TECHNICAL SUPPORT DOCUMENT
For
DRAFT/PROPOSED AIR EMISSION PERMIT NO. 05300480-003

This Technical Support Document (TSD) is intended for all parties interested in the draft/proposed permit and to meet the requirements that have been set forth by the federal and state regulations (40 CFR § 70.7(a)(5) and Minn. R. 7007.0850, subp. 1). The purpose of this document is to provide the legal and factual justification for each applicable requirement or policy decision considered in the preliminary determination to issue the draft/proposed permit.

1. General Information

1.1 Applicant and Stationary Source Location:

Table 1. Applicant and Source Address

Applicant/Address	Stationary Source/Address (SIC Code: 5093)
Northern Metals, LLC 2800 Pacific Street North Minneapolis, MN 55411	Northern Metals, LLC 2800 Pacific Street North Minneapolis, MN Hennepin County
Contact: Thomas Swafford Phone: 612-305-7310	

1.2 Facility Description

Northern Metals, LLC (Northern Metals or the Permittee) is a metal recycling company whose wholly-owned subsidiary, American Iron & Supply Company, operates the Pacific Street Yard at 2800 Pacific Street North in Minneapolis, MN (the facility).

Northern Metals operates a hammermill metal shredder at the facility (Minneapolis Shredder or shredder). The Minneapolis Shredder reduces the size of the scrap metal, removes dirt and non-metallic materials from the shredded metal, and separates ferrous and nonferrous metals. The shredder installation includes an in-feed conveyor system, the shredder itself, size separation equipment, cleaning equipment (referred to collectively as the cascade cleaning system), initial magnetic separation equipment, manual separation stations, finished product conveyor system, and the associated air pollution control system.

For the purpose of the air permit, the Minneapolis Shredder installation is divided into two emission points, or emission units, the hammermill shredder (EU 001) and the cascade cleaning system (EU 002). The two units vent to a common stack (SV 001) and are each controlled by a high efficiency cyclone, venturi scrubber, and fabric filter. The shredder equipment is totally

enclosed in a Leadership in Energy and Environmental Design (LEED) -designed building. The primary pollutants emitted from the shredding process are total particulate matter (PM), particulate matter less than 10 microns (PM_{10}), and particulate matter less than 2.5 microns ($PM_{2.5}$). All three pollutants are limited in the air permit and controlled by the shredder's pollution control equipment.

The facility also has small combustion equipment onsite that qualifies as insignificant activities under Minn. R. 7007.1300 as well as fugitive particulate emission sources from paved roads and material handling.

The facility holds a non-expiring State Total Facility Operating Permit. The facility has accepted limits to avoid classification as a major source with respect to the Part 70 Operating Permit Program, the Prevention of Significant Deterioration (PSD) Program, and the National Emissions Standards for Hazardous Air Pollutants (NESHAP) Program. Many of the permit conditions are based on an Environmental Assessment Worksheet (EAW) conducted in 1995 prior to the construction of the facility and a second EAW conducted concurrent with this permit action. See Section 1.5 "Facility History" for further explanation.

1.3 Changes to the Permit through this Permit Action

This permit action is a major amendment to a State Total Facility Operating Permit to revise site-specific conditions. The permit does not authorize construction. Northern Metals has made several changes to the Pacific Street Yard since the previous permit was issued in 1998 (referred to throughout this document as the "original permit"). Those changes are described under Section 1.6 "Changes to the facility since the issuance of Permit 05300480-002". Changes to the permit through this permit action include:

What	Why
1) Modifying the PM/PM_{10} Limit: New limits take into account condensable particulate matter and are protective of the National Ambient Air Quality Standards (NAAQS)	Although the original permit contained the requirement that PM and PM_{10} limits include organic condensibles, the limits were not originally calculated taking into account organic condensable emissions. This permit action corrects that inconsistency. When the original permit was issued in 1998, consistent with Minnesota rules, the MPCA included the phrase "including organic condensables" to the PM limit to clarify that the limit included both the filterable and organic condensable portions of the PM gas stream. Minnesota rules also required that PM10 include condensables. However, Northern Metals states that condensables were not considered when they proposed the limit of 0.43 lb/hr, a limit that came from a guarantee from a baghouse manufacturer obtained during the 1995 EAW process. Based on the results of performance tests during which Northern Metals properly operated its control equipment, the MPCA believes it is reasonable to adjust the particulate matter limits to account for additional condensable particulate matter that was not accounted for in the original particulate limits. (See Table 9 for Comparison of filterable and condensable particulate emissions.)
2) Adding a $PM_{2.5}$ Limit: New limit is the same as the PM/PM_{10} limits and is protective of the NAAQS	Although the EPA promulgated the first NAAQS standard for $PM_{2.5}$ in 1997 (prior to the issuance of the facility's permit), in the early stages of implementation of this new NAAQS, it was not common to put $PM_{2.5}$ emission limits in permits. However, now it is standard practice to have $PM_{2.5}$ limits in permits for facilities that also have PM and PM_{10} limits. It is common for the MPCA to add $PM_{2.5}$ limits to permits that already have PM and/or PM_{10} limits if the permit is going through the major amendment or reissuance process.
3) Adding a daily shredder output limit Daily shredder output limit of 2,400 tons/day	The daily output limit was added to ensure on-going compliance with emissions used in the health risk assessment.

What	Why
4) Removing requirements that have been completed or are obsolete a) Requirement to pave roads b) Requirement to record weight of all residue and material collected by the pollution control equipment	a) The requirement to pave roads at the facility is removed because the facility has completed all road paving per MPCA requirements. b) The requirement to record the weight of residue and material collected by the pollution control equipment was included in the original permit because all Potential to Emit (PTE) calculations were based entirely on a mass-balance approach, and it was thought that this data could be useful in future mass balance calculations. However, this information is not needed going forward for permit calculations or compliance demonstrations because many of the PTE calculations for this permit use stack test results to obtain the data that residue weight may have been used to calculate. Additionally, the setup of the Minneapolis Shredder's pollution control equipment makes it difficult to accurately perform this measurement.
5) Incorporating performance test frequencies: Once every 60 mos. for $PM/PM_{10}/PM_{2.5}$, mercury, and opacity	Performance test frequencies are incorporated into the permit Additional testing for metals other than mercury is not included in the permit because the initial performance tests demonstrated compliance, provided enough information to conduct the risk assessment, and compliance with the metals limits is ensured through other permit conditions. See Section 3.6 "Metal HAP Limits" for further explanation of these conditions.
6) Removing restrictions on the amount of aluminum, brass, copper, and stainless steel scrap processed in the shredder, and modifying metal emissions limits	These metal feedstocks were limited in the original permit because of assumptions made in the 1995 EAW and Risk Assessment. These assumptions were not used in the 2011 EAW and risk assessment. Removal of the restrictions does not cause the facility to exceed any risk guidelines. Metal emissions limits were modified based on new information obtained through stack testing that was not available when the limits were set through the 1995 EAW and Risk Assessment. This permit action also incorporates monitoring and recordkeeping to support the limits. See Section 3.4 "Feedstock Restrictions: Aluminum, Brass, Copper, and Stainless Steel" and Section 3.6 "Metal HAP Limits"

What	Why
7) Removing the restriction on processing auto hulks	This restriction was incorporated into the original permit based on concerns that shredding auto hulks would allow unacceptable amounts of mercury switches into the feedstock. The combination of the facility's mercury limit, feedstock control plan, and control equipment provides a reasonable assurance that mercury emissions will not be increased from the original permitted limit by allowing the shredding of auto hulks. See Section 3.4 "Feedstock Restrictions: Auto Hulks" and Section 3.5 "Mercury Limit".
8) Modifying the form of the mercury limit and compliance demostration: The limit is changed from a lb/hr limit to a 12-month rolling sum lb/yr limit	The mercury emissions allowed by the permit are not increased with this permit action. With the new form of the limit the Permittee will now be required to demonstrate compliance with this limit on an on-going basis vs. once per year through a stack test (to measure lb/hr emissions), as was required in the original permit. See Section 3.5 "Mercury Limit".
9) Incorporating an updated feedstock control plan	The Permittee was required to create a feedstock control plan in the original permit; this permit action incorporates that plan as an enforceable part of the permit. See Section 3.3 "Feedstock Control Plan".
10) Incorporating standard Tier 3 modeling requirements	Based on the results of the facility's $PM_{2.5}$ ambient air modeling and the MPCA's policy for determining under what circumstances remodeling should be required by the facility, the facility falls into what is termed "Tier 3". The Tier 3 requirements for remodeling are incorporated at the Total facility level of the permit. See Section 3.2 "Ambient Air Quality Modeling".
11) Updating standard citations and formatting	This is standard practice when processing major amendments.
12) Adding standard pollution control equipment requirements	The original permit simply referenced the monitoring, recordkeeping, and reporting requirements of the Minnesota control equipment rule. This permit lists the requirements directly in the permit rather than simply referencing the requirements because all applicable requirements should be contained in the permit.
13) Updating PTE calculations	New data on process emissions obtained from the Minneapolis Shredder's performance test was used to update the calculations supporting this permit action. See Section 3.7 "Calculations of Potential to Emit".
14) Updated insignificant activities list	The list in the original permit was out of date.

What	Why
15) Modifying fugitive source requirements and adding requirements to manage fugitive sources through a fugitive dust control plan	The original permit did not require any monitoring to support the Minnesota Rule for Control of Fugitive Particulate Matter for FS 001 and FS 003. This permit action removes requirements that were not supported with periodic monitoring and recordkeeping and instead requires submittal of, and compliance with, a fugitive dust control plan that will ensure that the requirements of the rule are met.

Changes to Draft Permit since Placed on Public Notice in November, 2011

- Lowering of the PM, PM_{10}, $PM_{2.5}$ limits from 4.2 lb/hr to 1.83 lb/hr. See Section 3.2
- Addition of alternative PM, PM_{10}, $PM_{2.5}$ limit scenario. See Section 3.2
- Change to mercury testing frequency to match that of PM, PM_{10}, and $PM_{2.5}$. See Section 3.5
- Addition of clarifying language to Fugitive Dust Control Plan requirement.

1.4. Facility Emissions

Table 2. Change Summary:
Controlled and Limited Potential Emissions from SV 001

Pollutant	Permit Action 002 (tpy)	Permit Action 003 (tpy)	Chnage due to Permit Action 003 (tpy)
PM	0.81	3.46/4.25[+]	2.65/3.44[+]
PM_{10}	0.81	3.46/4.25[+]	2.65/3.44[+]
$PM_{2.5}$	NA*	3.46/4.25+	NA*
Total HAPs	0.04	0.12	0.08

*$PM_{2.5}$ was not calculated for Permit Action 002
[+]Based on Particulate Limit Scenario 2

Table 3. Total Facility Limited and Controlled Potential to Emit Summary

	PM tpy	PM_{10} tpy	$PM_{2.5}$ tpy	SO_2 tpy	NO_x tpy	CO tpy	CO_2e tpy	VOC tpy	HAPs tpy
Total Facility Limited Potential Emissions	4.38/ 5.17[+]	3.64/ 4.43[+]	3.50/ 4.30[+]	0.00[**]	0.00[**]	0.00[**]	0.00[**]	0.00[**]	0.12
Total Facility Actual Emissions (2009)	0.87	0.73	*	0.00	0.00	0.00	*	0.00	*

* Not reported in 2009 MN emission inventory
+ Based on Particulate Limit Scenario 2
** The emission units at the facility do not emit these pollutants, but the facility has insignificant activities that emit these pollutants (See Attachment 1 for the insignificant activity PTE summary)

Table 4. Facility Classification

Classification	Major/Affected Source	Synthetic Minor/Area	Minor/Area
PSD		PM_{10}, $PM_{2.5}$	CO, NO_x, VOC
Part 70 Permit Program		PM, PM_{10}, $PM_{2.5}$	CO, NO_x, VOC
Part 63 NESHAP		HAP	

1.5 Facility History

In 1995, MPCA prepared an Environmental Assessment Worksheet and a Screening Level Human Health Risk Assessment for the Permittee's subsidiary company, American Iron and Supply Company (American Iron), on a proposed metal shredder at the same facility. (American Iron was then an independent company.)

After the MPCA Board's negative declaration on the need for an EIS, American Iron applied for an air emission permit. The application proposed the following control equipment: CE001 High Efficiency Cyclone on the hammermill shredder; CE002 High Efficiency Cyclone on the Cascade Cleaning system; and CE003 Common Fabric Filter (Baghouse) following both cyclones. But before the MPCA could act on American Iron's application, the City of Minneapolis (City) brought litigation challenging the negative declaration on the need for an EIS.

After the litigation concluded in early 1998, the MPCA resumed work on American Iron's air emission permit application. In writing the Air Permit, the MPCA listed the pollution control equipment proposed in the application and incorporated a 0.43 pounds per hour particulate emission rate as a permit condition for PM and PM_{10} emissions. The MPCA issued an Air Emission Permit to American Iron for installation and operation of the Minneapolis Shredder, on December 8, 1998.

When the permit was issued in 1998, consistent with Minnesota rules, the MPCA included the phrase "including organic condensables" to the PM limit to clarify that the limit included filterables and organic condensables. Minnesota rules also required that PM10 include condensables. However, Northern Metals states that condensables were not considered when the limit of 0.43 lb/hr was adopted, a limit that came from a guarantee from a baghouse manufacturer obtained during the 1995 EAW process.

After the MPCA issued the Air Permit in 1998, further litigation between American Iron and the City delayed the Minneapolis Shredder installation until a settlement was agreed to in late 2002. Minor preparatory activities related to the storm water management system commenced, but an internal ownership dispute further delayed the Minneapolis Shredder installation.

In early 2007, Northern Metals purchased American Iron. Construction of the Shredder Building and Minneapolis Shredder installation began in August of 2008. Soil remediation work was completed in the same year.

The Minneapolis Shredder commenced operation on June 18, 2009. The stack testing required by the Air Permit was conducted November 30 through December 4, 2009. Because the filter bags had been changed the day before the test, and had not been conditioned to provide typical removal, a re-test for particulate matter emissions was conducted on December 22,

2009. Additional stack testing for mercury emissions was conducted on June 22, 23 and 29, 2010, in accordance with the *Air Emissions Compliance Plan for the Hammermill Metal Shredder at the Pacific Street Yard in Minneapolis, Minnesota* (Compliance Plan) submitted April 16, 2010.

1.6 Changes to the facility since the issuance of Permit 05300480-002

Completion of Soil Remediation Including Paving. Northern Metals completed the soil remediation activities required by the MPCA Voluntary Response Action Plan (VRAP). This included paving all unpaved portions of the Pacific Street Yard except a small area behind the North Warehouse and Metal Recycling Plant Building as specified in the VRAP.

Replacement of Rail Tracks. Northern Metals replaced the internal rail system at the Pacific Street Yard with a new system at new grades and a new rail scale. This work included paving around and between the new tracks with six inches of asphalt to meet the paving requirement in the VRAP.

Storm Water Management System. Northern Metals installed an underground storm water management system that directs all paved areas of the Pacific Street Yard to a storm water storage and treatment system as previously permitted by the MPCA. See *American Iron and Steel Company NPDES/SDS Permit No. MN0063380* (NPDES Permit). Northern Metals replaced the two barge docks on the Mississippi River with a modern, single dock. Unlike the two old docks, all storm water from the new dock is directed to the storm water management system.

Minneapolis Shredder Installation. Northern Metals constructed a LEED-designed Shredder Building and installed a Metso Texas hammermill metal shredder inside the building as it was being built. The Minneapolis Shredder installation included the in-feed conveyor system, the shredder itself, size separation equipment, cleaning equipment (referred to collectively as the cascade cleaning system), initial magnetic separation equipment, manual separation stations, finished product conveyor system, and the associated air pollution control equipment. Each exhaust stream is controlled by a high efficiency cyclone, a wet scrubber, and a fabric filtration system.

New Metal Recycling Plant. The North Warehouse was modified to accommodate a new Metal Recycling Plant that further separates and recovers ferrous and non-ferrous metals from the shredding process.

New Entrance, Truck Scale, and Scale House. Northern Metals reorganized the flow of materials through the Pacific Street Yard by opening a new entrance on Pacific Street North at 30th Avenue North, installing a new truck scale at this entrance, building a new scale house to serve the new truck and rail scales, and changing the old entrance/exit at Pacific Street North and 28th Avenue North to an exit only.

2. Regulatory and/or Statutory Basis

New Source Review (NSR)

The facility has accepted limits to remain a minor source with respect to NSR regulations. The previous permit incorrectly categorized the source as a "true minor" source. Because the source relies on control equipment to limit its PTE below NSR thresholds, it is not a true minor source. In practical terms, this doesn't affect the permit other than citing the requirement to operate control equipment (and associated control equipment parameters and monitoring) as a Title I Conditions. Other than correcting the miscategorization, the changes authorized by this permit do not affect the facility's status with respect to NSR regulations.

Part 70 Permit Program

The facility has accepted limits to remain below the Part 70 permitting thresholds. The facility was also miscategorized as a "true minor" source under Part 70 in the previous permit action. Because the source relies on control equipment to limit its PTE below Part 70 thresholds, it is not a true minor source.

New Source Performance Standards (NSPS)

There are no New Source Performance Standards applicable to the operations at this facility.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

The facility has taken limits to remain an area source under 40 CFR pt. 63, the NESHAP regulations. Thus, no major source NESHAPs apply. In addition, the Permittee has stated that no area source NESHAPs apply to the facility.

Compliance Assurance Monitoring (CAM)

CAM does not apply to the modifications allowed in this permit amendment because CAM only applies to facilities required to hold a Part 70 permit. The facility is not required to hold a Part 70 permit.

Environmental Review & Air Emissions Risk Analysis (AERA)

The Permittee submitted an EAW and complete AERA with the permit amendment.

Minnesota State Rules

Portions of the facility are subject to the following Minnesota Standards of Performance:

- Minn. R. 7011.0715 Standards of Performance for Post-1969 Industrial Process Equipment
- Minn. R. 7011.0150 Preventing Particulate Matter from Becoming Airborne

Table 5. Regulatory Overview of Units Affected by the Modification/Permit Amendment

Level*	Applicable Regulations	Comments:
FC	Minn. Stat. Section 116.07; Minn. R. 7009.0010-0080	Ambient Air Quality Standards: The permit contains Tier 3 remodeling requirements based on the results of the PM2.5 ambient air modeling (See Section 3.2). The permit also requires the submittal of a fugitive control plan, and compliance with that plan.
	Minn. R. ch. 4410	Environmental Review: The Permittee is subject to requirements based on environmental review because the Permittee conducted an EAW in 1995 as well as an EAW with this permit action. The findings of the EAWs informed the permit conditions cited "Minn. R. ch. 4410." Based on the EAW, the Permittee shall comply with a Feedstock Control Plan.
	Minn. R. 7011.0150	Minnesota Rule for Control of Fugitive Particulate Matter: This rule is a general applicable requirement for facilities with fugitive particulate emission sources. To comply with this rule, the facility shall comply with a fugitive dust control plan.
EU 001 (Scrap Metal Hammermill Shredder)	Minn. R. ch. 4410	Environmental Review: Shredder output limits based on EAW findings
	Minn. R. 7007.0800	Minnesota Rule for Permit Content: The facility is limited to operating the shredder only between certain hours on weekdays, weekends, and holidays. These hours of operation were specified in Special Council Permit No. 62483 issued by the city of Minneapolis (City) on June 11, 1990, and the Conditional Use Permit issued by the City on November 1, 2002. The requirement is carried forward with this permit action.
SV 001 (combined shredder and cascade cleaning system stack)	Minn. Stat. Section 116.07; Minn. R. 7009.0010-0080	Ambient Air Quality Standards: Limits on $PM/PM_{10}/PM_{2.5}$ based on NAAQS/MAAQS modeling
	Minn. R. ch. 4410	Environmental Review: Limit on metal HAPs based on EAW findings

Level*	Applicable Regulations	Comments:
	Minn. R. 7011.0715	Industrial Process Equipment Rule: This rule applies to EU 001 and EU 002 individually, but is listed at SV level because these two units vent to a common stack. The units are subject to this rule because they are not subject to any other standard of performance and were constructed after 1969.
CE 001 (high efficiency cyclone)	40 CFR Section 52.21 & Minn. R. 7007.300; 40 CFR Section 70.2 & Minn. R. 7007.0200; 40 CFR Section 63.2	PSD/Part 70/NESHAPs: The facility relies on control equipment to limit their PTE below the major source threshold for all three of these programs.
CE 004 & CE 005 (venturi scrubbers)	40 CFR Section 52.21 & Minn. R. 7007.300; 40 CFR Section 70.2 & Minn. R. 7007.0200; 40 CFR Section 63.2	PSD/Part 70/NESHAPs: The facility relies on control equipment to limit their PTE below the major source threshold for all three of these programs.
CE 006 & CE 007 (fabric filters)	40 CFR Section 52.21 & Minn. R. 7007.300; 40 CFR Section 70.2 & Minn. R. 7007.0200; 40 CFR Section 63.2	PSD/Part 70/NESHAPs: The facility relies on control equipment to limit their PTE below the major source threshold for all three of these programs.
FS 001 (product storage piles)	Minn. R. 7011.0150	Minnesota Rule for Control of Fugitive Particulate Matter: Preventing Particulate Matter from Becoming Airborne. There are negligible emissions from this fugitive source, and its PTE qualifies it as an insignificant activity under Minn. R. 7007.1300 3(I), but the requirement remains in the permit to ensure that it is managed according to the facility's fugitive dust control plan.

Level*	Applicable Regulations	Comments:
FS 002 (paved roads)	Minn. R. 7011.0150 Minn. Stat. Section 116.07; Minn. R. 7009.0010-0080	Minnesota Rule for Control of Fugitive Particulate Matter: The facility complies with this rule through a fugitive dust control plan and daily road cleaning. Ambient Air Quality Standards: The facility demonstrated that fugitive PM_{10} emissions fall below the threshold for inclusion in the PM_{10} ambient air quality monitoring using silt loading data for facilities that conduct daily road cleaning; therefore, the facility is required to conduct daily road sweeping except under certain circumstances as outlined in the permit. This approach is consistent with other facilities that have daily road sweeping/watering requirements. It should be noted that the PTE of this source qualifies it as an insignificant activity under Minn. R. 7007.1300 3(I), but the requirement remains in the permit to ensure that it is managed according to the facility's fugitive dust control plan.
FS 003 (material handling)	Minn. R. 7011.0150	Minnesota Rule for Control of Fugitive Particulate Matter: There are minimal emissions from this fugitive source, and its PTE qualifies it as an insignificant activity under Minn. R. 7007.1300 3(I), but the requirement remains in the permit to ensure that it is managed according to the facility's a fugitive dust control plan.

*Where the requirement appears in the permit (e.g., EU, SV, GP, etc.).

3. Technical Information

3.1 Air Emissions Risk Analysis

An AERA was performed for this permit action. The AERA Impact Statement and the MPCA Risk Manager's Form are attached to the TSD. Both documents provide more information on the AERA.

The risk analysis captured any potential changes in emissions due to the elimination of feedstock restrictions and changes in permit limits. The analysis found that refined facility urban gardener cancer risk estimates were at facility risk guidelines at the potentially most impacted residentially zoned area and that all other facility risk estimates were below facility risk guidelines.

The metal feedstock restrictions were included in the original permit because of assumptions about the feedstock compositions used in the 1995 risk assessment and EAW. These feedstock restriction assumptions were not used in the 2011 EAW and AERA. The Minneapolis Shredder output limits, in combination with the shredder's control equipment, ensure that the emission rates of the air toxics remain below the emission rates determined to be at or below risk guidelines through the AERA.

In addition, it should be noted that the emission estimates used in the AERA are conservative estimates to ensure that the calculated potential risk at the facility was not under-predicted. The emission estimates used in the AERA for the proposed facility changes are either based on permit emission limits or PTE.

The emissions used in the AERA are conservative estimates because:

- The annual tons per year emission rates assume that the highest potential emission rate per ton shredder output (lb/ton shredder output) is emitted for all material processed during the year (377,800 tons/yr, permit limit). This is actually a physically impossible scenario since the worst case scenarios assume 100% of a given scrap metal makes up *all* the shredder metal output, but the worst case scrap metal is different for different pollutants. Thus the annual emission rates are likely overestimates and could contribute to an overestimation of long term risks.
- When deriving potential emission rates from stack test data, the detection limit for pollutants that were not detected (such as specific PCB's and dioxin/furan congeners) and the highest stack test run (rather than the average of the stack test runs) was used.
- Emission estimates based on Material Safety Data Sheet (MSDS) data used worst-case pollutant content for a given scrap metal, and for each pollutant assumed that the metal with the highest content of each pollutant constituted 100% of the metal feedstock. In reality, metal feedstocks will be made up of several types of metals, and the percentages of given pollutants in scrap metals will be in the entire range of the MSDS data (not just the highest percentage).

Considering the emission estimates for the risk driver pollutants were based on stack testing and the permit limit of 377,800 tons/yr and 2,400 tons/day shredder output, a recalculation of the risk estimates should be considered if the shredder output limits were to be increased.

Risk estimates, however, were not recalculated based on the decrease of the particulate emission limits from 4.2 to 1.83 lb/hr because the results of the AERA analysis would improve as a result of the decreased particulate matter limit and in any event, would not change substantially, as explained below. Were the analysis to be redone based on a particulate matter emissions limit of 1.83 lb/hr or 2.25 lb/hr there would be a decrease in risk estimates.

The AERA is intended to consider worst case scenarios of potential facility emissions. While the AERA does not specifically quantify risks from particulate matter with a diameter of 2.5 microns or smaller ($PM_{2.5}$) some of the emission estimates for pollutants in the AERA are based on a $PM_{2.5}$ limit of 4.2 lb/hr. A description of how the emissions were calculated in the AERA can be found in Attachment 2. The AERA also shows that Dioxins/Furans/PCB's, Arsenic, and Nickel contribute the most to overall risk estimates. They are the risk drivers in the AERA analysis. The other pollutant concentrations are estimated to be less than 10% of their respective health benchmarks.

Dioxins/Furans/PCB's emission estimates are not based off of a $PM_{2.5}$ limit, but rather are based off of stack test results and a conservative scalar representing worst case increase in emission due to feedstock changes (the highest detected values or average instrument detection limit, when the pollutant was not detected, and a scalar of 1.6 to represent the potential 60% increase in non-metallic feedstock from processing auto hulks). Because the emission estimates for Dioxins/Furans/PCB's are not based on any assumptions about $PM_{2.5}$, changing the $PM_{2.5}$ limit would not change the risk estimates from Dioxins/Furans/PCB's at all.

Arsenic and Nickel emission estimates are based off of proposed permit limits. Thus changing the $PM_{2.5}$ permit limit would also not change the risk estimates from Arsenic and Nickel at all.

Since the risk drivers are not based on $PM_{2.5}$ assumptions, including a new $PM_{2.5}$ limit in the proposed permit would not change the results of the AERA included in the November 10th 2011 EAW.

3.2 Ambient Air Quality Modeling

PM_{10} and $PM_{2.5}$ modeling of the emissions from SV 001 support this permit action. The modeling results demonstrate compliance with the NAAQS and the MAAQS. Table 6 summarizes the results of the $PM_{2.5}$ and PM_{10} dispersion modeling

Table 6. $PM_{2.5}$ and PM_{10} Air Dispersion Modeling Results

Pollutant	Averaging Time	Modeled Impacts ($\mu g/m^3$)	Background Value ($\mu g/m^3$)	Total Predicted Impacts ($\mu g/m^3$)	NAAQS (MAAQS) ($\mu g/m^3$)	% of NAAQS (MAAQS)	MPCA Modeling Language Tier Recommendations
PM_{10}	*24-hr*	12.7	49	61.7	150	41%	Tier 1
	Annual	1.5	21	22.5	50	45%	
$PM_{2.5}$	*24-hr*	3.9	30	33.9	35	97%	Tier 3
	Annual	1.5	10	11.5	15	77%	

Based on the MPCA's tiered modeling policy and the results of the facility's modeling, the facility falls into Tier 3 for $PM_{2.5}$ and Tier 1 for $PM_{10.}$ The tier dictates what level of remodeling

is required if the facility makes changes to any of the modeled parameters. The tier requirements are at the "Total Facility" level of the permit.

Table 7. MPCA Tiered Modeling Policy

% of NAAQS/MAAQS:	**> 90%**	**90% - 75%**	**< 75%**
PSD - Limits	Tier 4	Tier 2	Tier 1
PSD – No Limits	Tier 3	Tier 2	Tier 1
Not PSD - Limits	Tier 3	Tier 2	Tier 1
Not PSD – No Limits	Tier 1	Tier 1	Tier 1

The modeling analysis did not include fugitive emissions, but they were included in subsequent MPCA modeling. However, the MPCA separately confirmed through internal modeling that the addition of $PM_{2.5}$ and PM_{10} fugitive emissions would not substantially affect the modeling results. Consistent with the MPCA's PSD and Title V Modeling Guidance, particulate emissions from insignificant activities were not modeled because emissions from each activity were less than 0.10 lb/hr.

When this permit was first put on notice in November of 2011, it relied on modeling conducted by the Permittee that demonstrated compliance with the NAAQS and MAAQS at an emission rate of 4.2 lb/hr of PM_{10} and 4.2 lb/hr $PM_{2.5}$. These emission rates were incorporated into the permit as limits at the time.

In the process of reviewing the draft permit and EAW after receiving comments during the public notice periods, MPCA staff re-ran the modeling for $PM_{2.5}$ at the proposed 4.2 lb/hr emission limit. Staff re-ran the model because updated ambient air concentration data, a critical input in the modeling, had become available. The re-run modeling showed that Northern Metals could not demonstrate modeled compliance with the 24-hour $PM_{2.5}$ NAAQS at an emission rate of 4.2 lb/hr.

The MPCA therefore, lowered the PM, PM_{10}, $PM_{2.5}$ limits in the draft permit from 4.2 lb/hr to 1.83 lb/hr, a number that models compliance with the NAAQS and MAAQS, that is technically feasible for the facility to meet given the pollution control equipment onsite, takes into account condensable particulate matter, and provides a reasonable margin of compliance with the tested rate from SV 001 of 1.32 lb/hr.

Particulate Limit Scenarios

Since the draft permit was put on public notice in November of 2011, the MCPA has also added a second particulate matter limit scenario. This scenario allows the Permittee to comply with an emission limit of 2.25 lb/hr from SV 001 for PM, PM_{10}, and $PM_{2.5,}$ but only if the following criteria have been fulfilled first:

1) 36 months have passed since permit issuance

2) The Permittee has conducted MPCA-approved performance testing on PM, PM_{10}, $PM_{2.5}$ and opacity and demonstrated compliance with the permit limits of 1.83 lb/hr and 20% opacity.
3) The Permittee has conducted MPCA-approved performance testing on mercury to establish a new mercury emission factor
4) The Permittee has demonstrated compliance through MPCA-approved dispersion modeling with the $PM_{2.5}$ NAAQS and MAAQS using a $PM_{2.5}$ emission rate of 2.25 lb/hr from SV 001.
5) The MPCA has provided written notification to the Permittee indicating that criteria 1-4 have been completed and that the Permittee is authorized to comply with the permit limits of 2.25 lb/hr

The MPCA believes it is reasonable to pre-authorize this increase only after all appropriate analysis has been completed because it is a small increase and under Minnesota permitting rules (Minn. R. 7007.1250, subp. 1), absent any other permit condition or rule requirements prohibiting such a change, increasing particulate emissions from an emission rate of 1.83 lb/hr to 2.25 lb/hr (an increase of 0.42 lb/hr) is considered a insignificant modification that would not, by itself, require a permit amendment. 1.83 lb/hr is a limit in the permit because it is the rate used to demonstrate compliance through dispersion modeling with the NAAQS. If the Permittee can demonstrate compliance with the NAAQS at 2.25 lb/hr (and all other criteria are specified above met), it is reasonable for 2.25 to become the limit in the permit for $PM_{2.5}$, PM_{10}, and PM. A change in the particulate matter emission limits from 1.83 lb/hr to 2.25 lb/hr also would not affect the results of the AERA as explained in Section 3.1 above. Since assuming a particulate limit of 4.2 lb/hr, showed that risk from the facility were similar to other facility risks, assuming a limit of 2.25 lb/hr in the calculations would only represent a decrease in the health risk.

3.3 Feedstock control plan

Because emissions from the Minneapolis Shredder are highly dependent on the composition of the feedstock, the Permittee has implemented an extensive feedstock control plan. The plan is an enforceable part of the permit and appears in Appendix B of the permit. At the time of permit issuance, the plan contained in the appendices of the permit is the most up to date version of the plan. It is expected that the Permittee may need to make changes in the plan based on normal changes in operational procedures. Thus, the Permittee is required to update the plan if there are any changes and submit the updated plan to the Commissioner for approval. This approach is consistent with how waste management plans are treated in permits for other facilities that use waste materials as a feedstock.

Northern Metals' feedstock control plan is based on five key components: internal practices and training, restriction on incoming scrap materials, supplier education and certification, load inspections, and recordkeeping. Each component is described in detail in the plan.

3.4 Feedstock Restrictions

Aluminum, Brass, Copper, and Stainless Steel

The discussion under Section 3.1 "Air Emissions Risk Analysis" provides further justification for removing the restrictions on shredding aluminum, brass, copper, and stainless steel based on risk assessment results.

These metal feedstocks were limited in the original permit because the 1995 EAW and Risk Assessment relied on the assumptions that incidental amounts of these metals were shredded. These assumptions were also essentially duplicates of emission limits that already existed in the permit (emission limits for arsenic, beryllium, and hexavalent chromium). The EAW and Risk Assessment that support this permit did not rely on those assumptions (instead they assume that any amount of any of the metal feedstocks can be shredded). Additionally, more information about the emissions from the Minneapolis Shredder was obtained through stack testing (information that was not available at the time of the 1995 EAW). Namely, for a feedstock that is 95% metallic, roughly 5% of the particulate matter emissions are metal particulate. Based on this new information, assuming the possibility of shredding even 100% of any of the previously limited feedstock metals and using the 5% of particulate matter emissions as metal particulate, does not put the facility risk above any risk guidelines. The shredder output limits (2,400 tons/day and 378,800 tons/yr) and the shredder's control equipment ensure that the emission rates of these pollutants, as well as other air toxics, remain below emission rates determined to be health protective through the AERA.

Auto Hulks

The prohibition on shredding auto hulks was incorporated into the original permit based on concerns about mercury switches entering the feedstock. Through this permit action, a detailed feedstock control plan was incorporated as an enforceable part of the permit, which ensures that mercury switches or other devices are removed to the greatest extent possible for any material that enters the shredder.

The facility will not accept any unprocessed vehicles. All vehicles must be processed by a certified end of life vehicle supplier or by the company's trained employees before arriving on-site. Furthermore, the permit contains a mercury limit with associated monitoring, recordkeeping, reporting, and performance testing. The combination of these permit conditions provides a reasonable assurance that unacceptable amounts of mercury are not emitted from the shredding process. As permitted, the facility's risk, based on potential mercury emissions is well below all risk guidelines.

Used Oil Filters

The facility's original permit unnecessarily prohibited the shredding of used oil filters. The facility's feedstock control plan addresses used oil filters. Used oil filters are listed on the "Unacceptable Materials List". Under Minn. R. 7045.0990, used oil filters must be sent to scrap metal recyclers or burned for energy recovery at a permitted facility, unless they are disposed of as hazardous waste (used oil filters themselves may be recycled under the scrap metal exemption of part 7045.0125, subp. 4(C), but filter media must be treated as hazardous waste).

3.5 Mercury limit

Through this permit action the form of the mercury limit is modified, but mercury emissions are not increased. The mercury limit in the original permit was 0.00079 lb/hr. With this permit action, the limit is converted to a 3 lb/yr limit, which is the annual equivalent of the original hourly limit (0.00079 lb/hr x 3778 hr/yr = 3 lb/yr). The conversion does not authorize an increase in mercury emissions. An annual limit is a more appropriate form for the limit, for three main reasons:

1) Risks associated with short term exposure are at least an order of magnitude below risk driver levels, so a short term limit is not needed.
2) The new form of the limit requires the Permittee to demonstrate compliance with daily records, monthly rolling sum calculations, adherence to the feedstock control plan, and periodic stack testing. The original permit only required periodic stack testing, so compliance could only be determined at a "snapshot in time" during the performance test rather than on an ongoing basis through 12-month rolling sum calculations supported by daily records.
3) A 12-month rolling sum lb/yr limit is also more appropriate because it acknowledges and accommodates the facility's variability in feedstock without allowing an increase in mercury emissions or increasing risk to human health and the environment.

The Permittee will be required to conduct performance tests every 60 months to establish a mercury emission factor in the units of pounds of mercury per ton of shredder output. The Permittee shall use a minimum of 3, and a maximum of 6, test runs to obtain data for the emission factor. On a monthly basis the Permittee shall calculate the 12-month rolling sum mercury emissions by applying the mercury emission factor to the monthly shredder output totals. The monthly shredder output shall be determined by summing the daily and monthly shredder output records. After MPCA approval of each subsequent performance test's results, the Permittee will calculate a new emission factor and begin using that factor in the 12-month rolling sum calculations.

The MPCA has a reasonable assurance that the facility can comply with a 3 lb/yr limit. Using the data from the 9 performance test runs that the facility has conducted since it began

operating in 2009, every possible unique combination of six runs, when converted to an emissions factor, and multiplied by the facility's production limit, shows that the Permittee can achieve compliance.

Table 8. Mercury Emissions Stack Test Results by Testing Date

Stack Test Results (lb/hr)		
Date: 12/2009	Dates: 06/22/2010-06/23/2010	Date: 06/29/2011
0.00047	< 0.00021	0.00046
0.0003	< 0.00022	0.00028
.00236	< 0.00022	0.00027

< indicates non-detect
*Shaded cells are the 6 highest test runs, converted to a lb/yr based on maximum operating potential yields an emission rate of 2.6 lbs/yr.

It is expected that mercury switches in recycled automobiles and appliances will continue to decrease. Several national mercury reduction programs have been implemented since the original air permit was issued in 1998. Mercury switches have been eliminated in automobiles since model year 2003. In 2006, the US EPA instituted the National Vehicle Mercury Switch recovery Program (NVMSRP) which encourages removal of mercury switches in automobiles through 2017. Northern Metals is a participant in NVMSRP.

The draft permit that was put on public notice in November of 2011 contained a more frequent testing schedule than once per 60 months. The Permittee requested a frequency of once per 60 months. The MPCA has determined that because the primary methods of ensuring continual compliance with the mercury limit are: 1) the feedstock control plan, 2) the proper operation, monitoring, and maintenance of the pollution control equipment, and 3) the 12-month rolling sum mercury calculation, testing once every 60 months, consistent with the Permittee's request, is reasonable. It is important to note that there is no state or federal rule that governs performance test frequency in this situation and that the performance test itself does not demonstrate compliance with the mercury limit, it is only used to establish the mercury emission factor to be used in the 12-month rolling sum calculation. So, more frequent performance testing would not determine compliance with a limit at a more frequent rate, it would require the Permittee to reset their emission factor at a more frequent rate. This approach (the performance test being used to set an emission factor, but not for compliance demonstration) has not changed since the draft permit was put on notice in November of 2011.

3.6 Metal HAP Limits

This permit action also modifies metal HAP emissions limits. These limits were modified in two ways:

1) The new values of the limits represents a more defendable calculation method that represents the worst-case scenario at the facility and takes into account new emissions data from the facility's performance tests (see discussion under "Section 3.7 Calculations of Potential to Emit: Metal HAPs with Permit Limits).
2) Similar to the mercury limits, the metal HAP limits are converted from a lb/hr to a lb/yr (or ton/yr) format based on the limited hours of operation (3,778 hr/yr). As with the mercury limit, these are more appropriate forms of the limits because
    a. Many of the pollutants do not have acute risk values. For those pollutants that do, the hourly risk estimates, based on hourly PTE, are below all risk driver levels, so short term limits are not needed.
    b. An annual limit is enforceable on an ongoing basis. Demonstration of compliance with the annual limits is incorporated into this permit through daily and monthly monitoring of the shredder output and operation of the control equipment.

3.7 Calculations of Potential to Emit

Attachment 1 to this TSD contains detailed spreadsheets and supporting information prepared by the MPCA and the Permittee. Theses spreadsheets document the calculations and assumptions used in determining the PTE for the facility.

PM, PM10, and PM2.5 Stack Emissions

The limited and controlled PTE of EU 001 and EU 002 is expressed as the permit limit on $PM/PM_{10}/PM_{2.5}$ at the stack vent level.

There are no published emission factors for particulate emissions from hammermill metal shredders. To calculate the uncontrolled filterable particulate emission rate from EU 001, the hammermill shredder was assigned a mass loading of 5.0 grains per cubic foot and an air displacement of 47,000 ft^3/min was assumed (5.0 gr/dscf represents the industry standard estimate of grain loading produced by a hammermill shredder multiplied by a safety factor). The dust loading rate represents filterable particulate matter emissions only. The stack test performed on December 22, 2009, measured an actual air flow rate of 94,000 acfm from the combined stack SV001. The air flow rate is produced by two fans of equal size. One fan is for the exhaust stream from the shredder, and the other fan is for the exhaust stream for the cascade cleaning system. The air flow rate for the shredder is estimated to be 47,000 acfm for this calculation. Uncontrolled filterable PM_{10} is assumed to be 5% of the total uncontrolled particulate matter emission rate based on particle size distributions for a shredder used in the

1995 EAW. Uncontrolled filterable $PM_{2.5}$ is assumed to be the same as uncontrolled filterable PM_{10}.

To calculate the pound per hour uncontrolled filterable particulate PTE from EU 002, the cascade cleaning system, a conservative waste loading rate to the cascade cleaning system determined from operating data, and a shredder output of 267 tons/hr (daily output limit divided by 9 hr/day weekend/holiday hours of operation limit) was used. To determine the ton per year uncontrolled, filterable particulate PTE, the same approach was used, but with a shredder output of 377,800 tons/yr. The uncontrolled, filterable PTE also takes into account the control equipment rule efficiencies for a high efficiency cyclone because, for the cascade cleaning system, the cyclone is considered inherent process equipment.

Controlled, filterable PTE for both EU 001 and EU 002 were calculated assuming theoretical control efficiencies for control equipment used in series and control equipment efficiencies based on the control equipment rule.

It is important to note that the PTE calculations described above are only used for the purposes of determining whether or not the facility is a “true minor” or “synthetic minor” source with respect to Part 70 and PSD regulations. The calculations do not reflect permit limits or actual emissions.

Condensable particulate matter (gases or vapors that condense to form particulate matter after discharge to the atmosphere) is difficult to quantify from this operation and is not captured in this mass-balance approach for calculating PTE for EU 001 and EU 002. Condensable particulate is represented in the controlled and limited PTE for SV 001. Although SV 001 PTE should be calculated by the combining the PTE of EU 001 and EU 002, this approach would only yield filterable particulate PTE. For the purposes of representing both filterable and condensable particulate emissions in the PTE, the lb/hr limit on $PM/PM_{10}/PM_{2.5}$ (which takes into account condensable particulate) is converted to an annual emission rate based on the operating limit of 3,778 hrs/yr.

One would expect that the lb/hr limit on $PM/PM_{10}/PM_{2.5}$ is greater than the combined controlled and limited hourly PTE from EU 001 and EU 002 because the limit takes into account the presence of condensable particulate matter and the mass balance approach to calculated PTE from EU 001 and EU 002 only takes into account filterable particulate matter. However, due to the conservative nature of the assumptions made in the mass balance approach, the opposite is true based on a permit limit of either 1.83 or 2.25 lb/hr.

For reference, Table 9 below shows that the tested filterable particulate matter only makes up about 25% of the total particulate matter.

Table 9. Comparison of Emission Rates of Filterable and Condensable Particulate Matter Based on Results of December 22, 2009 Stack Testing

Type of Particulate Matter	Measured Particulate Emission Rate (lb/hr)
Dry Catch Only (Filterable)	0.34
Dry Catch + Organic Condesables	0.87
Dry Catch + Organic Condesables + Aqueous Phase Condensables	1.32

PM, PM_{10}, and $PM_{2.5}$ Fugitive Emissions

Fugitive $PM/PM_{10}/PM_{2.5}$ potential emissions were calculated using AP-42 equations for paved roads and aggregate handling and storage piles. Data for raw material moisture content and silt loading was not available for this type of facility, so conservative values were used based on data from iron and steel production (for material moisture content) and ethanol facilities (for silt loading).

Metal HAPs Emissions (HAPs without Permit Limits)

The metal HAPs that could be emitted from the shredding process, but do not have permit emission limits are: antimony, cobalt, and selenium. Permit emission limits for these pollutants are not needed because risk estimates based on the PTE of these pollutants is below risk guidelines.

The limited, controlled PTE for these pollutants is calculated using a "composite MSDS" sheet that was prepared for the 1995 EAW based on the major commodities handled by scrap recyclers (see Attachment 1 for a compilation of this data). The constituents of the scrap were identified by review of analytical data gathered through research on wastes from scrap materials, MSDSs from the manufacturers of the original materials, and process and industrial hygiene references. Where a material content range was found for a given pollutant, the highest number in the range was used in the assessment.

To determine worst case emissions of antimony and cobalt, it was assumed that 100% of the feedstock consisted of the scrap metal with the highest composition of each of the pollutants (e.g. the highest percentage of antimony is found in Aluminum, at 1%, and the highest percentage of cobalt is found in stainless steel, at 12%). The conservative scenario in which 100% of the metal feedstock would consist of either of these scrap metals or either of the other two scrap metals with relatively high percentages of HAP metals (brass and copper) is theoretical only for the purposes of determining that the risk from these feedstocks is below

risk guidelines. If the Permittee had a large portion of any of these metals by themselves, it would be more economical to sell off the homogeneous scrap rather than send it through the shredder.

The worst case shredder output was then multiplied by the product of the particulate matter rate of 4.2 lb/hr (which was the proposed permit limit at the time of the calculations) and a conservative estimate of the portion particulate emissions that are metallic (the metallic portion is calculated from stack test data, with a safety factor of 2 applied). By multiplying by the permit limit, rather than the tested rate of 1.32 lb/hr, the calculations take into account the possibility of a higher hourly emission rate based on shredding more than 100 tons/hr.

Selenium is not expected to constitute more than incidental amounts in any of the scrap metals analyzed, and therefore the PTE of this compound could not be calculated according to the same methods as antimony and cobalt. Instead, the highest stack test run was multiplied by a factor of 3.2. The scaling factor represents the ratio of the particulate emission rate (4.2 lb/hr) to the actual stack test results (1.32 lb/hr).

Uncontrolled PTE for these pollutants was back calculated from the controlled, limited PTE using pollution control efficiency.

Metal HAPs Emissions (HAPs with Permit Limits)

The permit contains limits for arsenic, beryllium, cadmium, hexavalent chromium, lead, manganese, mercury, nickel. With the exception of hexavalent chromium and mercury, the controlled, unlimited PTE of these metals were calculated in the same manner as antimony and cobalt, as described above, but using the respective worst-case percent compositions for each pollutant. The limited and controlled PTE of all of these metal HAPs, however, is based on the permit limits.

Hexavalent Chromium was calculated from chromium PTE. The chromium PTE was calculated according to the same material balance-based method. Hexavalent and total chromium were both measured in the stack test analyses. The ratio of hexavalent chromium to total chromium of 3.21% was applied to the total chromium PTE to determine the hexavalent chromium PTE.

The limits for metals in the original permit were determined by multiplying the original particulate limit (0.43 lb/hr) by their assumed respective weighted average composition percentages from the composite MSDS. With this permit action, the approach was altered to take into account data obtained from performance testing that was not available at the time of the original risk assessment. The performance tests from the facility show that only a small percentage of the particulate emissions were metallic particulate emissions (5%). The new limits, also more accurately represent the possible maximum percentage of a metal HAP in

given metal feedstock because rather than using the weighted average composition percentages, the calculations use the highest percentage in any of the scrap metals.

Uncontrolled PTE for these pollutants was back calculated from the controlled, limited PTE using pollution control efficiency.

PCB and Dioxin/Furan Emissions

Limited and controlled PTE of PCBs and Dioxin/Furans were calculated based on stack test results. However, not all PCBs and Dioxin/Furans were detected during the performance test. To produce a calculation of PCB and Dioxin/Furan for determining possible health effects, MPCA staff used the average instrument detection limit for the pollutants that were not detected.

The performance test results were used to calculate the combined TCDD toxic equivalents of PCBs and Dioxins/Furans by summing the TCDD toxic equivalents calculated for PCBs and Dioxins/Furans. The TCDD toxic equivalents were calculated conservatively using the highest stack test run for each compound, or if the compound was not detected, the average instrument detection limit was used. The combined TCDD toxic equivalents was multiplied by a scaling factor of 1.6 . The scaling factor represents the potential 60 percent increase in processed shredder residue from shredding of processed automobiles. The facility residue is likely to contain plastics. The formation of dioxin/furan is a complex process known to occur when chlorine containing materials, like plastics, paper, etc. are heated and catalyzed by metals. This potential increase in non-metallic residue, due to lifting the auto hulk restriction and its possible affect on Dioxin/Furan/PCB emissions is addressed by applying this scaling factor to the performance test results.

It should be noted that the facility tests the shredder fluff quarterly for the presence of PCBs and Dioxin/Furans and has not detected the pollutants in its testing to date. Additionally, the facility has stated that they do not believe that the conditions in the shredder are appropriate for the formation of PCBs and Dioxin/Furans.

Insignificant Activity Emissions

The unlimited, uncontrolled PTE from insignificant activities is calculated based on AP-42 emission factors for the fuel(s) used and the maximum rated capacity of the combustion equipment.

The boiler, hot water heaters, evaporators, space heaters and rooftop heaters burn natural gas, so emission factors for natural gas combustion from AP-42, 5^{th} Ed., Tables 1.4-1 – 1.4-4 were used.

The evaporators evaporate the wastewater from the two venturi scrubbers. The evaporators include oil/water separators to remove any oily waste prior to evaporation. Solid products settle out and are collected in the bottom of the evaporators, removed, tested, and sent to an appropriate offsite treatment or disposal facility. The majority of the HAPs generated by the shredding process are particulate metal HAPs. These HAPs are not water soluble, and would settle out if they were in water. Thus, it is not expected that any metal HAP would be emitted from the evaporators other than that produced from the combustion of natural gas. Additionally, the type of mercury most likely to be present in the mercury exhaust is elemental mercury (as mercury switches are manufactured using elemental mercury). Elemental mercury is also not soluble in water and, therefore, is unlikely to be emitted when the scrubber water is evaporated; therefore, it is appropriate to evaluate only combustion pollutants when quantifying the emissions from the two evaporators.

For the oil-fired heaters, PTE was calculated using worst case emissions factors for space heaters combusting waste oil from AP-42, 5th Ed., Tables 1.11-1 – 1.11-5. To calculate GHG emissions from the oil-fired heaters, emission factors for methane and nitrous oxide from fuel oil combustion were used because there are no emissions factors for these two compounds in AP-42 for waste oil combustion.

It should be noted that the potential emissions from the insignificant activities did not affect the risk characterization of the facility. The MPCA confirmed that the risks from PTE from insignificant activities were below the risk driver levels even when considered together.

3.8 Periodic Monitoring

In accordance with the Clean Air Act, it is the responsibility of the owner or operator of a facility to have sufficient knowledge of the facility to certify that the facility is in compliance with all applicable requirements.

In evaluating the monitoring included in the permit, the MPCA considers the following:

- The likelihood of violating the applicable requirements;
- Whether add-on controls are necessary to meet the emission limits;
- The variability of emissions over time;
- The type of monitoring, process, maintenance, or control equipment data already available for the emission unit;
- The technical and economic feasibility of possible periodic monitoring methods; and
- The kind of monitoring found on similar units elsewhere.

The table below summarizes the periodic monitoring requirements for those emission units for which the monitoring required by the applicable requirement is nonexistent or inadequate

Table 10. Periodic Monitoring

Level*	Requirement (rule basis)	Additional Monitoring	Discussion
EU 001 (the shredder)	Shredder output ≤ 377,800 tons/yr Shredder Output ≤ 2,400 tons/day (Minn. R. ch. 4410, findings of 1995 and 2011 EAWs)	Daily records, monthly records, 12-mo. rolling sum calculations	On a daily basis, the Permittee will record the shredder output. By the 15th of the month, the Permittee will calculate the 12-month rolling sum shredder output. The daily limit on shredder output provides a reasonable assurance that short term emissions will not exceed the emission rates used in the NAAQS modeling.

Level*	Requirement (rule basis)	Additional Monitoring	Discussion
SV 001 (combined shredder and cascade cleaning system stack)	PM ≤ 1.83 lb/hr PM_{10} ≤ 1.83 lb/hr $PM_{2.5}$ ≤ 1.83 lb/hr Hg ≤ 3.0 lb/yr Pb ≤ 15.1 lb/yr As ≤ 2.42 lb/yr Be ≤ 7.56 lb/yr Cd ≤ 4.91 lb/yr Cr^{6+} ≤ 1.40 lb/yr Ni ≤ 60.4 lb/yr Mn ≤ 33.2 lb/yr (Minn. R. ch. 4410, findings of 2011 EAW) PM ≤ 0.30 gr/DSCF Opacity ≤ 20% (Minn. R. 7011.0715)	1) Performance testing for PM, PM_{10}, $PM_{2.5}$, Hg, & Opacity; 2) Feedstock control plan monitoring, recordkeeping and reporting; 3) Shredder output daily records, 12-mo. rolling sum calculations; and 4) Control equip. monitoring, recordkeeping, and reporting;	1) The Permittee shall conduct performance testing on a periodic basis to ensure compliance with the PM, PM_{10}, $PM_{2.5}$, Hg, & Opacity limits. 2) On a daily basis the Permittee will follow the requirements of the feedstock control plan to ensure that unwanted materials do not enter the feedstock. 3) On a daily basis the Permittee will record the shredder output, and on a monthly basis calculates the 12-month rolling sum material shredder output to ensure that the facility operates beneath the shredder output limits. Metals limits are set assuming maximum shredder output of a single metal that contains the greatest percentage of the given pollutant. Although neither of this scenarios are likely, by monitoring the shredder output there is a reasonable assurance of compliance with the metals limits. 4) The control equipment controls all of the pollutants for which the facility has limits. Although the limits were not calculated assuming a specific control efficiency, the proper operation of the control equipment ensures that the process is well-controlled and that there is a reasonable assurance that the permit limits will be met.
CE 001 (high efficiency cyclone)	1.0 ≤ ΔP ≤ 11.0 in. H_2O Control efficiencies: PM ≥ 90% PM_{10} ≥ 78% $PM_{2.5}$ ≥ 78% HAP-metal ≥ 78%	Pressure drop monitoring, Recordkeeping, O & M, inspections, corrective actions	Monitoring based on the Minnesota Performance Standard for Control Equipment is adequate to have a reasonable assurance of compliance.

Level*	Requirement (rule basis)	Additional Monitoring	Discussion
CE 004 & CE 005 (venturi scrubbers)	4.0 ≤ ΔP ≤ 9.0 in. H_2O 7.0 ≤ liq. Level ≤ 7.5 gauge Control efficiencies: PM ≥ 90% PM_{10} ≥ 78% $PM_{2.5}$ ≥ 78% HAP-metal ≥ 78%	Pressure drop monitoring, scrubber liquid level monitoring, Recordkeeping, O & M, inspections, corrective actions	Monitoring based on the Minnesota Performance Standard for Control Equipment is adequate to have a reasonable assurance of compliance.
CE 006 & CE 007 (fabric filters)	1.8 ≤ ΔP ≤ 8.0 in. H_2O Control efficiencies: PM ≥ 90% PM_{10} ≥ 78% $PM_{2.5}$ ≥ 78% HAP-metal ≥ 78%	Pressure drop monitoring, Recordkeeping, O & M, inspections, corrective actions	Monitoring based on the Minnesota Performance Standard for Control Equipment is adequate to have a reasonable assurance of compliance.
FS 002 (paved roads)	Preventing particulate matter from becoming airborne (Minn. R. 7011.0150)	Recordkeeping, corrective actions	The Permittee shall maintain daily records of road cleaning, or, if the roads are not cleaned, the Permittee shall maintain a record of the reason the road could not be cleaned (e.g. ice covered or > 0.1 inch/day of rain).
FS 001 & 003	Preventing particulate matter from becoming airborne (Minn. R. 7011.0150)	Fugitive dust control plan	Monitoring described in an MPCA-approved fugitive dust control plan is considered adequate to provide a reasonable assurance of compliance. A fugitive dust control plan prepared by the Permittee, and approved by the MPCA is a common way to incorporate fugitive control measures, monitoring, and recordkeeping into a permit. This approach is consistent with how the MPCA addresses fugitive control at many other facilities, including facilities with much greater fugitive emissions.

*Where the requirement appears in the permit (e.g., EU, SV, GP, etc.).

3.9 Insignificant Activities

Northern Metals has several operations which are classified as insignificant activities. These are listed in Appendix A to the permit.

The permit is required to include periodic monitoring for all emissions units, including insignificant activities, per EPA guidance. The insignificant activities at this facility are only subject to general applicable requirements. Using the criteria outlined earlier in this TSD, the following table documents why no additional periodic monitoring is necessary for the current insignificant activities. See Attachment 1 of this TSD for PTE information for the insignificant activities.

Table 11. Insignificant Activities

Insignificant Activity	General Applicable Emission limit	Discussion
Brazing, soldering or welding equipment (Minn. R. 7007.1300 subp. 3(H)(3))	PM, variable depending on airflow Opacity $\leq$ 20% (Minn. R. 7011.0710/715)	Northern Metals has welding equipment used for maintenance. For these units, based on EPA published emissions factors, it is highly unlikely that they could violate the applicable requirement. In addition, these units are typically operated and vented inside a building, so testing for PM or opacity is not feasible.
Individual units with PTE less than 1) 2000 lb/yr PM, PM_{10}, $PM_{2.5}$, NO_x, VOC, and ozone and 2) 4000 lb/yr CO, and 3) 1000 tpy of CO_2e (Minn. R. 7007.1300 subp. 3(I))	PM, variable depending on airflow Opacity $\leq$ 20% (with exceptions) (Minn. R. 7011.0715 and Minn. R. 7011.610) or $SO_2 \leq$ 0.5 lb/MMBtu Opacity $\leq$ 20% (Minn. R. 7011.2300)	Northern Metals has: • 384,000 Btu/hr natural gas fired boiler • Five 64,000 Btu/hr natural gas fired rooftop heaters • Four 173,250Btu/hr natural gas fired space heaters • 750,000 Btu/hr and 395,000 Btu/hr evaporators • CO_2 gas used in welding, 176 CF tanks containing 75% argon/ 25% CO_2 For the combustion units, based on the fuels used and EPA published emissions factors, it is highly unlikely that they could violate the applicable requirement. In addition, all of these units are operated and vented inside a building, so testing for PM or opacity is not feasible. The CO_2 gas from the welding is not expected to generate particulate matter.

Insignificant Activity	General Applicable Emission limit	Discussion
Fugitive Emissions from unpaved roads and parking lots (Minn. R. 7007.1300, subp. 3(J))	Requirement to take reasonable measures to prevent PM from becoming airborne (Minn. R. 7011.0150)	Nearly all surfaces are currently paved, but the facility has a small unpaved area behind the North Warehouse. The draft/proposed permit does contain a general requirement that this standard must be met. It is unlikely that any additional unpaved surfaces will be added in the future.

3.10 Permit Organization

In general, the permit meets the MPCA Delta Guidance for ordering and grouping of requirements. One area where this permit deviates slightly from Delta guidance is in the use of appendices. While appendices are fully enforceable parts of the permit, in general, any requirement that the MPCA thinks should be tracked (e.g., limits, submittals, etc.), should be in Table A or B. The main reason is that the appendices are word processing sections and are not part of the tracking system. Violation of the appendices can be enforced, but the computer system will not automatically generate the necessary enforcement notices or documents. Staff must generate these.

3.5 Comments Received

Public Notice Period: November 17, 2011 – December 16, 2011; January 13, 2012 – February 21, 2012
EPA 30-day Review Period: November 17, 2011 – December 16, 2011
The changes made to the permit since the end of the public notice periods have made the limits in the permit more stringent. Therefore, the MPCA did not re-notice the draft air permit.

The MPCA received several comments during the public notice periods. Those comments and the MPCA's response to comments are attached to the TSD in Attachment 7 and 8 respectively.

4. Permit Fee Assessment

Attachment 5 to this TSD contains the MPCA's assessment of Application and Additional Points used to determine the permit application fee for this permit action as required by Minn. R. 7002.0019. The permit action includes a permit application for a major amendment received after the effective date of the rule (July 1, 2009). The permit action also includes an AERA, air dispersion modeling, and an EAW. Only the AERA is assessed additional points under Minn. R. 7002.0019 subp. 2. The EAW is not assessed additional points because it is a discretionary EAW, and the air dispersion analysis is not assessed additional points because it is part of an AERA, and the AERA additional points account for the air dispersion modeling review.

5. Conclusion

Based on the information provided by Northern Metals, the MPCA has reasonable assurance that the proposed operation of the emission facility, as described in the Air Emission Permit No. 05300480-003 and this TSD, will not cause or contribute to a violation of applicable federal regulations and Minnesota Rules.

Staff Members on Permit Team: Kelsey Suddard (permit writer/engineer)
Brent Rohne (enforcement)
Curt Stock (stack testing)
Steve Gorg (peer review)
Heather Magee-Hill (risk assessment)
Melissa Sheffer (modeling)
Bill Lynott (environmental review)

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Attachments:
1. Calculation Spreadsheets
2. AERA Impact Statement
3. MPCA Risk Manager's Form
4. CD-01 Forms
5. Fee Points Calculator
6. Public Comments (not included in this draft)
7. Response to Comments (not included in this draft)