder RTO construction permit.
Maximum Annual Shredder Throughput ^b	tons/year	1,000,000	
RTO VOM Control Eff.	%	98.0%	RTO manufacturer's guarantee. The November 2019 testing demonstrated a VOM control efficiency of 99%. Using 98% to calculate permit limits results in incorporating a safety factor of 2.0.
VOM emission safety factor		1.00	Safety factor used to establish permitted shredder VOM emission limit.
Shredder VOM Emissions ^a	tons/month	0.51	Maximum VOM emission rates requested in construction permit application.
	tons/year	5.12	

Parameter	Units	Units	Comment
CO Emissions (from combustion of natural gas and VOM)			
CO emission factor measured at scrubber stack	lb/ton	0.0129	CO Emission Factor measured from November 14, 2019 emission testing
CO emissions safety factor		2.00	Safety factor applied to establish permitted shredder CO emission limits.
Total Shredder CO Emissions	tons/month	1.29	Maximum CO emission rates requested in construction permit application.
	tons/year	12.86	

a. VOM emissions measured by USEPA Method 25A minus methane, ethane, and compounds exempt from the federal definition of VOC and reported as propane.

b. Maximum annual shredder throughput requested in shredder RTO construction permit application based on recent operating data.

Table 3-1B Summary of Controlled Shredder Filterable Particulate Emissions

General III, LLC - Chicago, Illinois

Parameter	Units	Values	Comment
Captured PM/PM₁₀ Emissions Controlled by Cyclone and Roll Media Filter and Emitted Through the RTO/Scrubber Stack			
Demonstrated Filterable PM Emission Factor ^a	$\frac{\text{lbs of filterable PM}}{\text{ton of gross shredder feed}}$	0.0047	Measured value from November 18, 2019 emission testing.
Maximum Annual Shredder Throughput ^b	tons/month	100,000	Permitted maximum shredder feed rates requested in shredder RTO construction permit.
	tons/year	1,000,000	
Filterable PM Emissions Safety Factor		4.00	Safety factor used to establish permitted shredder PM emission rates.
Controlled Shredder Filterable PM Emission Rates	tons/month	0.94	Permitted filterable PM/PM ₁₀ emission rates requested in shredder RTO/Scrubber construction permit.
	tons/year	9.40	
Controlled Shredder Filterable PM ₁₀ Emission Rates	tons/month	0.94	Assumes that all PM is PM ₁₀ . Estimates assume no PM/PM ₁₀ emission reductions in RTO/Scrubber.
	tons/year	9.40	

a. Filterable PM emission rate measured by USEPA Methods 1 through 4 and Method 29.

b. Maximum annual shredder throughput requested in shredder RTO construction permit application based on recent operating data.

Table 3-1C Summary of November 2019 Shredder RTO/Scrubber HAP Emissions
General III, LLC - Chicago, Illinois

Pollutant	Emission Factor Nov 2019 RTO/ Scrubber Emis Testing lb/ton	Permitted Shredder Thruput Rates	
		100,000 ton/mo Maximum Hourly Emissions ton/month	1,000,000 tpy Maximum Annual Emissions tpy
Metal HAPs¹			
Lead ²	1.38E-06 ¹	2.77E-04	2.77E-03
Manganese	1.99E-06 ¹	3.98E-04	3.98E-03
Mercury	≤ 4.46E-05 ¹	≤ 8.93E-03	≤ 8.93E-02
Nickel	3.30E-06 ¹	6.59E-04	6.59E-03
Antimony	≤ 1.12E-06 ¹	≤ 2.25E-04	≤ 2.25E-03
Arsenic	≤ 3.97E-07 ¹	≤ 7.94E-05	≤ 7.94E-04
Beryllium	≤ 8.90E-08 ¹	≤ 1.78E-05	≤ 1.78E-04
Cadmium	≤ 4.26E-07 ¹	≤ 8.51E-05	≤ 8.51E-04
Chromium ³	≤ 3.45E-06 ¹	≤ 6.90E-04	≤ 6.90E-03
Cobalt	≤ 1.06E-07 ¹	≤ 2.13E-05	≤ 2.13E-04
Phosphorus	≤ 1.21E-04 ¹	≤ 2.43E-02	≤ 2.43E-01
Selenium	≤ 6.05E-06 ¹	≤ 1.21E-03	≤ 1.21E-02
Volatile HAPs²			
Ethylbenzene	6.67E-05 ²	1.33E-04	1.33E-03
Styrene	1.33E-05 ²	2.66E-05	2.66E-04
Toluene	3.33E-04 ²	6.66E-04	6.66E-03
Tetrachloroethane (PCE)	2.67E-06 ²	5.34E-06	5.34E-05
m,p-Xylene	1.33E-05 ²	2.66E-05	2.66E-04
Benzene	4.00E-04 ²	8.00E-04	8.00E-03
1,1,1-Trichloroethane	2.00E-04 ²	4.00E-04	4.00E-03
Methylene Chloride	6.00E-05 ²	1.20E-04	1.20E-03
Trichloroethene (TCE)	6.67E-05 ²	1.33E-04	1.33E-03
o-Xylene	6.67E-05 ²	1.33E-04	1.33E-03
Acid HAPs			
Hydrochloric Acid	7.72E-04 ¹	1.54E-01	1.54E+00
Hydrofluoric Acid	3.18E-04 ¹	6.36E-02	6.36E-01
Total Metal HAPs		≤ 4.40E-02	≤ 4.40E-01
Total Organic HAPs		2.44E-03	2.44E-02
Total Acid HAPs		2.18E-01	2.18E+00
Total HAPs		≤ 2.64E-01	≤ 2.64E+00
Maximum Individual HAP	Hydrochloric Acid	1.54E-01	1.54E+00

1. Measured metal emission rates from hammermill shredder controlled by RTO/Scrubber from November 2019.

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

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

Table 3-1D Shredder RTO Natural Gas Combustion Emissions
General III, LLC - Chicago, Illinois

Pollutant	Pollutant Emission Factor ^a lb/MMscf	RTO Max Firing Rate 15.0 MMBtu/hr NG HHV = 1,020-Btu/scf Annual Gas Consumption 52,500 MMBtu/yr	
		ton/month ^b	tpy
Nitrogen Oxide (NOx)	100	0.26	2.57
Carbon Monoxide (CO)	84	0.22	2.16
Total Filterable PM	1.9	0.00	0.05
Total Condensable PM	5.7	0.01	0.15
Total Particulate Matter	7.6	0.02	0.20
Sulfur Dioxide (SO ₂)	0.6	0.00	0.02
Volatile Organic Compounds (VOC)	5.5	0.01	0.14
Greenhouse Gas Emissions			
Carbon Dioxide (CO ₂)	120,174	309.27	3,092.72
Methane (CH ₄)	2.2649	0.0058	0.06
Nitrous Oxide (N ₂ O)	0.2265	0.0006	0.01
Carbon Dioxide Equivalents (CO₂e) ^c		309.59	3,095.91

a. AP-42 Emission factors from Tables 1.4-1 and 1.4-2.

b. Monthly emissions are assumed to be 10% of annual emissions.

c. Global Warming Potentials (GWPs) for CO₂, CH₄ and N₂O are 1, 25, and 298 respectively (40 CFR 98 Subpart A).

Table 3-1D Shredder RTO Natural Gas Combustion Emissions
General III, LLC - Chicago, Illinois

Summary of HAP Emissions from Natural Gas Combustion

HAP ^b Y/N	Pollutant	Emission Factor ^a (lb/10 ^b scf)	Emissions	
			ton/month ^e	tpy
Metal HAPs^c				
Y	Lead	0.0005	1.29E-06	1.29E-05
Y	Manganese	3.80E-04	9.78E-07	9.78E-06
Y	Mercury	2.60E-04	6.69E-07	6.69E-06
Y	Nickel	2.10E-03	5.40E-06	5.40E-05
Y	Arsenic	2.00E-04	5.15E-07	5.15E-06
Y	Beryllium	< 1.20E-05	3.09E-08	3.09E-07
Y	Cadmium	1.10E-03	2.83E-06	2.83E-05
Y	Chromium	1.40E-03	3.60E-06	3.60E-05
Y	Cobalt	8.40E-05	2.16E-07	2.16E-06
Y	Selenium	< 2.40E-05	6.18E-08	6.18E-07
Volatile HAPs^d				
Y	Toluene	3.40E-03	8.75E-06	8.75E-05
Y	Hexane	< 1.80E+00	< 4.63E-03	< 4.63E-02
Y	Anthracene	< 2.40E-06	< 6.18E-09	< 6.18E-08
Y	Pyrene	5.00E-06	1.29E-08	1.29E-07
Y	Benzo(g,h,i)perylene	< 1.20E-06	< 3.09E-09	< 3.09E-08
Y	Indeno(1,2,3-cd)pyrene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Acenaphthylene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Benzo(b)fluoranthene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Fluoranthene	3.00E-06	7.72E-09	7.72E-08
Y	Benzo(k)fluoranthene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Chrysene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Dichlorobenzene	1.20E-03	3.09E-06	3.09E-05
Y	Formaldehyde	7.50E-02	1.93E-04	1.93E-03
Y	Benzo(a)pyrene	< 1.20E-06	< 3.09E-09	< 3.09E-08
Y	Dibenzo(a,h)anthracene	< 1.20E-06	< 3.09E-09	< 3.09E-08
Y	3-Methylcholanthrene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Benz(a)anthracene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	7,12-Dimethylbenz(a)anthracene	< 1.60E-05	< 4.12E-08	< 4.12E-07
Y	Benzene	< 2.10E-03	< 5.40E-06	< 5.40E-05
Y	Acenaphthene	< 1.80E-06	< 4.63E-09	< 4.63E-08
Y	Phenanathrene	1.70E-05	4.38E-08	4.38E-07
Y	Fluorene	2.80E-06	7.21E-09	7.21E-08
Y	Naphthalene	6.10E-04	1.57E-06	1.57E-05
Y	2-Methylnaphthalene	2.40E-05	6.18E-08	6.18E-07
Total HAPs			4.86E-03	4.86E-02
Maximum Individual HAP		Hexane	4.63E-03	4.63E-02

a. Criteria pollutant emission factors for natural gas combustion - AP-42 Tables 1.4-1 and 1.4-2.

b. Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

c. Metal HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-4.

d. Organic HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-3.

e. Monthly emissions are assumed to be 10% of annual emissions.

**Table 3-1E Summary of Controlled Shredder Emissions
General Iron Industries, Inc. - Chicago, Illinois**

Pollutant	Shredder RTO/Scrubber Stack Emissions ^c		Shredder RTO Natural Gas Combustion Emissions ^{c,d}		Total Shredder RTO/Scrubber Stack Emissions	
	ton/mo	ton/yr	ton/mo	ton/yr	ton/mo	ton/yr
NOx	-	-	0.26	2.57	0.26	2.57
CO ^e	1.29	12.86	0.22	2.16	1.50	15.02
PM ^a	0.94	9.40	0.02	0.20	0.96	9.60
PM10 ^a	0.94	9.40	0.02	0.20	0.96	9.60
SO2	-	-	0.00	0.02	0.00	0.02
VOM ^{a,b}	0.51	5.12	0.01	0.14	0.53	5.26
Total HAPs	0.26	2.64	0.00	0.05	0.27	2.69
Max Single HAP (HCl)	0.15	1.54			0.15	1.54
GHG (CO ₂ e)	309.6	3,095.9	309.6	3,095.9	619.2	6,191.8

a. VOM and PM/PM₁₀ emission rates in the above table are based on a maximum monthly feed rate of 100,000 tons/month and a maximum annual feed rate of 1,000,000 tons/year.

b. VOM emissions are based on Method 25A testing performed in November 2019.

c. See Table 1A for VOM emission estimates, Table 1B for PM/PM10 emission estimates, Table 1C for HAP emission estimates, and Table 1D for RTO natural gas combustion emission estimates.

d. Natural gas emissions are based on a maximum RTO firing rate of 15.00 MMBtu/hr.

e. CO emissions are based on a measured November 2019 emission factor and an applied safety factor.

**Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 100,000 tpm
Annual Throughput 1,000,000 tpy

Row #	Equipment Generating Emissions		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	PM Emissions		PM10 Emissions			PM2.5 Emissions					
											tpm	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
	ID #	Description									tpm	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
1	Barge 1	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	0.00014 ^d	0.0051	0.0514	0.000046 ^o	0.0017	0.0169	0.000013 ^d	0.0005	0.0048
2	Barge 2	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	0.00014 ^d	0.0051	0.0514	0.000046 ^o	0.0017	0.0169	0.000013 ^d	0.0005	0.0048
3	Barge 3	Ferrous Transfer Conveyor	Shred	5.4% ^{a2}	Outside	N				Drop	73,400	734,000	0.00127 ^c	0.0465	0.4645	0.00060 ^o	0.0220	0.2197	0.00009 ^e	0.0033	0.0333
4	C-001	Shredded Material Transfer Conveyor	Shred	Y	Outside	N		NA		A	100,000	1,000,000	0.00014 ^d	0.0070	0.0700	0.000046 ^o	0.0023	0.0230	0.000013 ^d	0.0007	0.0065
5	C-002	Shredded Material Transfer Conveyor	Shred	Y	Outside	N		NA		A	200.0	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000
6	C-002	Mat'l Not Removed by Poker Picker	Shred	Y	Outside	N		NA		A	99,800	998,000	0.00014 ^d	0.0070	0.0699	0.000046 ^o	0.0023	0.0230	0.000013 ^d	0.0006	0.0065
7	C-003	Ferrous Transfer Conveyor	Residue	Y	Outside	N		NA		A	26,000	260,000	0.00014 ^d	0.0018	0.0182	0.000046 ^o	0.0006	0.0060	0.000013 ^d	0.0002	0.0017
8	C-003	Ferrous Transfer Conveyor	Ferrous	Y	Outside	N		NA		A	73,800	738,000	0.00014 ^d	0.0052	0.0517	0.000046 ^o	0.0017	0.0170	0.000013 ^d	0.0005	0.0048
9	C-006	Ferrous Transfer Conveyor	Shred	Y	Outside	Y	Z-Box Air Loop	100%	100%	A	36,600	366,000	0.00014 ^d	0.0026	0.0000	0.000046 ^o	0.0008	0.0000	0.000013 ^d	0.0002	0.0000
10	C-007	Ferrous Transfer Conveyor	Shred	Y	Outside	Y	Z-Box Air Loop	100%	100%	A	36,600	366,000	0.00014 ^d	0.0026	0.0000	0.000046 ^o	0.0008	0.0000	0.000013 ^d	0.0002	0.0000
11	C-008	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	11,200	112,000	0.00014 ^d	0.0008	0.0078	0.000046 ^o	0.0003	0.0026	0.000013 ^d	0.0001	0.0007
12	C-009	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
13	C-010	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
14	C-011	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	11,000	110,000	0.00014 ^d	0.0008	0.0077	0.000046 ^o	0.0003	0.0025	0.000013 ^d	0.0001	0.0007
15	C-012	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	11,200	112,000	0.00014 ^d	0.0008	0.0078	0.000046 ^o	0.0003	0.0026	0.000013 ^d	0.0001	0.0007
16	C-013	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
17	C-014	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
18	C-015	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	11,000	110,000	0.00014 ^d	0.0008	0.0077	0.000046 ^o	0.0003	0.0025	0.000013 ^d	0.0001	0.0007
19	C-016	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	0.00014 ^d	0.0051	0.0514	0.000046 ^o	0.0017	0.0169	0.000013 ^d	0.0005	0.0048
20	C-020	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	0.00014 ^d	0.0051	0.0514	0.000046 ^o	0.0017	0.0169	0.000013 ^d	0.0005	0.0048
21	C-022	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	11,000	110,000	0.00014 ^d	0.0008	0.0077	0.000046 ^o	0.0003	0.0025	0.000013 ^d	0.0001	0.0007
22	C-023	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	11,000	110,000	0.00014 ^d	0.0008	0.0077	0.000046 ^o	0.0003	0.0025	0.000013 ^d	0.0001	0.0007
23	C-024	Non-metallic transfer conveyor	Ferrous	Y	Outside	N		NA		A	800	8,000	0.00014 ^d	0.0001	0.0006	0.000046 ^o	0.0000	0.0002	0.000013 ^d	0.0000	0.0001
24	C-025	Non-metallic not removed by magnet E-	Ferrous	Y	Outside	N		NA		A	400	4,000	0.00014 ^d	0.0000	0.0003	0.000046 ^o	0.0000	0.0001	0.000013 ^d	0.0000	0.0000
25	C-025	material removed by first magnet to second	Ferrous	Y ^{a2}	Outside	N		NA		A	200	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000

**Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 100,000 tpm
Annual Throughput 1,000,000 tpy

Row #	Equipment Generating Emissions		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	PM Emissions			PM10 Emissions			PM2.5 Emissions				
	ID #	Description									tpm	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
26	C-026	Ferrous Transfer Conveyor	Ferrous	Y ^{#2}						A	200	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000
27	C-027	Ferrous Transfer Conveyor	Ferrous	Y ^{#2}	Outside	N		NA		A	200	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000
28	C-028	Non-metallic Transfer Conveyor	Ferrous	Y	Outside	N		NA		A	200	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000
29	C-029	Non-metallic Transfer Conveyor	Ferrous	Y						A	200	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000
30	C-031	ASR Transfer Conveyor	Residue	Y	Outside	N		NA		A	800	8,000	0.00014 ^d	0.0001	0.0006	0.000046 ^o	0.0000	0.0002	0.000013 ^d	0.0000	0.0001
31	C-032	ASR Transfer Conveyor	Residue	Y	Outside	N		NA		A	800	8,000	0.00014 ^d	0.0001	0.0006	0.000046 ^o	0.0000	0.0002	0.000013 ^d	0.0000	0.0001
32	C-033	Magnetic Material	Shred	Y	Outside	N		NA		A	1,000	10,000	0.00014 ^d	0.0001	0.0007	0.000046 ^o	0.0000	0.0002	0.000013 ^d	0.0000	0.0001
33	C-033	ASR Not Removed by Magnet E-12	Residue	Y	Outside	N		NA		A	25,800	258,000	0.00014 ^d	0.0018	0.0181	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
34	C-034	Ferrous Transfer Conveyor	Shred	Y	Outside	N		NA		A	1,000	10,000	0.00014 ^d	0.0001	0.0007	0.000046 ^o	0.0000	0.0002	0.000013 ^d	0.0000	0.0001
35	C-035	Ferrous Transfer Conveyor	Shred	Y	Outside	N		NA		A	1,000	10,000	0.00014 ^d	0.0001	0.0007	0.000046 ^o	0.0000	0.0002	0.000013 ^d	0.0000	0.0001
36	C-036	ASR Transfer Conveyor	Residue	Y	Outside	N		NA		A	25,800	258,000	0.00014 ^d	0.0018	0.0181	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
37	E-01	Drop Raw Scrap onto Shredder Feed Chute	Unprepared	Y ^{#4}	Outside	N		NA		A	100,000	1,000,000	0.00014 ^d	0.0070	0.0700	0.000046 ^o	0.0023	0.0230	0.000013 ^d	0.0007	0.0065
38	E-015	Z-Box Separator Cyclone	Ferrous	Y	Outside	N		NA		A	400	4,000	0.00014 ^d	0.0000	0.0003	0.000046 ^o	0.0000	0.0001	0.000013 ^d	0.0000	0.0000
39	E-016	Z-Box Separator Cyclone	Ferrous	Y	Outside	N		NA		A	400	4,000	0.00014 ^d	0.0000	0.0003	0.000046 ^o	0.0000	0.0001	0.000013 ^d	0.0000	0.0000
40	E-05	Shredder Under Mill Vibratory Conveyor	Shred	Y	Inside	N		NA		A	100,000	1,000,000	0.00014 ^d	0.0070	0.0700	0.000046 ^o	0.0023	0.0230	0.000013 ^d	0.0007	0.0065
41	E-07	Magnet Discharge to Chute	Shred	Y	Outside	N		NA		A	37,400	374,000	0.00014 ^d	0.0026	0.0262	0.000046 ^o	0.0009	0.0086	0.000013 ^d	0.0002	0.0024
42	E-07	Magnet Discharge to Chute	Shred	Y	Outside	N		NA		A	37,400	374,000	0.00014 ^d	0.0026	0.0262	0.000046 ^o	0.0009	0.0086	0.000013 ^d	0.0002	0.0024
43	E-08	ASR Not Removed by Magnet	Shred	Y	Outside	N		NA		A	400	4,000	0.00014 ^d	0.0000	0.0003	0.000046 ^o	0.0000	0.0001	0.000013 ^d	0.0000	0.0000
44	E-08	Ferrous Removed by Magnet E-7	Residue	Y	Outside	N		NA		A	37,000	370,000	0.00014 ^d	0.0026	0.0259	0.000046 ^o	0.0009	0.0085	0.000013 ^d	0.0002	0.0024
45	E-10	Ferrous Removed by Magnet	Shred	Y ^{#2}	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
46	E-11	Ferrous Removed by Magnet	Shred	Y ^{#2}	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
47	E-11	Ferrous Removed by Magnet	Shred	Y ^{#2}	Outside	N		NA		A	11,000	110,000	0.00014 ^d	0.0008	0.0077	0.000046 ^o	0.0003	0.0025	0.000013 ^d	0.0001	0.0007
48	E-11	Ferrous Removed by Magnet	Shred	Y ^{#2}	Outside	N		NA		A	11,000	110,000	0.00014 ^d	0.0008	0.0077	0.000046 ^o	0.0003	0.0025	0.000013 ^d	0.0001	0.0007
49	E-12	Ferrous Removed by Magnet	Ferrous	Y	Outside	N		NA		A	1,000	10,000	0.00014 ^d	0.0001	0.0007	0.000046 ^o	0.0000	0.0002	0.000013 ^d	0.0000	0.0001
50	E-13	Ferrous Removed by E-13	Ferrous	Y ^{#2}	Outside	N		NA		A	200	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000

**Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 100,000 tpm
Annual Thruputput 1,000,000 tpy

Row #	Equipment Generating Emissions		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	PM Emissions			PM10 Emissions			PM2.5 Emissions				
	ID #	Description									tpm	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
51	E-13	Ferrous Removed by E-13	Ferrous	Y	Outside	N		NA		A	200	2,000	0.00014 ^d	0.0000	0.0001	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000
52	E-14	Mat'l Not removed by Separator	Ferrous	Y	Outside	N		NA		A	50.00	500	0.00014 ^d	0.0000	0.0000	0.000046 ^o	0.0000	0.0000	0.000013 ^d	0.0000	0.0000
53	E-7	ASR Not Removed by Magnet	Shred	Y ^{a3}	Outside	N		NA		A	400	4,000	0.00014 ^d	0.0000	0.0003	0.000046 ^o	0.0000	0.0001	0.000013 ^d	0.0000	0.0000
54	E-7	Ferrous Removed by Magnet E-7	Residue	Y	Outside	N		NA		A	37,000	370,000	0.00014 ^d	0.0026	0.0259	0.000046 ^o	0.0009	0.0085	0.000013 ^d	0.0002	0.0024
55		Truck Dumping of Raw Feed	Unprepared	5.4 ^{a2}	Outside	N				Drop	100,000	1,000,000	0.00127 ^c	0.0633	0.6328	0.00060 ^c	0.0299	0.2993	0.00009 ^c	0.0045	0.0453
56		Raw Feed from Ground after Truck Dumping	Unprepared	5.4 ^{a2}	Outside	N				Drop	100,000	1,000,000	0.00127 ^c	0.0633	0.6328	0.00060 ^c	0.0299	0.2993	0.00009 ^c	0.0045	0.0453
57		Non-metallic Loadout	Non-metallic	N	Outside	N				D	37,400	374,000	0.000204 ^f	0.0038	0.0382	0.000100 ^f	0.0019	0.0187	0.000015 ^f	0.0003	0.0028
58		Poker Loadout	Pokers	N	Outside	N				D	200	2,000	0.000204 ^f	0.0000	0.0002	0.000100 ^f	0.0000	0.0001	0.000015 ^f	0.0000	0.0000
59	Magnet/Clam	Drop Raw Scrap to Infeed Conveyor	Unprepared	N ^{a4}	Outside	N		NA		D	100,000	1,000,000	0.000204 ^f	0.1012	0.1022	0.000100 ^f	0.0050	0.0500	0.000015 ^f	0.0008	0.0076
60	C-030	Mat'l not Removed by Separator	Ferrous	1.5% ^{a1}	Outside	Y	Cover	0%		Drop	450.00	4,500	0.00761 ^c	0.0017	0.0171	0.00360 ^c	0.0008	0.0081	0.000054 ^c	0.0001	0.0012
61	C-037	ASR Transfer Conveyor to Stockpile	Residue	10.0% ^{a3}	Outside	N		0%		Drop	25,800	258,000	0.00053 ^c	0.0069	0.0689	0.00025 ^c	0.0033	0.0326	0.00004 ^c	0.0005	0.0049
62	E-06	Poker Picker Chute to Stockpile	Shred	1.5% ^{a1}	Outside	N		0%		Drop	200	2,000	0.00761 ^c	0.0008	0.0076	0.00360 ^c	0.0004	0.0036	0.000054 ^c	0.0001	0.0005
63	E-14	Final Discharge from Mat'l Separator	Ferrous	1.5% ^{a1}	Outside	N		0%		Drop	150.00	1,500	0.00761 ^c	0.0006	0.0057	0.00360 ^c	0.0003	0.0027	0.000054 ^c	0.0000	0.0004
64	SC-001	Supplemental Conveyor	Shred	Y	Outside	N		NA		A	36,600	366,000	0.00014 ^d	0.0026	0.0256	0.000046 ^o	0.0008	0.0084	0.000013 ^d	0.0002	0.0024
65	SC-009	Supplemental Conveyor	Ferrous	Y	Outside	N		NA		A	400	4,000	0.00014 ^d	0.0000	0.0003	0.000046 ^o	0.0000	0.0001	0.000013 ^d	0.0000	0.0000
66	SC-002	Supplemental Conveyor	Shred	Y	Outside	N		NA		A	36,600	366,000	0.00014 ^d	0.0026	0.0256	0.000046 ^o	0.0008	0.0084	0.000013 ^d	0.0002	0.0024
67	SC-010	Supplemental Conveyor	Ferrous	Y	Outside	N		NA		A	400	4,000	0.00014 ^d	0.0000	0.0003	0.000046 ^o	0.0000	0.0001	0.000013 ^d	0.0000	0.0000
68	SC-005	Supplemental Conveyor	Shred	Y	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
69	SC-008	Supplemental Conveyor	Shred	Y	Outside	N		NA		A	25,600	256,000	0.00014 ^d	0.0018	0.0179	0.000046 ^o	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
70	C-004	Ferrous Transfer Conveyor	Shred	Y	Outside	N		NA		A	37,000	370,000	Emissions captured by inward air flow at inlet to Z-Box separator								
71	C-014	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	Alternate to C-014 to C-016. Emissions from 100% of material throughput assigned to C-014 to C-016.								
72	C-005	Ferrous Transfer Conveyor	Shred	Y	Outside	N		NA		A	37,000	370,000	Emissions captured by inward air flow at inlet to Z-Box separator								
73	C-012	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	Alternate to C-012 to C-016. Emissions from 100% of material throughput assigned to C-012 to C-016.								
74	C-015	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	Alternate to C-015 to C-016. Emissions from 100% of material throughput assigned to C-015 to C-016.								
75	C-019	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	Alternate to C-016 top C-017. Emissions from 100% of material throughput assigned to C-016 to C-017.								

**Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 100,000 tpm
Annual Throughput 1,000,000 tpy

Row #	Equipment Generating Emissions		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	PM Emissions		PM10 Emissions			PM2.5 Emissions						
	ID #	Description									tpm	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	
76	C-013	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	Alternate to C-013 to C-016. Emissions from 100% of material throughput assigned to C-013 to C-016.									
77	C-017	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	Alternate to C-020/C-021 or C-017/C-018. Emissions from 100% of material throughput assigned to C-017 to Barge 1.									
78	C-020	Ferrous Transfer Conveyor	Shred	Y ^{a2}	Outside	N		NA		A	73,400	734,000	Alternate to C-017 to C-018. Emissions from 100% of material throughput assigned to C-017 to C-018.									
79	E-02	Shredder Bottom Discharge	Shred	Y	shredder emissions captured by shredder hood and controlled by RTO/Scrubber					A	100,000	1,000,000	Emissions captured and controlled by shredder emission control system									
80	C-21	Ferrous Transfer Conveyor	Shred	5.4% ^{a2}	Outside	N		NA		Drop	73,400	734,000	Alternate to C-018 to N Ferrous Stockpile or Barge 2 to Barge. Emissions from 100% of material throughput assigned to Barge 2 to Barge.									
81	E-02	Shredder Chute	Unprepared	Y	shredder emissions captured by shredder hood and controlled by RTO/Scrubber					A	100,000	1,000,000	Emissions captured and controlled by shredder emission control system									
82	C-018	Ferrous Transfer Conveyor	Shred	5.4% ^{a2}	Outside	N		NA		Drop	73,400	734,000	Alternate to C-021 to S Ferrous Stockpile or Barge 2 to Barge. Emissions from 100% of material throughput assigned to Barge 2 to Barge.									
Totals Ferrous Plant Material Handling PM Emissions														0.30	2.93		0.13	1.25		0.02	0.23	
Totals Ferrous Plant Material Handling HAP Metal Emissions														0.49% ^h	0.0000	0.0143	Ratio of HAP metal to total PM from June 2018 emission test of existing roll media filter at GII.					

- a1 Controlled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying used based on conservative assumption that moisture content is greater than 1.5% due to water added in the shredder.
- 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 crushed stone. Use uncontrolled emission 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
- h Modeled total metal HAPs emission rate expressed as as percent of estimated PM from Ferrous material handling.

**Table 3-2 - Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 100,000 tpm
Annual Throughput 1,000,000 tpy

Row #	Equipment Generating Emissions		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	PM Emissions			PM10 Emissions			PM2.5 Emissions		
	ID #	Description									tpm	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton

Material Drop PM Equations (AP-42, Section 13.2.4.3)

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

E = emission factor (lb/ton of material dropped)
 k = particle size multiplier (dimensionless)
 U = mean wind speed
<https://www.timeanddate.com/weather/usa/chicago/climate>
 M = material moisture content (%)

- U = 9.0 mph - annual average wind speed for Chicago (Midway Airport)
- k = 0.74 PM - AP-42, Section 13.2.4, for particle size < 30 um
- 0.35 PM - AP-42, Section 13.2.4, for particle size < 10 um
- 0.053 PM - AP-42, Section 13.2.4, for particle size < 2.5 um
- M = 1.5 Moisture content for use of controlled emission factors for crushed stone processing - Conveyor Transfer Points - AP-42, Table 11.19.2-2.
 The material moisture content for stockpile drop emission calculations varies by material - see Column E above.

Summary of Ferrous Material Processing System Emission Points and Emissions by Emission Factor Type

# of Pts	Ferrous Material Processing System Emission Points	Process Rate		PM Emissions			PM10 Emissions			PM2.5 Emissions		
		tpm	tpy	Factor lb/ton	tpm	tpy	Factor lb/ton	tpm	tpy	Factor lb/ton	tpm	tpy
59	Conveyor Transfer Points	1,444,050	14,440,500	0.00014	0.10	0.96	0.000046	0.03	0.31	0.000013	0.01	0.09
3	Truck/Barge Loadout	137,600	1,376,000	0.000204	0.01	0.14	0.0001	0.01	0.07	0.000015	0.00	0.01
7	Stockpile Drops	300,000	3,000,000	Varies	0.18	1.83	Varies	0.09	0.87	Varies	0.01	0.13
Total Emissions					0.30	2.93		0.13	1.25		0.02	0.23

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
												ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
1	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	92.1	921	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
2	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	92.1	921	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
3	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	368.6	3,686	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
4	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	368.6	3,686	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
5	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	154.8	1,548	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
6	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	154.8	1,548	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
7	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	154.8	1,548	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
8	Shaker		Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	B	154.8	1,548	0.002200	Note f	Note f	Note f.	0.000740	Note f	Note f	0.000050	Note f	Note f
9	E-19	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	2,152.5	21,525	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
10	E-19	Induction Sorter	Wire Fuzz	N	Inside		Y	Dust Collector	100%	DC Eff.	A	552.9	5,529	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
11	E-20	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	368.6	3,686	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
12	E-20	Induction Sorter	Wire	N	Inside		Y	Dust Collector	100%	DC Eff.	A	184.3	1,843	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
13	E-25	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	2,152.5	21,525	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
14	E-25	Induction Sorter	Wire Fuzz	N	Inside		Y	Dust Collector	100%	DC Eff.	A	552.9	5,529	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
15	E-26	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	368.6	3,686	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
16	E-26	Induction Sorter	Wire	N	Inside		Y	Dust Collector	100%	DC Eff.	A	184.3	1,843	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
17	E-30	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	2,395.7	23,957	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
18	E-30	Induction Sorter	Zuric	N	Inside		Y	Dust Collector	100%	DC Eff.	A	239.6	2,396	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
19	E-31	Induction Sorter	Zuric	N	Inside		Y	Dust Collector	100%	DC Eff.	A	239.6	2,396	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
20	E-37	Induction Sorter	Zone	N	Inside		Y	Dust Collector	100%	DC Eff.	A	552.9	5,529	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
21	E-37	Induction Sorter	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	1,308.4	13,084	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
22	E-39	Induction Sorter	Drops Zuric Recov Finder	N	Inside		Y	Dust Collector	100%	DC Eff.	A	110.6	1,106	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
23	E-39	Induction Sorter	Zone	N	Inside		Y	Dust Collector	100%	DC Eff.	A	442.3	4,423	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
24	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	81.1	811	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
25	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	81.1	811	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
26	Material Separator	Drop to container	Residue	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	11.1	111	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
27	Material Separator	Drop to container	Residue	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	11.1	111	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
28	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	346.5	3,465	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
29	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	346.5	3,465	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
30	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	22.1	221	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
31	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	22.1	221	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
32	Shaker Fines		Zorba	N	Inside		Y	Dust Collector	100%	DC Eff.	A	70.0	700	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
33	Shaker Mids		Zorba	N	Inside		Y	Dust Collector	100%	DC Eff.	A	44.2	442	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
34	Shaker Mids		Zorba	N	Inside		Y	Dust Collector	100%	DC Eff.	A	44.2	442	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
35	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	7.4	74	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
36	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	7.4	74	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
37	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	36.9	369	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
38	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	36.9	369	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
39	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	18.4	184	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
40	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	151.1	1,511	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
41	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	151.1	1,511	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
42	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	151.1	1,511	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
43	Material Separator	Transfer Conveyor	Residue	N	Inside		Y	Dust Collector	100%	DC Eff.	A	151.1	1,511	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
44	Material Separator	Drop to container	Zorba	1.5% ^a	Inside		Y	Dust Collector	100%	DC Eff.	Drop	51.6	516	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
45	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	3.1	31	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
46	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	3.1	31	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
47	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	3.1	31	0.000140	Note f	Note f	Note f.	0.000046	Note f	Note f	0.000013	Note f	Note f
48	Material Separator	Transfer Conveyor	Product	N	Inside		Y	Dust Collector	100%	DC Eff.	A	3.1	31	0.000140	Note f	Note f	Note f.	0.000046 ^a	Note f	Note f	0.000013 ^a	Note f	Note f
49	Shaker		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	516.0	5,160	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f
50	Shaker		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	516.0	5,160	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f
51	Shaker		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	387.0	3,870	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f
52	Shaker		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	387.0	3,870	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f
53	Shaker		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	387.0	3,870	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f
54	Shaker		Residue	N	Inside		N	Dust Collector	100%	DC Eff.	B	387.0	3,870	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
55	Shaker	Drop to container	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	36.9	369	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
56	Shaker	Drop to container	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	36.9	369	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
57	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	154.8	1,548	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
58	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	154.8	1,548	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
59	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	154.8	1,548	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
60	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	154.8	1,548	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
61	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	77.4	774	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
62	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	77.4	774	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
63	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	77.4	774	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
64	Shaker	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	77.4	774	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
65	C-031	Conveyor	Wire	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	368.6	3,686	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
66	C-025	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	2,635.3	26,353	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
67	C-026	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	1,861.3	18,613	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
68	C-027	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	2,705.3	27,053	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
69	C-028	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	2,705.3	27,053	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
70	C-032	Conveyor	Zone	N	Inside		N	Dust Collector	100%	DC Eff.	A	552.9	5,529	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
71	C-053	Conveyor	Wire	N	Inside		N	Dust Collector	100%	DC Eff.	A	368.6	3,686	0.003000 ⁰	Note f	Note f	Note f.	0.001100 ⁰	Note f	Note f	0.000167 ⁰	Note f	Note f
72	C-069	Conveyor	Lights Zuric	N	Inside		N	Dust Collector	100%	DC Eff.	A	129.0	1,290	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
73	E-18	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	2,705.3	27,053	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
74	E-24	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	2,705.3	27,053	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
75	E-29	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	2,635.3	26,353	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
76	E-36	Vibratory Feeder	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,861.3	18,613	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
77	E-38	Vibratory Feeder	Zone	N	Inside		N	Dust Collector	100%	DC Eff.	A	552.9	5,529	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
78	E-51	Separator	Heavies Zuric	N	Inside		N	Dust Collector	100%	DC Eff.	B	110.6	1,106	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f
79	E-51	Separator	Lights Zuric	N	Inside		N	Dust Collector	100%	DC Eff.	B	129.0	1,290	0.025000	Note f	Note f	Note f.	0.008700	Note f	Note f	0.001317	Note f	Note f
80	ECS	Eddy Current Separator	Residue/Drops	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,231.0	12,310	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
81	ECS	Eddy Current Separator	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	147.4	1,474	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
82	Elevator	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	162.2	1,622	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
83	Elevator	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,297.4	12,974	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
84	FC-01	Conveyor	Zorba	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	184.3	1,843	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
85	FC-02	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	1,032.0	10,320	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
86	FC-03	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	692.9	6,929	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
87	FC-04	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	162.2	1,622	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
88	FC-05	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	692.9	6,929	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
89	FC-06	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,297.4	12,974	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
90	FC-07	Conveyor	Residue	N	Inside	Y	N	Dust Collector	100%	DC Eff.	A	1,548.0	15,480	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
91	FC-08	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,548.0	15,480	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
92	FC-09	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	619.2	6,192	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
93	FC-10	Conveyor drop to stockpile	Residue	1.5% ^a	Inside		N	Dust Collector	100%	DC Eff.	Drop	154.8	1,548	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
94	FC-11	Conveyor drop to stockpile	Residue	1.5% ^a	Inside		N	Dust Collector	100%	DC Eff.	Drop	154.8	1,548	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
95	FC-12	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	6.2	62	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
96	FC-13	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	6.2	62	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
97	FC-14	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	12.4	124	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
98	FC-15	Conveyor	Product	N	Inside		N	Dust Collector	100%	DC Eff.	A	12.4	124	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
99	FC-16	Conveyor drop to container	Product	1.5% ^a	Inside		N	Dust Collector	100%	DC Eff.	Drop	12.4	124	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
100	FC-17	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	604.5	6,045	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
101	FC-18	Conveyor transfer to shaker	Residue/Drops	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,231.0	12,310	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
102	FC-20	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,231.0	12,310	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
103	FC-21	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	840.3	8,403	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
104	FC-22	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	420.2	4,202	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
105	FC-23	Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	420.2	4,202	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
106	Feeder	Discharge to conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	3,350.3	33,503	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
107	Feeder	Transfer to Eddy Current Separator	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	162.2	1,622	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
108	Feeder	Transfer to Eddy Current Separator	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,297.4	12,974	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
												ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
109	Shaker Fines	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	1,083.6	10,836	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
110	Shaker Overs	Transfer Conveyor	Residue	N	Inside		N	Dust Collector	100%	DC Eff.	A	147.4	1,474	0.003000	Note f	Note f	Note f.	0.001100	Note f	Note f	0.000167	Note f	Note f
111	Shaker Overs	Drop to container	Zorba	1.5% ^a	Inside		N	Dust Collector	100%	DC Eff.	Drop	25.8	258	0.00760	Note f	Note f	Note f.	0.00360	Note f	Note f	0.00050	Note f	Note f
112	Total Emissions for Sources Inside Building														0.5143	0.1444	1.4441		0.1444	1.4441		0.1444	1.4441
113	C-001	Conveyor	Residue	Y	Outside	Y	N	NA			A	25,800.0	258,000	0.00140 ^d	0.0098	0.0018	0.0181	0.000046 ^d	0.0006	0.0059	0.000013 ^d	0.0002	0.0017
114	C-002	Conveyor	Residue	N	Outside	Y	N	NA			A	25,026.0	250,260	0.003000 ^o	0.2037	0.0375	0.3754	0.001100 ^o	0.0138	0.1376	0.000167 ^o	0.0021	0.0208
115	C-002	Conveyor	Ferrous	N	Outside	Y	N	NA			A	774.0	7,740	0.003000 ^o	0.0063	0.0012	0.0116	0.001100 ^o	0.0004	0.0043	0.000167 ^o	0.0001	0.0006
116	C-003	Conveyor	Residue	N	Outside	Y	N	NA			A	25,026.0	250,260	0.003000 ^o	0.2037	0.0375	0.3754	0.001100 ^o	0.0138	0.1376	0.000167 ^o	0.0021	0.0208
117	C-004	Conveyor	Residue	N	Outside	Y	N	NA			A	22,446.0	224,460	0.003000 ^o	0.1827	0.0337	0.3367	0.001100 ^o	0.0123	0.1235	0.000167 ^o	0.0019	0.0187
118	C-005	Conveyor	Residue	N	Outside	Y	N	NA			A	11,223.0	112,230	0.003000 ^o	0.0914	0.0168	0.1683	0.001100 ^o	0.0062	0.0617	0.000167 ^o	0.0009	0.0093
119	C-006	Conveyor	Residue	N	Outside		N	NA			A	11,223.0	112,230	0.003000 ^o	0.0914	0.0168	0.1683	0.001100 ^o	0.0062	0.0617	0.000167 ^o	0.0009	0.0093
120	C-007	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	5,805.0	58,050	0.003000 ^o	0.0095	0.0017	0.0174	0.001100 ^o	0.0006	0.0064	0.000167 ^o	0.0001	0.0010
121	C-008	Conveyor	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	5,805.0	58,050	0.003000 ^o	0.0095	0.0017	0.0174	0.001100 ^o	0.0006	0.0064	0.000167 ^o	0.0001	0.0010
122	C-009	Conveyor	Residue	N	Outside		N	NA			A	3,368.7	33,687	0.003000 ^o	0.0274	0.0051	0.0505	0.001100 ^o	0.0019	0.0185	0.000167 ^o	0.0003	0.0028
123	C-010	Conveyor	Residue	N	Outside		N	NA			A	3,368.7	33,687	0.003000 ^o	0.0274	0.0051	0.0505	0.001100 ^o	0.0019	0.0185	0.000167 ^o	0.0003	0.0028
124	C-011	Conveyor	Residue	N	Outside	Y	N	NA			A	3,096.0	30,960	0.003000 ^o	0.0252	0.0046	0.0464	0.001100 ^o	0.0017	0.0170	0.000167 ^o	0.0003	0.0026
125	C-012	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	3,368.7	33,687	0.003000 ^o	0.0055	0.0010	0.0101	0.001100 ^o	0.0004	0.0037	0.000167 ^o	0.0001	0.0006
126	C-013	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	3,368.7	33,687	0.003000 ^o	0.0055	0.0010	0.0101	0.001100 ^o	0.0004	0.0037	0.000167 ^o	0.0001	0.0006
127	C-014	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	3,096.0	30,960	0.003000 ^o	0.0050	0.0009	0.0093	0.001100 ^o	0.0003	0.0034	0.000167 ^o	0.0001	0.0005
128	C-015	Conveyor	Ferrous	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	92.1	921	0.003000 ^o	0.0002	0.0000	0.0003	0.001100 ^o	0.0000	0.0001	0.000167 ^o	0.0000	0.0000
129	C-016	Conveyor	Residue	N	Outside	Y	N	NA			A	995.1	9,951	0.003000 ^o	0.0081	0.0015	0.0149	0.001100 ^o	0.0005	0.0055	0.000167 ^o	0.0001	0.0008
130	C-017	Conveyor	Ferrous	N	Outside		N	NA			A	645.0	6,450	0.003000 ^o	0.0053	0.0010	0.0097	0.001100 ^o	0.0004	0.0035	0.000167 ^o	0.0001	0.0005
131	C-018	Conveyor	Ferrous	N	Outside	Y	N	NA			A	645.0	6,450	0.003000 ^o	0.0053	0.0010	0.0097	0.001100 ^o	0.0004	0.0035	0.000167 ^o	0.0001	0.0005
132	C-019	Conveyor	Lights	N	Outside	Y	N	NA			A	92.1	921	0.003000 ^o	0.0008	0.0001	0.0014	0.001100 ^o	0.0001	0.0005	0.000167 ^o	0.0000	0.0001
133	C-020	Conveyor	Residue	N	Outside	Y	N	NA			A	4,098.5	40,985	0.003000 ^o	0.0334	0.0061	0.0615	0.001100 ^o	0.0023	0.0225	0.000167 ^o	0.0003	0.0034
134	C-021	Conveyor	Residue	N	Outside	Y	N	NA			A	4,098.5	40,985	0.003000 ^o	0.0334	0.0061	0.0615	0.001100 ^o	0.0023	0.0225	0.000167 ^o	0.0003	0.0034
135	C-022	Conveyor to Wind Sifter	Mixed Non-Ferrous	N	Outside	Y	Y	Wind Sifter	100%	100%	A	294.9	2,949	0.003000 ^o	0.0024	0.0004	0.0000	0.001100 ^o	0.0002	0.0000	0.000167 ^o	0.0000	0.0000

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
136	C-023	Conveyor to Wind Sifter	Residue	N	Outside	Y	Y	Wind Sifter	100%	100%	A	2,686.9	26,869	0.000140 ^o	0.0010	0.0002	0.0000	0.000046 ^o	0.0001	0.0000	0.000013 ^o	0.0000	0.0000
137	C-024	Conveyor to Wind Sifter	Residue	N	Outside	Y	Y	Wind Sifter	100%	100%	A	2,686.9	26,869	0.000140 ^o	0.0010	0.0002	0.0000	0.000046 ^o	0.0001	0.0000	0.000013 ^o	0.0000	0.0000
138	C-034	Conveyor	Material Separator	N	Outside	Y	N	NA			A	202.7	2,027	0.003000 ^o	0.0017	0.0003	0.0030	0.001100 ^o	0.0001	0.0011	0.000167 ^o	0.0000	0.0002
139	C-035	Conveyor	Residue	N	Inside	Y	N	ECS Enclosure	100%	Bldg Eff.	A	995.1	9,951	0.003000 ^o	0.0016	0.0003	0.0030	0.001100 ^o	0.0001	0.0011	0.000167 ^o	0.0000	0.0002
140	C-039	Conveyor	Mixed Non-Ferrous	N	Outside		N	NA			A	294.9	2,949	0.003000 ^o	0.0024	0.0004	0.0044	0.001100 ^o	0.0002	0.0016	0.000167 ^o	0.0000	0.0002
141	C-040	Conveyor	Residue	N	Outside		N	NA			A	1,032.0	10,320	0.003000 ^o	0.0084	0.0015	0.0155	0.001100 ^o	0.0006	0.0057	0.000167 ^o	0.0001	0.0009
142	C-040	Conveyor	Mids	N	Outside		N	NA			A	2,580.0	25,800	0.003000 ^o	0.0210	0.0039	0.0387	0.001100 ^o	0.0014	0.0142	0.000167 ^o	0.0002	0.0021
143	C-040	Conveyor	Residue	N	Outside		N	NA			A	1,548.0	15,480	0.003000 ^o	0.0126	0.0023	0.0232	0.001100 ^o	0.0009	0.0085	0.000167 ^o	0.0001	0.0013
144	C-041	Conveyor	Zorba	N	Outside		N	NA			A	184.3	1,843	0.003000 ^o	0.0015	0.0003	0.0028	0.001100 ^o	0.0001	0.0010	0.000167 ^o	0.0000	0.0002
145	C-042	Conveyor	Zorba	N	Outside		N	NA			A	552.9	5,529	0.003000 ^o	0.0045	0.0008	0.0083	0.001100 ^o	0.0003	0.0030	0.000167 ^o	0.0000	0.0005
146	C-043	Conveyor	Zorba	N	Outside		N	NA			A	1,105.7	11,057	0.003000 ^o	0.0090	0.0017	0.0166	0.001100 ^o	0.0006	0.0061	0.000167 ^o	0.0001	0.0009
147	C-044	Conveyor	Residue	N	Outside	Y	N	NA			A	9,166.4	91,664	0.003000 ^o	0.0746	0.0137	0.1375	0.001100 ^o	0.0050	0.0504	0.000167 ^o	0.0008	0.0076
148	C-044	Conveyor	Lights Zuric	N	Outside	Y	N	NA			A	110.6	1,106	0.003000 ^o	0.0009	0.0002	0.0017	0.001100 ^o	0.0001	0.0006	0.000167 ^o	0.0000	0.0001
149	C-045	Conveyor	Residue	N	Outside	Y	N	NA			A	9,166.4	91,664	0.003000 ^o	0.0746	0.0137	0.1375	0.001100 ^o	0.0050	0.0504	0.000167 ^o	0.0008	0.0076
150	C-047	Conveyor	To SSI	N	Outside		N	NA			A	202.7	2,027	0.003000 ^o	0.0017	0.0003	0.0030	0.001100 ^o	0.0001	0.0011	0.000167 ^o	0.0000	0.0002
151	C-048	Conveyor	Out of SSI	N	Outside		N	NA			A	202.7	2,027	0.003000 ^o	0.0017	0.0003	0.0030	0.001100 ^o	0.0001	0.0011	0.000167 ^o	0.0000	0.0002
152	C-050	Conveyor	Residue	N	Outside	Y	N	NA			A	9,240.1	92,401	0.003000 ^o	0.0752	0.0139	0.1386	0.001100 ^o	0.0051	0.0508	0.000167 ^o	0.0008	0.0077
153	C-052	Conveyor	Residue	N	Outside		N	NA			A	829.3	8,293	0.003000 ^o	0.0068	0.0012	0.0124	0.001100 ^o	0.0005	0.0046	0.000167 ^o	0.0001	0.0007
154	C-055	Conveyor	Wire	N	Outside	Y	N	NA			A	368.6	3,686	0.003000 ^o	0.0030	0.0006	0.0055	0.001100 ^o	0.0002	0.0020	0.000167 ^o	0.0000	0.0003
155	C-058	Conveyor	Zuric drops	N	Outside	Y	N	NA			A	110.6	1,106	0.003000 ^o	0.0009	0.0002	0.0017	0.001100 ^o	0.0001	0.0006	0.000167 ^o	0.0000	0.0001
156	C-060	Conveyor	Zone	N	Outside	Y	N	NA			A	442.3	4,423	0.003000 ^o	0.0036	0.0007	0.0066	0.001100 ^o	0.0002	0.0024	0.000167 ^o	0.0000	0.0004
157	C-061	Conveyor drop to stockpile	Heavies Zuric	1.5% ^a	Outside		N	NA			Drop	353.8	3,538	0.00761 ^c	0.0073	0.0013	0.0135	0.00360 ^c	0.0006	0.0064	0.00054 ^c	0.0001	0.0010
158	C-061	Conveyor drop to stockpile	Heavies Zuric	1.5% ^a	Outside		N	NA			Drop	110.6	1,106	0.00761 ^c	0.0023	0.0004	0.0042	0.00360 ^c	0.0002	0.0020	0.00054 ^c	0.0000	0.0003
159	C-062	Conveyor	Heavier Zorba	N	Outside		N	NA			A	460.7	4,607	0.003000 ^o	0.0038	0.0007	0.0069	0.001100 ^o	0.0003	0.0025	0.000167 ^o	0.0000	0.0004
160	C-063	Conveyor drop to stockpile	Zorba	1.5% ^a	Outside		N	NA			Drop	995.1	9,951	0.00761 ^c	0.0205	0.0038	0.0378	0.00360 ^c	0.0018	0.0179	0.00054 ^c	0.0003	0.0027
161	C-063	Conveyor drop to stockpile	Heavies Zorba	1.5% ^a	Outside		N	NA			Drop	313.3	3,133	0.00761 ^c	0.0065	0.0012	0.0119	0.00360 ^c	0.0006	0.0056	0.00054 ^c	0.0001	0.0009
162	C-064	Conveyor drop to container	Zorba	1.5% ^a	Outside		N	NA			Drop	258.0	2,580	0.00761 ^c	0.0053	0.0010	0.0098	0.00360 ^c	0.0005	0.0046	0.00054 ^c	0.0001	0.0007

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM ₁₀ Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
												ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
163	C-065	Conveyor	Residue	N	Outside	Y	N	NA		A	810.9	8,109	0.003000 ^d	0.0066	0.0012	0.0122	0.001100 ^d	0.0004	0.0045	0.000167 ^d	0.0001	0.0007	
164	C-066	Conveyor	Residue	N	Outside	Y	N	NA		A	20,046.6	200,466	0.003000 ^d	0.1632	0.0301	0.3007	0.001100 ^d	0.0110	0.1103	0.000167 ^d	0.0017	0.0167	
165	C-067	Conveyor	Residue	N	Outside	Y	N	NA		A	20,046.6	200,466	0.003000 ^d	0.1632	0.0301	0.3007	0.001100 ^d	0.0110	0.1103	0.000167 ^d	0.0017	0.0167	
166	C-068	Conveyor drop to stockpile	Residue	1.5% ^a	Outside	Y	N	NA		Drop	20,046.6	200,466	0.00761 ^c	0.4137	0.0762	0.7624	0.00360 ^c	0.0361	0.3606	0.00054 ^c	0.0055	0.0546	
167	C-070	Conveyor drop to stockpile	Waste to Stockpile	1.5% ^a	Outside		N	NA		Drop	202.7	2,027	0.00761 ^c	0.0042	0.0008	0.0077	0.00360 ^c	0.0004	0.0036	0.00054 ^c	0.0001	0.0006	
168	C-071	Conveyor	Lights	N	Outside	Y	Y	Cover		A	11.1	111	0.000140 ^d	0.0000	0.0000	0.0000	0.000046 ^d	0.0000	0.0000	0.000013 ^d	0.0000	0.0000	
169	C-072	Conveyor	Lights	N	Outside	Y	Y	Cover		A	11.1	111	0.000140 ^d	0.0000	0.0000	0.0000	0.000046 ^d	0.0000	0.0000	0.000013 ^d	0.0000	0.0000	
170	DC-01 Cyc	DC-01 fines discharge to covered conveyer	Lights	N	Outside		Y	Cover		A	2.9	29	0.000140 ^d	0.0000	0.0000	0.0000	0.000046 ^d	0.0000	0.0000	0.000013 ^d	0.0000	0.0000	
171	DC-02 Cyc	DC-02 fines discharge to covered conveyer	Lights	N	Outside		Y	Cover		A	2.9	29	0.000140 ^d	0.0000	0.0000	0.0000	0.000046 ^d	0.0000	0.0000	0.000013 ^d	0.0000	0.0000	
172	DC-03 Cyc	DC-03 fines discharge to covered conveyer	Lights	N	Outside		Y	Cover		A	2.9	29	0.000140 ^d	0.0000	0.0000	0.0000	0.000046 ^d	0.0000	0.0000	0.000013 ^d	0.0000	0.0000	
173	DC-04 Cyc	DC-04 fines discharge to covered conveyer	Lights	N	Outside		Y	Cover		A	2.9	29	0.000140 ^d	0.0000	0.0000	0.0000	0.000046 ^d	0.0000	0.0000	0.000013 ^d	0.0000	0.0000	
174	E-01	Vibratory Batch Feeder	Residue	Y	Outside		N	NA		A	25,800.0	258,000	0.000140 ^d	0.0098	0.0018	0.0181	0.000046 ^d	0.0006	0.0059	0.000013 ^d	0.0002	0.0017	
175	E-03	Screeener	Residue	Y	Outside		N	NA		B	22,446.0	224,460	0.002200 ^e	0.1340	0.0247	0.2469	0.000740 ^e	0.0083	0.0831	0.000050 ^e	0.0006	0.0056	
176	E-03	Screeener	Residue	Y	Outside		N	NA		B	2,506.3	25,063	0.002200 ^e	0.0150	0.0028	0.0276	0.000740 ^e	0.0009	0.0093	0.000050 ^e	0.0001	0.0006	
177	E-03	Screeener	Residue	Y	Outside		N	NA		B	995.1	9,951	0.002200 ^e	0.0059	0.0011	0.0109	0.000740 ^e	0.0004	0.0037	0.000050 ^e	0.0000	0.0002	
178	E-04	Screeener	Residue	Y	Outside		N	NA		B	5,805.0	58,050	0.002200 ^e	0.0347	0.0064	0.0639	0.000740 ^e	0.0021	0.0215	0.000050 ^e	0.0001	0.0015	
179	E-04	Screeener	Residue	Y	Outside		N	NA		B	3,368.7	33,687	0.002200 ^e	0.0201	0.0037	0.0371	0.000740 ^e	0.0012	0.0125	0.000050 ^e	0.0001	0.0008	
180	E-04	Screeener	Residue	Y	Outside		N	NA		B	1,548.0	15,480	0.002200 ^e	0.0092	0.0017	0.0170	0.000740 ^e	0.0006	0.0057	0.000050 ^e	0.0000	0.0004	
181	E-05	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	5,480.7	54,807	0.003000	0.0089	0.0016	0.0164	0.001100	0.0006	0.0060	0.000167	0.0001	0.0009	
182	E-05	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	3,637.8	36,378	0.003000	0.0059	0.0011	0.0109	0.001100	0.0004	0.0040	0.000167	0.0001	0.0006	
183	E-05	Magnetic Separation	Ferrous	N	Inside		N	NA		A	324.3	3,243	0.003000	0.0026	0.0005	0.0049	0.001100	0.0002	0.0018	0.000167	0.0000	0.0003	
184	E-05	Magnetic Separation	Ferrous	N	Inside		N	NA		A	1,842.9	18,429	0.003000	0.0150	0.0028	0.0276	0.001100	0.0010	0.0101	0.000167	0.0002	0.0015	
185	E-06	Eddy Current Separator	Residue	N	Outside		N	NA		A	2,255.7	22,557	0.003000 ^d	0.0184	0.0034	0.0338	0.001100 ^d	0.0012	0.0124	0.000167 ^d	0.0002	0.0019	
186	E-06	Eddy Current Separator	Mids	N	Outside		N	NA		A	1,290.0	12,900	0.003000 ^d	0.0105	0.0019	0.0194	0.001100 ^d	0.0007	0.0071	0.000167 ^d	0.0001	0.0011	
187	E-06	Eddy Current Separator	Zorba	N	Outside		N	NA		A	92.1	921	0.003000 ^d	0.0008	0.0001	0.0014	0.001100 ^d	0.0001	0.0005	0.000167 ^d	0.0000	0.0001	
188	E-07	Wind Sifter	Lights	N	Outside		Y	Cover		B	92.1	921	0.002200 ^d	0.0006	0.0001	0.0010	0.000740 ^d	0.0000	0.0003	0.000050 ^d	0.0000	0.0000	
189	E-07	Wind Sifter	Heavies	1.5% ^a	Outside		Y	Wind Sifter	90%	100%	552.9	5,529	0.00761 ^c	0.0103	0.0021	0.0000	0.00360 ^c	0.0010	0.0000	0.00054 ^c	0.0002	0.0000	

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions					
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
190	E-11	Screener	Residue	N	Outside		N	NA			B	5,805.0	58,050	0.025000 ^d	0.3938	0.0726	0.7256	0.008700 ^d	0.0253	0.2525	0.001317 ^d	0.0038	0.0382			
191	E-11	Screener	Residue	N	Outside		N	NA			B	3,368.7	33,687	0.025000 ^d	0.2285	0.0421	0.4211	0.008700 ^d	0.0147	0.1465	0.001317 ^d	0.0022	0.0222			
192	E-11	Screener	Residue	N	Outside		N	NA			B	1,548.0	15,480	0.025000 ^d	0.1050	0.0194	0.1935	0.008700 ^d	0.0067	0.0673	0.001317 ^d	0.0010	0.0102			
193	E-12	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	5,480.7	54,807	0.003000	0.0089	0.0016	0.0164	0.001100	0.0006	0.0060	0.000167	0.0001	0.0009			
194	E-12	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	3,637.8	36,378	0.003000	0.0059	0.0011	0.0109	0.001100	0.0004	0.0040	0.000167	0.0001	0.0006			
195	E-12	Magnetic Separation	Ferrous	N	Inside		N	NA			A	324.3	3,243	0.003000	0.0026	0.0005	0.0049	0.001100	0.0002	0.0018	0.000167	0.0000	0.0003			
196	E-12	Magnetic Separation	Ferrous	N	Inside		N	NA			A	1,842.9	18,429	0.003000	0.0150	0.0028	0.0276	0.001100	0.0010	0.0101	0.000167	0.0002	0.0015			
197	E-12	Magnetic Separation	Zorba	N	Outside		N	NA			A	92.1	921	0.003000 ^d	0.0008	0.0001	0.0014	0.001100 ^d	0.0001	0.0005	0.000167 ^d	0.0000	0.0001			
198	E-13	Eddy Current Separator	Residue	N	Outside		N	NA			A	2,255.7	22,557	0.003000 ^d	0.0184	0.0034	0.0338	0.001100 ^d	0.0012	0.0124	0.000167 ^d	0.0002	0.0019			
199	E-13	Eddy Current Separator	Mids	N	Outside		N	NA			A	1,290.0	12,900	0.003000 ^d	0.0105	0.0019	0.0194	0.001100 ^d	0.0007	0.0071	0.000167 ^d	0.0001	0.0011			
200	E-14	Wind Sifter	Lights	N	Outside		Y	Cover			B	73.7	737	0.002200 ^d	0.0004	0.0001	0.0008	0.000740 ^d	0.0000	0.0003	0.000050 ^d	0.0000	0.0000			
201	E-14	Wind Sifter	Heavies	1.5% ^a	Outside		Y	Wind Sifter	100%	100%	Drop	221.1	2,211	0.00761 ^c	0.0046	0.0008	0.0000	0.00360 ^c	0.0004	0.0000	0.00054 ^c	0.0001	0.0000			
202	E-15	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	3,350.3	33,503	0.003000	0.0055	0.0010	0.0101	0.001100	0.0004	0.0037	0.000167	0.0001	0.0006			
203	E-15	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	3,055.5	30,555	0.003000	0.0050	0.0009	0.0092	0.001100	0.0003	0.0034	0.000167	0.0001	0.0005			
204	E-15	Magnetic Separation	Ferrous	N	Outside		N	NA			A	18.4	184	0.003000 ^d	0.0002	0.0000	0.0003	0.001100 ^d	0.0000	0.0001	0.000167 ^d	0.0000	0.0000			
205	E-15	Magnetic Separation	Mixed Non-Ferrous	N	Outside		N	NA			A	147.4	1,474	0.003000 ^d	0.0012	0.0002	0.0022	0.001100 ^d	0.0001	0.0008	0.000167 ^d	0.0000	0.0001			
206	E-16	Eddy Current Separator	Residue	N	Outside		N	NA			A	2,686.9	26,869	0.003000 ^d	0.0219	0.0040	0.0403	0.001100 ^d	0.0015	0.0148	0.000167 ^d	0.0002	0.0022			
207	E-16	Eddy Current Separator	Zorba	N	Outside		N	NA			A	368.6	3,686	0.003000 ^d	0.0030	0.0006	0.0055	0.001100 ^d	0.0002	0.0020	0.000167 ^d	0.0000	0.0003			
208	E-17	Wind Sifter	Lights	N	Outside		Y	Cover			B	401.7	4,017	0.002200 ^d	0.0024	0.0004	0.0044	0.000740 ^d	0.0001	0.0015	0.000050 ^d	0.0000	0.0001			
209	E-17	Wind Sifter	Residue	N	Outside		Y	Wind Sifter	100%	100%	B	2,285.1	22,851	0.002200 ^d	0.0136	0.0025	0.0000	0.000740 ^d	0.0008	0.0000	0.000050 ^d	0.0001	0.0000			
210	E-21	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	3,055.5	30,555	0.003000	0.0050	0.0009	0.0092	0.001100	0.0003	0.0034	0.000167	0.0001	0.0005			
211	E-21	Magnetic Separation	Ferrous	N	Outside		N	NA			A	18.4	184	0.003000 ^d	0.0002	0.0000	0.0003	0.001100 ^d	0.0000	0.0001	0.000167 ^d	0.0000	0.0000			
212	E-21	Magnetic Separation	Mixed Non-Ferrous	N	Outside		N	NA			A	147.4	1,474	0.003000 ^d	0.0012	0.0002	0.0022	0.001100 ^d	0.0001	0.0008	0.000167 ^d	0.0000	0.0001			
213	E-22	Eddy Current Separator	Zorba	N	Outside		N	NA			A	368.6	3,686	0.003000 ^d	0.0030	0.0006	0.0055	0.001100 ^d	0.0002	0.0020	0.000167 ^d	0.0000	0.0003			
214	E-22	Eddy Current Separator	Residue	N	Outside		N	NA			A	2,686.9	26,869	0.003000 ^d	0.0219	0.0040	0.0403	0.001100 ^d	0.0015	0.0148	0.000167 ^d	0.0002	0.0022			
215	E-23	Wind Sifter	Lights	N	Outside		Y	Cover			B	401.7	4,017	0.002200 ^d	0.0024	0.0004	0.0044	0.000740 ^d	0.0001	0.0015	0.000050 ^d	0.0000	0.0001			
216	E-23	Wind Sifter	Residue	N	Outside		Y	Wind Sifter	100%	100%	B	2,285.1	22,851	0.002200 ^d	0.0136	0.0025	0.0000	0.000740 ^d	0.0008	0.0000	0.000050 ^d	0.0001	0.0000			

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions					
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
217	E-27	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	3,003.9	30,039	0.003000	0.0049	0.0009	0.0090	0.001100	0.0003	0.0033	0.000167	0.0001	0.0005			
218	E-27	Magnetic Separation	Ferrous	N	Outside		N	NA			A	92.1	921	0.003000 ^d	0.0008	0.0001	0.0014	0.001100 ^d	0.0001	0.0005	0.000167 ^d	0.0000	0.0001			
219	E-28	Eddy Current Separator	Residue	N	Outside		N	NA			A	2,635.3	26,353	0.003000 ^d	0.0215	0.0040	0.0395	0.001100 ^d	0.0014	0.0145	0.000167 ^d	0.0002	0.0022			
220	E-28	Eddy Current Separator	Zorba	N	Outside		N	NA			A	368.6	3,686	0.003000 ^d	0.0030	0.0006	0.0055	0.001100 ^d	0.0002	0.0020	0.000167 ^d	0.0000	0.0003			
221	E-34	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	2,414.1	24,141	0.003000	0.0039	0.0007	0.0072	0.001100	0.0003	0.0027	0.000167	0.0000	0.0004			
222	E-34	Magnetic Separation	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	2,414.1	24,141	0.003000	0.0039	0.0007	0.0072	0.001100	0.0003	0.0027	0.000167	0.0000	0.0004			
223	E-35	Eddy Current Separator	Zorba	N	Outside		N	NA			A	552.9	5,529	0.003000 ^d	0.0045	0.0008	0.0083	0.001100 ^d	0.0003	0.0030	0.000167 ^d	0.0000	0.0005			
224	E-35	Eddy Current Separator	Residue	N	Outside		N	NA			A	1,861.3	18,613	0.003000 ^d	0.0152	0.0028	0.0279	0.001100 ^d	0.0010	0.0102	0.000167 ^d	0.0002	0.0016			
225	E-40	Separator	Lights Zuric	N	Outside		N	NA			B	88.5	885	0.025000 ^d	0.0060	0.0011	0.0111	0.008700 ^d	0.0004	0.0038	0.001317 ^d	0.0001	0.0006			
226	E-40	Separator	Heavies Zuric	N	Outside		N	NA			B	353.8	3,538	0.025000 ^d	0.0240	0.0044	0.0442	0.008700 ^d	0.0015	0.0154	0.001317 ^d	0.0002	0.0023			
227	E-40	Separator	Lights Zuric	N	Outside		N	NA			B	129.0	1,290	0.025000 ^d	0.0088	0.0016	0.0161	0.008700 ^d	0.0006	0.0056	0.001317 ^d	0.0001	0.0008			
228	E-41	Separator	Lights	N	Outside		N	NA			B	350.1	3,501	0.025000 ^d	0.0238	0.0044	0.0438	0.008700 ^d	0.0015	0.0152	0.001317 ^d	0.0002	0.0023			
229	E-41	Separator drop to container	Heavies	1.5% ^a	Outside		N	NA			Drop	18.4	184	0.00761 ^c	0.0004	0.0001	0.0007	0.00360 ^c	0.0000	0.0003	0.00054 ^c	0.0000	0.0001			
230	E-42	Low speed shredder for size reduction	Out of SSI	N	Outside		N	NA			A	202.7	2,027	0.003000 ^d	0.0017	0.0003	0.0030	0.001100 ^d	0.0001	0.0011	0.000167 ^d	0.0000	0.0002			
231	E-43	Vibratory Feeder	Residue	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	995.1	9,951	0.003000	0.0016	0.0003	0.0030	0.001100 ^f	0.0001	0.0011	0.000167 ^f	0.0000	0.0002			
232	E-44	Eddy Current Separator drop to stockpile	Zorba	1.5% ^a	Inside		N	NA			Drop	184.3	1,843	0.00760	0.0038	0.0007	0.0070	0.00360	0.0003	0.0033	0.00050	0.0000	0.0005			
233	E-44	Eddy Current Separator	Residue	N	Outside		N	NA			A	810.9	8,109	0.003000 ^d	0.0066	0.0012	0.0122	0.001100 ^d	0.0004	0.0045	0.000167 ^d	0.0001	0.0007			
234	E-46	Separator	Heavier Zorba	N	Outside		N	NA			B	460.7	4,607	0.025000 ^d	0.0313	0.0058	0.0576	0.008700 ^d	0.0020	0.0200	0.001317 ^d	0.0003	0.0030			
235	E-46	Separator	Lights Zorba	N	Outside		N	NA			B	92.1	921	0.025000 ^d	0.0063	0.0012	0.0115	0.008700 ^d	0.0004	0.0040	0.001317 ^d	0.0001	0.0006			
236	E-47	Separator	Zorba	N	Outside		N	NA			B	995.1	9,951	0.025000 ^d	0.0675	0.0124	0.1244	0.008700 ^d	0.0043	0.0433	0.001317 ^d	0.0007	0.0066			
237	E-47	Separator	Heavies Zorba	N	Outside		N	NA			B	313.3	3,133	0.025000 ^d	0.0213	0.0039	0.0392	0.008700 ^d	0.0014	0.0136	0.001317 ^d	0.0002	0.0021			
238	E-47	Separator	Lights Zorba	N	Outside		N	NA			B	55.3	553	0.025000 ^d	0.0038	0.0007	0.0069	0.008700 ^d	0.0002	0.0024	0.001317 ^d	0.0000	0.0004			
239	E-47	Separator	Light Zorba	N	Outside		N	NA			B	110.6	1,106	0.025000 ^d	0.0075	0.0014	0.0138	0.008700 ^d	0.0005	0.0048	0.001317 ^d	0.0001	0.0007			
240	E-49	Transfer Conveyor	Residue onto ECS	N	Inside		N	ECS Enclosure	100%	Bldg Eff.	A	3,003.9	30,039	0.003000	0.0049	0.0009	0.0090	0.001100	0.0003	0.0033	0.000167	0.0001	0.0005			
241	E-50	Air Vibe	To Infeed SSI	N	Outside		Y	Cover			A	202.7	2,027	0.000140 ^d	0.0001	0.0000	0.0001	0.000046 ^d	0.0000	0.0000	0.000013 ^d	0.0000	0.0000			
242	ECS	Eddy Current Separator drop to container	Zorba	1.5% ^a	Inside		N	NA			Drop	14.7	147	0.00760	0.0003	0.0001	0.0006	0.00360	0.0000	0.0003	0.00050	0.0000	0.0000			
243	ECS	Eddy Current Separator drop to container	Zorba	1.5% ^a	Inside		N	NA			Drop	66.3	663	0.00760	0.0014	0.0003	0.0025	0.00360	0.0001	0.0012	0.00050	0.0000	0.0002			

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions					
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy
244	End Loader	Drop ASR into feed hopper	Residue into Hopper	N	Outside		Y	Cover			D	25,800.0	258,000	0.000204 ^d	0.0143	0.0026	0.0264	0.000100 ^d	0.0013	0.0129	0.000015 ^d	0.0002	0.0020			
245	End Loader	load waste to truck	Waste	N	Outside		N	NA			D	20,046.6	200,466	0.000204	0.0111	0.0020	0.0205	0.000100	0.0010	0.0100	0.000015	0.0002	0.0015			
246	SC-001	Supplemental Conveyor	Residue								A	5,805.0	58,050	0.003000	0.0473	0.0087	0.0871	0.001100	0.0032	0.0319	0.000167	0.0005	0.0048			
247	SC-002	Supplemental Conveyor	Residue								A	5,805.0	58,050	0.003000	0.0473	0.0087	0.0871	0.001100	0.0032	0.0319	0.000167	0.0005	0.0048			
248	SC-003	Supplemental Conveyor	Residue								A	2,705.3	27,053	0.003000	0.0220	0.0041	0.0406	0.001100	0.0015	0.0149	0.000167	0.0002	0.0023			
249	SC-004	Supplemental Conveyor	Residue								A	2,705.3	27,053	0.003000	0.0220	0.0041	0.0406	0.001100	0.0015	0.0149	0.000167	0.0002	0.0023			
250	SC-005	Supplemental Conveyor	Residue								A	20,046.6	200,466	0.003000	0.1632	0.0301	0.3007	0.001100	0.0110	0.1103	0.000167	0.0017	0.0167			
251	SC-006	Supplemental Conveyor	Residue								A	20,046.6	200,466	0.003000	0.1632	0.0301	0.3007	0.001100	0.0110	0.1103	0.000167	0.0017	0.0167			
Totals Nonferrous Plant Material Handling PM Emissions													4.58	0.89	8.84		0.42	4.21		0.19	1.85					
Totals NonferrousPlant Material Handling HAP Metal Emissions												0.83% ^g	0.04	0.01	0.07	Ratio of HAP metal to total PM from June 2018 emission test of roll media filter applied to nonferrous plant PM emissions.										

- a Material moisture content (%) for light materials - AP-42, Table 13.2.4-1 for crushed limestone - (conservative).
- 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 atmosphere through Dust Collection DC-01. Emissions are estimated by multiplying the DC air flow rate of 12,000 cfm by a grain loading of 0.005 gr/dscf.
- g Modeled total metal HAPs emissions rate expressed as as percent of estimated PM emissions from Non-Ferrous material handling.

**Table 3-3 - Non-Ferrous Material Processing - Particulate Emissions
General III, LLC - Chicago, Illinois**

Max Monthly Thruput 25,800 ton/mo	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%	ECS Enc. PM Control Eff	80.00%
Annual Throughput 258,000 tpy	DC PM Control Eff	99.90%	DC PM ₁₀ Control Eff	99.00%	DC PM _{2.5} Control Eff	98.00%

Row #	Equipment Generating Emissions		Material Conveyed	Moisture > 1.5% Y / N	Transfer Point Location (Inside / Outside)	Conveyor Covered	Transfer Point Controlled (Y/N)	Type of Transfer Point Control	Dust Pickup Capture Eff. (%)	Dust Control Eff. (%)	Emission Factor Source	Material Throughput Rates		PM Emissions				PM10 Emissions			PM2.5 Emissions		
	ID #	Description										ton/mo	tpy	lb/ton	lb/hr	ton/mo	tpy	lb/ton	ton/mo	tpy	lb/ton	ton/mo	tpy

Material Drop PM Equations (AP-42, Section 13).

$$E = k (0.0032) \times \frac{(U/S)^{1.3}}{(M/2)^{1.4}}$$

E = emission factor (lb/ton of material dropped)
 k = particle size multiplier (dimensionless)
 U = mean wind speed
<https://www.timeanddate.com/weather/usa/chicago/climate>
 M = material moisture content (%)

U = 9.0 mph - annual average wind speed for Chicago (Midway Airport)
 k = 0.74 PM - AP-42, Section 13.2.4, for particle size < 30 um
 0.35 PM - AP-42, Section 13.2.4, for particle size < 10 um
 0.053 PM - AP-42, Section 13.2.4, for particle size < 2.5 um
 M = 1.5 % for light materials - AP-42, Table 13.2.4-1 for crushed limestone - (conservative)
 The material moisture content for stockpile drop emission calculations varies by material - see Column E above.

Summary of Non-Ferrous Material Processing System Emission Points and Emissions by Emission Factor Type

# of Pts	Non-Ferrous Processing System Emission Points	Process Rate		PM Emissions			PM10 Emissions			PM2.5 Emissions		
		tpm	tpy	Factor lb/ton	tpm	tpy	Factor lb/ton	tpm	tpm	Factor lb/ton	tpm	tpy
88	Conveyor Transfer Points Uncontrolled	338,876	3,388,757	0.0030	0.4334	4.3339	0.0011	0.1589	1.5888	0.000167	0.0241	0.2406
11	Conveyor Transfer Points Controlled	57,210	572,103	0.00014	0.0036	0.0363	0.000046	0.0012	0.0118	0.000013	0.0003	0.0034
13	Screening - Uncontrolled	13,670	136,702	0.0250	0.1709	1.7088	0.0087	0.0594	0.5944	0.001317	0.0090	0.0900
12	Screening Controlled	42,209	422,085	0.0022	0.0414	0.4140	0.00074	0.0139	0.1394	0.00005	0.0009	0.0093
2	Truck Loadout	45,847	458,466	0.000204	0.0047	0.0469	0.0001	0.0023	0.0229	0.000015	0.0004	0.0035
13	Stockpile Drops	23,338	233,378	Varies	0.0858	0.8581	Varies	0.0406	0.4058	Varies	0.0062	0.0616
Total Emissions					0.75	7.40		0.28	2.76		0.04	0.41

Non-Ferrous Processing Building # of Pts	Dust Collector Emissions PM/PM10/PM2.5
51	All emissions controlled by dust collector and vented to atmosphere. Assume all PM is PM10.
30	
8	
8	
0	
14	
	0.14 1.44

Table 3-4 - Summary of Estimated Fugitive Particulate Emissions from Stockpile Operations^a
General III, LLC - Chicago, Illinois

Plant	Stock Pile	Stock Pile Area Acres	Control Factor ^b	No of Active Days day/yr ^c	Inactive Emissions			Active Emissions			Total PM Emissions		
					PM tpy ^{d,h}	PM10 tpy ^{e,h}	PM2.5 tpy ^{f,h}	PM tpy ^{d,h}	PM10 tpy ^{e,h}	PM2.5 tpy ^{f,h}	PM tpy ^{g,h}	PM10 tpy ^{g,h}	PM2.5 tpy ^{g,h}
Ferrous Plant	Poker North	0.0115	0.33	312	0.0004	0.0002	0.0000	0.0078	0.0039	0.0006	0.0082	0.0041	0.0006
	Poker South	0.0115	0.33	312	0.0004	0.0002	0.0000	0.0078	0.0039	0.0006	0.0082	0.0041	0.0006
	ASR	0.2541	1.00	312	0.0236	0.0118	0.0018	0.5232	0.2616	0.0396	0.5468	0.2734	0.0414
	Ferrous North	0.3630	1.00	312	0.0337	0.0169	0.0026	0.7475	0.3738	0.0566	0.7812	0.3907	0.0592
	Ferrous South	0.3630	1.00	312	0.0337	0.0169	0.0026	0.7475	0.3738	0.0566	0.7812	0.3907	0.0592
	Fluff (Bin)	0.0161	0.33	312	0.0005	0.0003	0.0000	0.0109	0.0055	0.0008	0.0114	0.0058	0.0008
	Raw Material Truck Dumping (Drop 1)	0.3630	1.00	312	0.0337	0.0169	0.0026	0.7475	0.3738	0.0566	0.7812	0.3907	0.0592
	Raw Material Movement from Truck Dumping Area to Stockpile (Drop 2)	0.1815	1.00	312	0.0168	0.0084	0.0013	0.3737	0.1869	0.0283	0.3905	0.1953	0.0296
Nonferrous Plant	FE from E-02	0.0047	0.33	312	0.0001	0.0001	0.0000	0.0032	0.0016	0.0002	0.0033	0.0017	0.0002
	5" + Zorba	0.0189	0.33	312	0.0006	0.0003	0.0000	0.0128	0.0064	0.0010	0.0134	0.0067	0.0010
	2-1/2" - 5" Zorba	0.0189	0.33	312	0.0006	0.0003	0.0000	0.0128	0.0064	0.0010	0.0134	0.0067	0.0010
	5/8" - 2-1/2" Zorba	0.0189	0.33	312	0.0006	0.0003	0.0000	0.0128	0.0064	0.0010	0.0134	0.0067	0.0010
	Tailings	0.0195	0.33	312	0.0006	0.0003	0.0000	0.0133	0.0067	0.0010	0.0139	0.0070	0.0010
	Open	0.0195	0.33	312	0.0006	0.0003	0.0000	0.0133	0.0067	0.0010	0.0139	0.0070	0.0010
	Wire	0.0195	0.33	312	0.0006	0.0003	0.0000	0.0133	0.0067	0.0010	0.0139	0.0070	0.0010
	Wire Rich Solids	0.0195	0.33	312	0.0006	0.0003	0.0000	0.0133	0.0067	0.0010	0.0139	0.0070	0.0010
	Zurick	0.0195	0.33	312	0.0006	0.0003	0.0000	0.0133	0.0067	0.0010	0.0139	0.0070	0.0010
	Waste	0.0868	0.33	312	0.0027	0.0014	0.0002	0.0590	0.0295	0.0045	0.0617	0.0309	0.0047
Totals											3.4834	1.7425	0.2635

- 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> 3.3087
- b. Control Factor of 0.33 (67.5% control) for partial enclosure consisting of walls on three sides of bin. Control Factor of 1.0 for no control. 0.1747
- 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. 3.4834
- d. From TCEQ Guidance
 Stockpile emission calculation:

$$\text{PM Emission Rate (tpy)} = [(\text{inactive day PM EF} \times \text{No. of inactive days}) \times \text{stockpile area}/2000 \times \text{control factor}] + [(\text{active day PM EF} \times \text{No. of active days}) \times (\text{stockpile area}/2000) \times \text{control factor}]$$

$$\text{Inactive Day PM Emission Factor} = 3.50 \text{ lb-PM/acre-day from TCEQ rock crushing emission calculation spreadsheet.}$$

$$\text{Active Day PM Emission Factor} = 13.20 \text{ lb-PM/acre-day from TCEQ rock crushing emission calculation spreadsheet.}$$
- e. PM10 emissions are half of PM emission per TCEQ Air Permits Division, Rock Crushing Emission Calculation spreadsheet.
- f. Where PM2.5 emission factors are not provided in AP-42, 11-19.2-2, a ratio of aerodynamic particle size multipliers from AP-42, 13.2.45 is used to estimate PM2.5 emission factors. $\text{PM2.5 EF} = (\text{PM10 EF}/.035) \times .0053$.
- g. Total particulate emissions is the sum of inactive day emissions plus active day emissions.
- h. Hourly emissions, if required, would be based on 8,760 hr/yr.

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 = average of 67.5	0.5-0.15 = average of 0.33
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

Table 3-5A - Fugitive PM Emissions - Paved Roads General III, LLC - Chicago, Illinois

Paved Road Fugitive Emission Calculation Procedure

$$E_{ext} = (k * (sL)^{0.91} * (W)^{1.02}) * (1 - (P/(4N)))$$

equation does not include brake and tire wear.

where:

E_{ext} =		Size specific annual average particulate emission factor (lb/VMT)
k =	See Below	Particle size multiplier lb/VMT (AP-42 Table 13.2.1-1)
sL =	9.7	mean controlled silt content, % (AP42 Table 13.2.1-3 Jan 2011 - Iron & Steel Range: 0.09 to 79; mean 9.7-g/m2)
W =	See Below	Mean vehicle weight, tons (use weighted average where available)
P =	120	Number of precipitation days (>0.01 in) per year (AP42 Fig 13.2.1.2 Jan 2011 - Chicago, IL)
N =	365	Averaging Period, annual
Control Eff % =	75.00%	Emission Control Efficiency for sweeping or watering
Daily Operating Hours	18	Hours per Year
Weekly Operating Days	6	Days /Week
Annual Operating Weeks =	52	Weeks/Year
Annual Operating hours =	5,616	Hours per Year

Material Hauling					PM Particle size multiplier (k) =		0.011
Vehicle Type	Mean Vehicle Weight (tons)	Miles Traveled per Day	Uncontrolled lb/VMT	Controlled lb/VMT	Annual Average Controlled Emissions		Annual PM Emissions tpy
					(lb/day)	(ton/month)	
Peddler Scrap Deliveries	3.45	133.23	0.2823	0.0706	9.406	0.147	1.47
Truck Scrap Delivery to North Scrap Stockpile	24.50	23.24	2.0848	0.5212	12.113	0.189	1.89
Truck Scrap Delivery to South Scrap Stockpile	24.50	39.99	2.0848	0.5212	20.844	0.325	3.25
Ferrous Scrap Shipment from North Stockpile	26.75	14.34	2.2802	0.5701	8.173	0.128	1.28
Ferrous Scrap Shipment from South Stockpile	26.75	21.20	2.2802	0.5701	12.089	0.189	1.89
Ferrous Waste Shipped Off Site by Truck	27.75	0.29	2.3672	0.5918	0.170	0.003	0.03
Non Ferrous Products Shipped Off Site by Truck	26.75	1.25	2.2802	0.5701	0.714	0.011	0.11
Non Ferrous Waste Shipped Off Site by Truck	27.75	9.72	2.3672	0.5918	5.752	0.090	0.90
WA500 Loaders	36.49	10.45	3.1302	0.7826	8.178	0.128	1.28
WA300 Loaders	16.60	4.75	1.4015	0.3504	1.664	0.026	0.26
Weighted Average Weight:	14.44	Subtotals:			79.104	1.234	12.34

Material Hauling					PM ₁₀ Particle size multiplier (k) =		0.0022
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Uncontrolled lb/VMT	Controlled lb/VMT	Annual Average Controlled Emissions		Annual PM ₁₀ Emissions tpy
					(lb/day)	(ton/month)	
Peddler Scrap Deliveries	3.45	133.23	0.0565	0.0141	1.879	0.029	0.29
Truck Scrap Delivery to North Scrap Stockpile	24.50	23.24	0.4170	0.1043	2.424	0.038	0.38
Truck Scrap Delivery to South Scrap Stockpile	24.50	39.99	0.4170	0.1043	4.171	0.065	0.65
Ferrous Scrap Shipment from North Stockpile	26.75	14.34	0.4560	0.1140	1.634	0.026	0.26
Ferrous Scrap Shipment from South Stockpile	26.75	21.20	0.4560	0.1140	2.417	0.038	0.38
Ferrous Waste Shipped Off Site by Truck	27.75	0.29	0.4734	0.1184	0.034	0.001	0.01
Non Ferrous Products Shipped Off Site by Truck	26.75	1.25	0.4560	0.1140	0.143	0.002	0.02
Non Ferrous Waste Shipped Off Site by Truck	27.75	9.72	0.4734	0.1184	1.151	0.018	0.18
WA500 Loaders	36.49	10.45	0.6260	0.1565	1.635	0.026	0.26
WA300 Loaders	16.60	4.75	0.2803	0.0701	0.333	0.005	0.05
Weighted Average Weight:	14.44	Subtotals:			15.821	0.247	2.47

Material Hauling					PM _{2.5} Particle size multiplier (k) =		0.00054
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Uncontrolled lb/VMT	Controlled lb/VMT	Annual Average Controlled Emissions		Annual PM _{2.5} Emissions tpy
					(lb/day)	(ton/month)	
Peddler Scrap Deliveries	3.45	133.23	0.0139	0.0035	0.466	0.007	0.07
Truck Scrap Delivery to North Scrap Stockpile	24.50	23.24	0.1023	0.0256	0.595	0.009	0.09
Truck Scrap Delivery to South Scrap Stockpile	24.50	39.99	0.1023	0.0256	1.024	0.016	0.16
Ferrous Scrap Shipment from North Stockpile	26.75	14.34	0.1119	0.0280	0.401	0.006	0.06
Ferrous Scrap Shipment from South Stockpile	26.75	21.20	0.1119	0.0280	0.594	0.009	0.09
Ferrous Waste Shipped Off Site by Truck	27.75	0.29	0.1162	0.0291	0.008	0.000	0.00
Non Ferrous Products Shipped Off Site by Truck	26.75	1.25	0.1119	0.0280	0.035	0.001	0.01
Non Ferrous Waste Shipped Off Site by Truck	27.75	9.72	0.1162	0.0291	0.283	0.004	0.04
WA500 Loaders	36.49	10.45	0.1537	0.0384	0.401	0.006	0.06
WA300 Loaders	16.60	4.75	0.0688	0.0172	0.082	0.001	0.01
Weighted Average Weight:	14.44	Subtotals:			3.889	0.061	0.61

**Table 3-5B - Fugitive PM Emissions - Unpaved Roads
General III, LLC - Chicago, Illinois**

Unpaved Industrial Road Fugitive Emission Calculation Procedure

5% of loader miles are assumed to be on unpaved roads

$$E_{ext} = [(k * (s/12)^a * (W/3)^b)] * [(N-P)/N]$$

Equation 1a & 2, AP-42 13.2.2-2 (Nov 2006)

where:

E_{ext} =	Size specific annual average particulate emission factor (lb/VMT)
k =	See Below Particle size multiplier lb/VMT (AP-42 Table 13.2.2-2)
s =	6 mean material silt content (%) (AP42 Table 13.2.2-1 Nov 2006 - Iron & Steel Production: mean = 6.0%)
W =	See Below Mean vehicle weight , tons (use weighted average where available)
P =	120 Number of precipitation days (>0.01 in) per year (AP42 Fig 13.2.1.2 Jan 2011 - Chicago, IL)
N =	365 Averaging Period, annual
Control Eff % =	50.00% Emission Control Efficiency for watering
Daily Operating Hours	18 Hours per Year
Weekly Operating Days	6 Days/Week
Annual Operating Weeks =	52 Weeks/Year
Annual Operating hours =	5,616 Hours per Year

AP42 Table 13.2.2-2 Nov 2006 - Industrial Roads (Eq. 1a)			
EQ 1a Constants	PM	PM10	PM2.5
a =	0.7	0.9	0.9
b =	0.45	0.45	0.45

Material Hauling

					PM Particle size multiplier (k) =		4.9
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Uncontrolled lb/VMT	Controlled lb/VMT	Annual Average Controlled Emissions		Annual PM Emissions tpy
					(lb/day)	(ton/month)	
WA500 Loaders	36.49	0.55	6.2323	3.1162	1.714	0.027	0.27
WA300 Loaders	16.60	0.25	4.3721	2.1861	0.547	0.009	0.09
Weighted Average Weight:	30.28	Subtotals:			2.260	0.035	0.35

Material Hauling

					PM ₁₀ Particle size multiplier (k) =		1.5
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Uncontrolled lb/VMT	Controlled lb/VMT	Annual Average Controlled Emissions		Annual PM ₁₀ Emissions tpy
					(lb/day)	(ton/month)	
WA500 Loaders	36.49	0.55	1.6609	0.8305	0.457	0.007	0.07
WA300 Loaders	16.60	0.25	1.1651	0.5826	0.146	0.002	0.02
Weighted Average Weight:	30.28	Subtotals:			0.602	0.009	0.09

Material Hauling

					PM _{2.5} Particle size multiplier (k) =		0.15
Vehicle Type	Vehicle Weight (tons)	Miles Traveled per Day	Uncontrolled lb/VMT	Controlled lb/VMT	Annual Average Controlled Emissions		Annual PM _{2.5} Emissions tpy
					(lb/day)	(ton/month)	
WA500 Loaders	36.49	0.55	0.1661	0.0831	0.046	0.001	0.01
WA300 Loaders	16.60	0.25	0.1165	0.0583	0.015	0.000	0.00
Weighted Average Weight:	30.28	Subtotals:			0.060	0.001	0.01

**Table 3-6 Miscellaneous Natural Gas Fired Environmental Heaters
General III, LLC - Chicago, Illinois**

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Pollutant	Pollutant Emission Factor ^a lb/MMscf	Total Max Firing Rate 10.0 MMBtu/hr NG HHV = 1,020-Btu/scf Annual Gas Consumption 65,700 MMBtu/yr	
		ton/mo ^e	tpy
Nitrogen Oxide (NO _x)	100	0.32	3.22
Carbon Monoxide (CO)	84	0.27	2.71
Total Filterable PM	1.9	0.01	0.06
Total Condensable PM	5.7	0.02	0.18
Total Particulate Matter	7.6	0.02	0.24
Sulfur Dioxide (SO ₂)	0.6	0.00	0.02
Volatile Organic Compounds (VOC)	5.5	0.02	0.18
Greenhouse Gas Emissions			
Carbon Dioxide (CO ₂)	120,174	387.03	3,870.31
Methane (CH ₄)	2.2649	0.0073	0.07
Nitrous Oxide (N ₂ O)	0.2265	0.0007	0.01
Carbon Dioxide Equivalents (CO₂e) ^c		387.43	3,874.31

a. AP-42 Emission factors from Tables 1.4-1 and 1.4-2.

b. Unit heaters are estimated to operate 6,570 hr/year.

c. Global Warming Potentials (GWPs) for CO₂, CH₄ and N₂O are 1, 25, and 298 respectively (40 CFR 98 Subpart A).

Table 3-6 Miscellaneous Natural Gas Fired Environmental Heaters
General III, LLC - Chicago, Illinois

Summary of HAP Emissions from Natural Gas Combustion

HAP ^b Y/N	Pollutant	Emission Factor ^a (lb/10 ⁶ scf)		
			ton/mo	tpy
Metal HAPs^c				
Y	Lead	0.0005	1.61E-06	1.61E-05
Y	Manganese	3.80E-04	1.22E-06	1.22E-05
Y	Mercury	2.60E-04	8.37E-07	8.37E-06
Y	Nickel	2.10E-03	6.76E-06	6.76E-05
Y	Arsenic	2.00E-04	6.44E-07	6.44E-06
Y	Beryllium	< 1.20E-05	3.86E-08	3.86E-07
Y	Cadmium	1.10E-03	3.54E-06	3.54E-05
Y	Chromium	1.40E-03	4.51E-06	4.51E-05
Y	Cobalt	8.40E-05	2.71E-07	2.71E-06
Y	Selenium	< 2.40E-05	7.73E-08	7.73E-07
Volatile HAPs^d				
Y	Toluene	3.40E-03	1.10E-05	1.10E-04
Y	Hexane	< 1.80E+00	< 5.80E-03	< 5.80E-02
Y	Anthracene	< 2.40E-06	< 7.73E-09	< 7.73E-08
Y	Pyrene	5.00E-06	1.61E-08	1.61E-07
Y	Benzo(g,h,i)perylene	< 1.20E-06	< 3.86E-09	< 3.86E-08
Y	Indeno(1,2,3-cd)pyrene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Acenaphthylene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Benzo(b)fluoranthene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Fluoranthene	3.00E-06	9.66E-09	9.66E-08
Y	Benzo(k)fluoranthene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Chrysene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Dichlorobenzene	1.20E-03	3.86E-06	3.86E-05
Y	Formaldehyde	7.50E-02	2.42E-04	2.42E-03
Y	Benzo(a)pyrene	< 1.20E-06	< 3.86E-09	< 3.86E-08
Y	Dibenzo(a,h)anthracene	< 1.20E-06	< 3.86E-09	< 3.86E-08
Y	3-Methylcholanthrene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Benz(a)anthracene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	7,12-Dimethylbenz(a)anthracene	< 1.60E-05	< 5.15E-08	< 5.15E-07
Y	Benzene	< 2.10E-03	< 6.76E-06	< 6.76E-05
Y	Acenaphthene	< 1.80E-06	< 5.80E-09	< 5.80E-08
Y	Phenanthrene	1.70E-05	5.48E-08	5.48E-07
Y	Fluorene	2.80E-06	9.02E-09	9.02E-08
Y	Naphthalene	6.10E-04	1.96E-06	1.96E-05
Y	2-Methylnaphthalene	2.40E-05	7.73E-08	7.73E-07
Total HAPs			6.08E-03	6.08E-02
Maximum Individual HAP		Hexane	5.80E-03	5.80E-02

a. AP-42 Emission factors from Tables 1.4-1 and 1.4-2.

b. Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

c. Metal HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-4.

d. Organic HAP emission factors from natural gas combustion - AP-42 Emission factors from Tables 1.4-3.

e. Monthly emissions are assumed to be 10% of annual emissions.

**Table 3-7 - Summary of Facility Wide Criteria Pollutant Emissions
General III, LLC - Chicago, Illinois**

Pollutant	RTO ^a		RTO Natural Gas ^b		Ferrous Plant ^c		Nonferrous Plant ^d		Misc Natural Gas ^e		Facility Wide Potential ^h tpy	Fugitive Emissions From Stockpile Operations ^e		Fugitive Emissions from Paved/Unpaved Roads ^f		Facility Wide Emissions with Fugitives tpy
	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy		ton/mo	tpy	ton/mo	tpy	
Oxides of Nitrogen - NOx			0.26	2.57					0.32	3.22	5.79					5.79
Carbon Monoxide - CO	1.29	12.86	0.22	2.16					0.32	2.71	17.72					17.72
Total Particulate Matter - PM	0.94	9.40	0.02	0.20	0.30	2.93	0.89	8.84		0.24	21.61	0.35	3.48	1.27	12.69	37.79
filterable PM less than 10 microns in diameter - PM ₁₀	0.94	9.40	0.02	0.20	0.13	1.25	0.42	4.21	0.00	0.24	15.30	0.17	1.74	0.26	2.56	19.60
Filterable PM less than 2.5 microns in diameter - PM _{2.5}			0.02	0.20	0.02	0.23	0.19	1.85	0.00	0.24	2.52	0.03	0.26	0.06	0.62	3.40
Sulfur Dioxide - SO ₂				0.02					0.00	0.02	0.03					0.03
Volatile Organic Material - VOM	0.51	5.12		0.14					0.02	0.18	5.44					5.44
Total - HAPs	0.2573	2.5733	0.0049	0.0486	0.0015	0.0143	0.0074	0.0730	0.0061	0.0608	2.7700	0.0021	0.0210	0.0028	0.0281	2.8191
Max Individual HAP		1.5442		0.0463		0.0069		0.0417		0.0580			0.0108		0.0098	
HAP Hexane		HCl		Hexane		Lead		Lead		Hexane			Mercury		Mercury	
				0.0463					0.0000	0.0580	0.1043					0.1043
Greenhouse Gas Emissions											0.00					0.00
Carbon Dioxide - CO ₂		3,095.91		3,092.72						3,870.31	10,058.94					10,058.94
Methane - CH ₄		0.0583		0.0583						0.0729	0.1895					0.1895
Nitrous Oxide - N ₂ O		0.0058		0.0058						0.0073	0.0190					0.0190
Carbon Dioxide Equivalents - CO ₂ e		3,099.10		3,095.91						3,874.31	10,069.33					10,069.33

- a. See Tables 3-1A (VOM and CO), Table 3-1B (PM), and Table 3-1C (HAPs). For the purposes of this application, GHG from combustion of VOM in the RTO is assumed to be equal to GHG from maximum natural gas combustion in RTO.
- b. See Table 3-1D.
- c. See Table 3-2.
- d. See Table 3-3.
- e. See Table 3-4.
- f. See Table 3-5.
- g. See Table 3-6.
- h. Scrap metal recycling is not one included in one of the 28 industrial quantities identified in PSD rules, there for purposes of PSD, fugitive emissions are not included in PTE.

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**Table 3-8 - Summary of Facility Wide HAP Emissions
General III, LLC - Chicago, Illinois**

Hazardous Air Pollutant	RTO ^a		RTO Natural Gas ^b		Ferrous Plant ^c		Nonferrous Plant ^c		Stockpile Operations ^c		Paved + Unpaved Fugitive Road ^c		Misc Natural Gas ^b		Facility Wide Total HAP	
	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	ton/mo	tpy	Ton/mo	tpy
Volatile HAPs																
Ethylbenzene	1.33E-04	1.33E-03													1.33E-04	1.33E-03
Styrene	2.66E-05	2.66E-04													2.66E-05	2.66E-04
Toluene	6.66E-04	6.66E-03	8.75E-06	8.75E-05								1.10E-05	1.10E-04	6.86E-04	6.86E-03	
Hexane			4.63E-03	4.63E-02								5.80E-03	5.80E-02	1.04E-02	1.04E-01	
Anthracene			6.18E-09	6.18E-08								7.73E-09	7.73E-08	1.39E-08	1.39E-07	
Tetrachloroethane (PCE)	5.34E-06	5.34E-05												5.34E-06	5.34E-05	
Pyrene			1.29E-08	1.29E-07									1.61E-08	1.61E-07	2.90E-08	2.90E-07
m,p-Xylene	2.66E-05	2.66E-04												2.66E-05	2.66E-04	
Benzo(g,h,i)perylene			3.09E-09	3.09E-08								3.86E-09	3.86E-08	6.95E-09	6.95E-08	
Indeno(1,2,3-cd)pyrene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
Acenaphthene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
Benzo(b)fluoranthene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
Fluoranthene			7.72E-09	7.72E-08								9.66E-09	9.66E-08	1.74E-08	1.74E-07	
Benzo(k)fluoranthene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
Chrysene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
Dichlorobenzene			3.09E-06	3.09E-05								3.86E-06	3.86E-05	6.95E-06	6.95E-05	
Formaldehyde			1.93E-04	1.93E-03								2.42E-04	2.42E-03	4.35E-04	4.35E-03	
Benzo(a)pyrene			3.09E-09	3.09E-08								3.86E-09	3.86E-08	6.95E-09	6.95E-08	
Dibenzo(a,h)anthracene			3.09E-09	3.09E-08								3.86E-09	3.86E-08	6.95E-09	6.95E-08	
3-Methylcholanthrene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
Benzo(a)anthracene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
7,12-Dimethylbenzene(a)anthracen			4.12E-08	4.12E-07								5.15E-08	5.15E-07	9.27E-08	9.27E-07	
Benzene	8.00E-04	8.00E-03	5.40E-06	5.40E-05								6.76E-06	6.76E-05	8.12E-04	8.12E-03	
1,1,1-Trichloroethane	4.00E-04	4.00E-03												4.00E-04	4.00E-03	
Methylene Chloride	1.20E-04	1.20E-03												1.20E-04	1.20E-03	
Trichloroethene (TCE)	1.33E-04	1.33E-03												1.33E-04	1.33E-03	
Acenaphthylene			4.63E-09	4.63E-08								5.80E-09	5.80E-08	1.04E-08	1.04E-07	
Phenanthrene			4.38E-08	4.38E-07								5.48E-08	5.48E-07	9.85E-08	9.85E-07	
Fluorene			7.21E-09	7.21E-08								9.02E-09	9.02E-08	1.62E-08	1.62E-07	
Naphthalene			1.57E-06	1.57E-05								1.96E-06	1.96E-05	3.53E-06	3.53E-05	
2-Methylnaphthalene			6.18E-08	6.18E-07								7.73E-08	7.73E-07	1.39E-07	1.39E-06	
o-Xylene	1.33E-04	1.33E-03												1.33E-04	1.33E-03	
Metal HAPs																
Lead	2.77E-04	2.77E-03	1.29E-06	1.29E-05	7.09E-04	6.86E-03	4.22E-03	4.17E-02	1.08E-03	1.08E-02	8.42E-04	8.42E-03	1.61E-06	1.61E-05	7.12E-03	7.06E-02
Manganese	3.98E-04	3.98E-03	9.78E-07	9.78E-06	4.31E-04	4.19E-03	1.57E-03	1.56E-02	5.63E-04	5.63E-03	9.79E-04	9.79E-03	1.22E-06	1.22E-05	3.95E-03	3.92E-02
Mercury	8.93E-03	8.93E-02	6.69E-07	6.69E-06	3.01E-06	2.91E-05	8.34E-06	8.26E-05	3.91E-06	3.91E-05	3.40E-06	3.40E-05	8.37E-07	8.37E-06	8.95E-03	8.95E-02
Nickel	6.59E-04	6.59E-03	5.40E-06	5.40E-05	6.09E-05	5.93E-04	2.78E-04	2.75E-03	8.32E-05	8.32E-04	1.87E-04	1.87E-03	6.76E-06	6.76E-05	1.28E-03	1.28E-02
Antimony	2.25E-04	2.25E-03			3.48E-07	3.42E-06	1.08E-06	1.07E-05	4.09E-07	4.09E-06	1.46E-06	1.46E-05			2.28E-04	2.28E-03
Arsenic	7.94E-05	7.94E-04	5.15E-07	5.15E-06	8.32E-07	8.17E-06	4.03E-06	3.99E-05	1.08E-06	1.08E-05	3.16E-06	3.16E-05	6.44E-07	6.44E-06	8.97E-05	8.96E-04
Beryllium	1.78E-05	1.78E-04	3.09E-08	3.09E-07	1.00E-06	9.96E-06	1.08E-06	1.07E-05	9.18E-07	9.18E-06	6.26E-06	6.26E-05	3.86E-08	3.86E-07	2.71E-05	2.71E-04
Cadmium	8.51E-05	8.51E-04	2.83E-06	2.83E-05	7.70E-06	7.45E-05	3.09E-05	3.06E-04	1.07E-05	1.07E-04	9.17E-06	9.17E-05	3.54E-06	3.54E-05	1.50E-04	1.49E-03
Chromium	6.90E-04	6.90E-03	3.60E-06	3.60E-05	8.57E-05	8.35E-04	3.80E-04	3.76E-03	1.15E-04	1.15E-03	3.42E-04	3.42E-03	4.51E-06	4.51E-05	1.62E-03	1.61E-02
Cobalt	2.13E-05	2.13E-04	2.16E-07	2.16E-06	9.33E-06	9.05E-05	4.98E-05	4.93E-04	1.36E-05	1.36E-04	1.80E-05	1.80E-04	2.71E-07	2.71E-06	1.12E-04	1.12E-03
Phosphorus	2.43E-02	2.43E-01			1.65E-04	1.60E-03	8.34E-04	8.26E-03	2.32E-04	2.32E-03	4.19E-04	4.19E-03			2.59E-02	2.59E-01
Selenium	1.21E-03	1.21E-02	6.18E-08	6.18E-07	3.48E-07	3.42E-06	1.08E-06	1.07E-05	4.09E-07	4.09E-06	1.46E-06	1.46E-05	7.73E-08	7.73E-07	1.21E-03	1.21E-02
Inorganic Acid HAPs																
Hydrochloric Acid	1.54E-01	1.54E+00													1.54E-01	1.54E+00
Hydrofluoric Acid	6.36E-02	6.36E-01													6.36E-02	6.36E-01
Total HAPs	2.57E-01	2.57E+00	4.86E-03	4.86E-02	1.47E-03	1.43E-02	7.37E-03	7.30E-02	2.10E-03	2.10E-02	2.81E-03	2.81E-02	6.08E-03	6.08E-02	2.82E-01	2.82E+00
Maximum Individual HAP													2.59E-02	2.59E-01		

a. Uncontrolled organic compound emission factors (lb/ton), as presented in ISRI Title V Applicability Workbook, Table D-11F, were multiplied by proposed permit throughput limits, adjusted for 98% control by the RTO. Metal HAP emission factors were taken from the November 2018 emission testing of the RTO at GII, LLC in Chicago, Illinois.

b. HAP emissions from natural gas combustion as identified in AP-42, Tables 1.4-3 and 1.4-4.

c. Metal HAP emissions calculated by multiplying the weight % of metal HAP in RTO particulate emission by the total PM emissions from identified emission unit..

d. HAP emission factors from natural gas combustion from AP-42, Tables 1.4-3 and 1.4-4 adjusted to propane on the basis of 1,020 Btu/cf (see footnotes on Table 5).

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**Updated Emission Estimates
Construction Permit Application 19090021 for a
New Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

January 27, 2020

APPENDIX D

**SHREDDER RTO/SCRUBBER EMISSIONS TEST REPORT
(TESTING PERFORMED NOVEMBER 2019)**

HARD COPY of This Document Contains a CD ROM with the above referenced test report.



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**Updated Emission Estimates
Construction Permit Application 19090021 for a
New Scrap Metal Recycling Facility**

**General III, LLC
11600 South Burley
Chicago, Illinois 60614**

January 27, 2020

**APPENDIX E
PROPOSED CHANGES TO
CONDITION 11 (EMISSION LIMITS) OF
CONSTRUCTION PERMIT 19090021**

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January 27, 2020; Note from John Pinion of RKA:
The changes identified herein corresponded to the updated emission estimates submitted to IEFA dated January 22, 2020. The values below should be included in the draft final construction permit.

11a. Emissions from and operation of the Hammermill Shredder System shall not exceed the following limits:

i. VOM emissions:

Emission Unit	Process Rate		Emission	VOM Emission	
	(Tons/Mo)	(Tons/Yr)	Factor (lb/Ton)	(Tons/Mo)	(Tons/Yr)
Hammermill Shredder RTO/Scrubber Stack	100,000	1,000,000	0.5119 243	0.51 24	5.12 2.43

These limits are based upon maximum shredder material throughput, an uncontrolled emission factor derived from a stack test, and 98% removal efficiency by the RTO/Scrubber. All measured total hydrocarbon (THC) emissions are assumed to be VOM.

ii. HAP emissions:

Emission Unit	Single HAP		Combined HAPs	
	(Tons/Mo)	(Tons/Yr)	(Tons/Mo)	(Tons/Yr)
Metal Shredder RTO/Scrubber Stack	0.15 0.03	1.54 0.30	0.27 0.06	2.69 0.61

Commented [R11]: Hydrochloric acid (HCl) at scrubber outlet from November 2019 emission testing with safety factor of 4 included.

These limits are based upon measured emission rates from a stack test adjusted by safety factor of 4.0 at maximum shredder material throughput in Condition 11(a) (i) above. ~~combined HAPs comprising 25% of the THC emissions and any single HAP comprising no more than 50% of the combined HAPs (12.5% of the THC emissions).~~

iii. Filterable PM, PM₁₀, and PM_{2.5} emissions:

Emission Unit	Process Rate		Emission	PM, PM ₁₀ , and PM _{2.5} Emissions	
	(Tons/Mo)	(Tons/Yr)	Factor (lb/Ton)	(Tons/Mo)	(Tons/Yr)
Metal Shredder RTO/Scrubber Stack	100,000	1,000,000	0.0047	0.94 24	9.40 2.36

These limits are based upon maximum shredder material throughput, emission factors derived from stack test adjusted by a safety factor of 4.0 ~~captured and measured filterable PM emissions~~, and all measured filterable PM assumed to be PM₁₀ and PM_{2.5}.

b. Emissions from fuel combustion in the Regenerative Thermal Oxidizer (RTO) associated with the Hammermill Shredding System shall not exceed the following limits:

i. Natural gas Usage: 6.57 mmscf/month, 52.5 mmscf/year

ii. Emissions from the combustion of natural gas:

Pollutant	Emission Factor (lbs/mmcf)	Emissions	
		(Tons/Mo)	(Tons/Yr)
Carbon Monoxide (CO)	-131.43 583.55	1.50	15.02
Nitrogen Oxides (NO _x)	100.0	0.28	2.57
Particulate Matter (PM)	7.6	0.02	0.20
Sulfur Dioxide (SO ₂)	0.6	0.01	0.02
Volatile Organic Material (VOM)	5.5	0.02	0.14

These limits are based on the maximum firing rate of the RTO burner (15.0 mmBtu/hour), maximum natural gas usage, approximately 1% (~~12.86~~ 1.22 tons/year) of uncontrolled VOM emissions being emitted as CO emissions due to incomplete combustion, and standard emission factors (Tables 1.4-1 and 1.4-2, AP-42, Fifth Edition, Volume I, Supplement D, July 1998).

c. Emissions from and operation of the Ferrous Material Separation Process shall not exceed the following limits:

i. ~~Filterable Particulate Matter Emissions~~

a. ~~PM₇, PM₁₀, and PM_{2.5}~~ emissions:

Emission Unit	Process Rate		Emission Factor (lb/Ton)	PM 7, PM₁₀, and PM_{2.5} Emissions	
	(Tons/Mo)	(Tons/Yr)		(Tons/Mo)	(Tons/Yr)
59 Conveyor Transfer Points	1,245,450	12,454,500	0.00014	0.08	0.82
	1,444,050	14,440,500		0.10	0.96
3 Truck, Railcar, & Barge Loading Points	174,000	1,740,000	0.000204	0.02	0.18
	137,600	1,376,000		0.01	0.14
7 Stockpile Loading Points	300,000	3,000,000	0.00122 varies	0.18	1.83
Total:				2.83	2.93

b. PM₁₀ emissions:

Emission Unit	Process Rate		Emission Factor (lb/Ton)	PM ₁₀ Emissions	
	(Tons/Mo)	(Tons/Yr)		(Tons/Mo)	(Tons/Yr)
59 Conveyor Transfer Points	1,444,050	14,440,500	0.000046	0.03	0.31
3 Truck & Barge Loading Points	137,600	1,376,000	0.0001	0.01	0.07
7 Stockpile Loading Points	300,000	3,000,000	Varies	0.09	0.87
Total:				1.25	

c. PM_{2.5} emissions:

<u>Emission Unit</u>	<u>Process Rate</u>		<u>Emission</u>	<u>PM_{2.5} Emissions</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>	<u>Factor</u> <u>(lb/Ton)</u>	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>
<u>59 Conveyor Transfer Points</u>	<u>1,444,050</u>	<u>14,440,500</u>	<u>0.000013</u>	<u>0.01</u>	<u>0.09</u>
<u>3 Truck & Barge Loading Points</u>	<u>137,600</u>	<u>1,376,000</u>	<u>0.000015</u>	<u>0.01</u>	<u>0.01</u>
<u>7 Stockpile Loading Points</u>	<u>300,000</u>	<u>3,000,000</u>	<u>Varies</u>	<u>0.01</u>	<u>0.13</u>
				<u>Total:</u>	<u>0.23</u>

The above filterable PM/PM₁₀/PM_{2.5} ~~se-~~limits are based upon maximum material throughput, Standard emission factors from AP-42 (Table 11.19.2-2, Fifth Edition, Volume I, Update 2004, August 2004) for conveyors transfer points and Truck/Barge Loading, stockpile loadings emission factor derived using AP-42, Section 13.2.4.3 (Table 13.2.4, AP-42, Fifth Edition, Volume I, November 2006) using coefficients of K=0.74 (PM), K=0.35 (PM₁₀), and K=0.053 (PM_{2.5}); U (mean windspeed) = 9.0 mph, and M (minimum moisture content) = 1.5% applied to light material stockpile, 5.4% applied to raw scrap metal handling, 10% applied to ASR stockpile loading.

- ii. Combined HAP emissions from Ferrous Material Separation Process shall not exceed the following limits:

<u>Emission Unit</u>	<u>Combined HAPs</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>
Ferrous Material Separation Process	0.01	0.04 <u>0.02</u>

These limits are based upon metal HAPs being ~~0.49~~^{1.33} of the total PM emissions ~~measured at the discharge of existing roll media filter during June 2018 metal emission test at General II, LLC.~~

- d. Emissions from and operation of the Non-Ferrous Material Separation Process and Fines Processing System shall not exceed the following limits:

- i. Filterable PM, PM₁₀, and PM_{2.5} emissions for sources inside building controlled by a baghouse shall be limited to 0.15 tons/month and 1.44 tons/year ~~.*~~

Commented [R12]: The baghouse PM emission calculations, as described, are completely independent of the number of emission points or the total material throughput.

<u>Emission Unit</u>	<u>Process Rate</u>		<u>Emission</u>	<u>PM, PM₁₀ and PM_{2.5} Emissions</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>	<u>(lb/Ton)</u>	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>
74 Conveyor Transfer Points (Uncontrolled)	110,624	1,106,236	0.00300	0.17	1.66
74 Conveyor Transfer Points (Controlled)	13,436	134,361	0.00014	0.01	0.01

8 Screening Points (Uncontrolled)	2,820	28,196	0.02500	0.04	0.35
8 Screening Points (Controlled)	1,541	15,406	0.00220	0.01	0.02
17 Stockpile Loading Points	—838	—8,381	0.00761	0.01	0.03
				Total:	2.07*

* These sources located inside building exhaust to the atmosphere through Dust Collector DC-01, ~~estimated~~ emissions may be calculation by using the stack flow rate (12,000 cfm) and grain loading of 0.005 gr/dscf and hours of operation (1.36 tons/year).

~~These limits are based upon maximum material throughput, Standard emission factors from AP-42 (Table 11.19.2-2, Fifth Edition, Volume I, Update 2004, August 2004) for conveyors transfer points screening and Truck Loading, stockpile loading emission factor derived using AP-42, Section 13.2.4.3 (Table 13.2.4, AP-42, Fifth Edition, Volume I, November 2006) using coefficients of K=0.74 (PM), K=0.35 (PM₁₀), and K=0.053 (PM_{2.5}); U (mean windspeed) = 9.0 mph, and M (minimum moisture content) = 1.5% applied to light material stockpile loading.~~

ii. Filterable Particulate Matter Emissions PM, PM₁₀, and PM_{2.5} ~~emissions from outdoor emission units~~

a. PM emissions from outdoor emission units:

Emission Unit	Process Rate		Emission Factor (lb/Ton)	PM-6-PM ₁₀ Emission	
	(Tons/Mo)	(Tons/Yr)		(Tons/Mo)	(Tons/Yr)
8859 Conveyor Transfer Points (Uncontrolled)	215,368	2,153,675	0.00300	0.32	3.23
	<u>338,876</u>	<u>3,338,757</u>		<u>0.43</u>	<u>4.34</u>
11 Conveyor Transfer Points (Controlled)	57,210	572,103	0.00014	0.01	0.04
13 Screening Points (Uncontrolled)	13,670	136,702	0.02500	0.17	1.71
12 Screening Points (Controlled)	42,209	422,085	0.00220	0.04	0.41
2 Truck Loading Points	26,003	260,027	0.000204	<u>0.01</u>	0.03
	<u>45,847</u>	<u>458,466</u>			<u>0.05</u>
130 Stockpile Loading Points	23,073	230,725	0.00761	0.090	0.865
	<u>23,338</u>	<u>233,378</u>	<u>Varies</u>		
				Total:	<u>6.27</u>
					<u>7.41</u>

b. PM₁₀ emissions from outdoor emission units:

Emission Unit	Process Rate		Emission Factor (lb/Ton)	PM ₁₀ Emission	
	(Tons/Mo)	(Tons/Yr)		(Tons/Mo)	(Tons/Yr)

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<u>88 Conveyor Transfer Points (Uncontrolled)</u>	<u>338,876</u>	<u>3,338,757</u>	<u>0.0011</u>	<u>0.16</u>	<u>1.59</u>
<u>11 Conveyor Transfer Points (Controlled)</u>	<u>57,210</u>	<u>572,103</u>	<u>0.000046</u>	<u>0.01</u>	<u>0.01</u>
<u>13 Screening Points (Uncontrolled)</u>	<u>13,670</u>	<u>136,702</u>	<u>0.0087</u>	<u>0.06</u>	<u>0.60</u>
<u>12 Screening Points (Controlled)</u>	<u>42,209</u>	<u>422,085</u>	<u>0.00074</u>	<u>0.01</u>	<u>0.14</u>
<u>2 Truck Loading Points</u>	<u>45,847</u>	<u>458,466</u>	<u>0.0001</u>	<u>0.01</u>	<u>0.02</u>
<u>13 Stockpile Loading Points</u>	<u>23,338</u>	<u>233,378</u>	<u>Varies</u>	<u>0.04</u>	<u>0.41</u>
				<u>Total:</u>	<u>2.77</u>

c. PM_{2.5} emissions from outdoor emission units:

<u>Emission Unit</u>	<u>Process Rate</u>		<u>Emission</u>	<u>PM_{2.5} Emission</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>	<u>Factor</u> <u>(lb/Ton)</u>	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>
<u>88 Conveyor Transfer Points (Uncontrolled)</u>	<u>338,876</u>	<u>3,338,757</u>	<u>0.000167</u>	<u>0.02</u>	<u>0.24</u>
<u>11 Conveyor Transfer Points (Controlled)</u>	<u>57,210</u>	<u>572,103</u>	<u>0.000013</u>	<u>0.01</u>	<u>0.01</u>
<u>13 Screening Points (Uncontrolled)</u>	<u>13,670</u>	<u>136,702</u>	<u>0.001317</u>	<u>0.01</u>	<u>0.09</u>
<u>12 Screening Points (Controlled)</u>	<u>42,209</u>	<u>422,085</u>	<u>0.00005</u>	<u>0.01</u>	<u>0.01</u>
<u>2 Truck Loading Points</u>	<u>45,847</u>	<u>458,466</u>	<u>0.000015</u>	<u>0.01</u>	<u>0.01</u>
<u>13 Stockpile Loading Points</u>	<u>23,338</u>	<u>233,378</u>	<u>Varies</u>	<u>0.01</u>	<u>0.06</u>
				<u>Total:</u>	<u>0.42</u>

These above PM/PM₁₀/PM_{2.5} limits are based upon maximum material throughput, Standard emission factors from AP-42 (Table 11.19.2-2, Fifth Edition, Volume I, Update 2004, August 2004) for conveyors transfer points screening and Truck Loading, stockpile loading emission factor derived using AP-42, Section 13.2.4.3 (Table 13.2.4, AP-42, Fifth Edition, Volume I, November 2006) using coefficients of K=0.74 (PM), K=0.35 (PM₁₀), and PM_{2.5} U (mean windspeed) = 9.0 mph, and M (minimum moisture content) = 1.5% applied to light material stockpile loading.

- iii. Combined HAP emissions from Ferrous Material Separation Process shall not exceed the following limits:

<u>Emission Unit</u>	<u>Combined HAPs</u>	
	<u>(Tons/Mo)</u>	<u>(Tons/Yr)</u>

Non-Ferrous Material Separation Process	0.01	0.01
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These limits are based upon metal HAPs being 0.831-33% of the total PM emissions ~~measured at the discharge of existing roll media filter during June 2018 metal emission test at General II, LLC.~~

~~e. This permit is issued based on negligible emissions of particulate matter (PM, PM₁₀, and PM_{2.5}) from the raw material receiving and handling, one Vibratory Feeder, and # Belt Conveyors (skirted or troughing). For this purpose, emissions from each emission unit shall not exceed nominal emission rate of 0.1 lb/hour and 0.44 ton/year for PM, PM₁₀, and PM_{2.5}.~~

ef. 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).

Commented [R13]: These emission points described in this condition consist of:
 E01 (conv.) discharge to shredder feed chute;
 Shredder discharge to E05 vibratory conv.;
 E05 vibratory Conv. discharge to C001; C001 discharge to C002; and.
 C002 discharge to Poker Picker stockpile(s).

 These emission points are included in the Ferrous Material Handling System PM emissions.